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THE ROLE OF SOVEREIGN WEALTH FUNDS IN THE GLOBAL CAPITAL MARKETS

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ABSTRACT

This thesis examines the topic of sovereign wealth fund (SWF) sustainability and its relationship with a country's strategic resources. When the relevant literature on SWFs is reviewed, it is found that these topics are seldom examined. There are studies that focus on the financial performance of SWFs, but the sustainability of SWFs did not attract enough attention in the academic and business circles. This thesis fills this conceptual gap by developing measures of SWF sustainability and country-level strategic resources and then connecting them in a novel conceptual model of SWF sustainability. Towards this aim, three sustainability measures are identified. These measures are investments in alternative asset classes, the employment of external fund managers, and spending on social and environmental projects and causes. When these measures are reviewed through different theories, it is found that the resource-based theory can justify the employment of external fund managers, while the natural resource-based theory justifies the spending on social and environmental projects and causes, and the portfolio diversification theory can be used to justify the investments in alternative asset classes. The resource-based theory is also used in establishing the new conceptual model of SWF sustainability. This theory argues that the resources and capabilities that companies possess matter for their competitive advantage and sustainability. However, this theory does not take country-level factors into account. In this context, the thesis extends the resource-based theory to the SWFs domain and incorporate the country-level strategic resources into the new model. So, this model of SWF sustainability postulates that countries' strategic resources would positively affect their SWFs' sustainability.

To test the relevant research hypotheses of the SWF sustainability model, the thesis uses firm-level data from 56 SWFs, covering the period of 2007-2017. There are four independent variables (i.e., the human development index, the innovation index, the reputation index, and FDI inflows) representing the country-level strategic resources and three dependent variables (i.e., the dummy for alternative asset classes, the dummy for employing external fund managers, and the dummy for social and environmental expenditures). The relationships between these dependent and independent variables are examined quantitatively using descriptive statistics, pairwise correlations, scatter plots, t-tests, and finally logistic and ordered logistic regressions. The results from different quantitative methods usually support each other. Overall, these quantitative results show that there is strong empirical support for the first two dimensions of SWF sustainability, which are investing in alternative asset classes and employing external fund managers. However, empirical evidence for the third SWFs dimension is relatively weak.

DECLARATION

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

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LIST OF ABBREVIATIONS

ADIA: Abu Dhabi Investment Authority

AUM: Assets Under Management

BpiFrance: Banque Publique d'Investissement

CALSTRS: California State Teachers' Retirement Fund

CSR: Corporate Social Responsibility

CIC: China Investment Corporation

ESG: Environmental, Social and Governance

FDI: Foreign Direct Investment

GFC: Global Financial Crisis

GIC: Government of Singapore Investment Corporation

IMF: International Monetary Fund

ISIF: Ireland Strategic Investment Fund

KIA: Kuwait Investment Authority

KIC: Korea Investment Corporation

MDB: Malaysia Development Berhad Scandal

NRBT: Natural Resource-based Theory

NSIA: Nigeria Sovereign Investment Authority

NPFR: National Pension Reserve Fund

QIA: Qatar Investment Authority

RBV: Resource- based View

REIT: Real Estate Investment Trust

RSF: Russia Reserve Fund

SWF(s): Sovereign Wealth Fund(s)

UNEP FI: The United Nations Environment Programme - Finance Initiative

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Chapter 1: Introduction

1.1. Motivations for the Research

Sovereign Wealth Funds (SWFs) have gradually obtained their important position in the global capital markets over the last few decades, particularly during the global financial crises (GFC). On a global scale, the assets under management (AUM) of the sector is $8.1 trillion, which is larger than the asset sizes of both hedge funds and private equity combined (Aguilera et al., 2016; Kotter & Lel, 2008, Sovereign Wealth Fund Institute, 2020). Managing their nation's wealth efficiently in dynamic global markets is similar to managing any revenue in general; however, for some countries, there are more important challenges to address (Eifert et al., 2002). Some of these issues include the assets to be saved for future generations, the achievement of economic stability in the face of uncertain and widely volatile revenues, and the way to ensure that spending is of high quality.

A relatively reliable mechanism for the accumulation in government's revenues is the employment of SWF's as an effective tool of fiscal policy. SWFs are not only investment vehicles of the governments, but they also make an excellent opportunity for countries with high revenues to ensure steady cash flow levels and provide resources for long-term investment (Bernstein et al., 2013). Additional revenues can be accumulated in a fund to smooth the fiscal cash flows and to make investments in long-term projects. Although SWFs are not a new phenomenon in the global markets, with the first SWF being created six decades ago, they have become a matter of concern and gained greater public attention since 2007-2008 (i.e., the GFC period) (Truman, 2007; Gilson & Milhaupt, 2009). This attention is due to the excessive increase in the asset sizes of some funds that were established after 2000 (Bremmer, 2009). As of early 2020, more than 60 governments globally possessed 91 funds (Sovereign Wealth Fund Institute, 2020). Their regional expansion has been matched by explosive growth in the total value of AUM, leading them to be a core player in the global capital markets (Jonson, 2007; Backer, 2010). The total AUM of these 91 SWFs is more than $8.1 trillion. The largest SWF is the Norway Government Pension Fund Global, which has assets of close to $1.2 trillion. This SWF holds around 1.5% of the global public equity.

The size and sheer growth of SWFs in recent years suggest that SWFs have been achieving a continuously growing pool of their nations' wealth (Ang, 2010). Governments, which have different objectives about their funds and varying roles in their managements, control much of

these funds directly or indirectly (Kalyuzhnova, 2011). Basically, most of their investment operations are being build-up cross border in financial assets (i.e. public equity and fixed income securities) (Kern, 2007) or in alternative investments (i.e. private equity, real estate and infrastructure) (Jen, 2009). As traditional investors, SWFs try to maximise the long-term returns and achieve financial efficiency, similar to other institutional investors (Wilson et al., 2010) such as pension funds. However, they may also confront an increasing degree of government political pressure to pursue social agendas; managing the nation's wealth sustainably between generations, especially during stressful times. As legal entities, SWFs have the fiduciary duty to act in the best long-term interest of their beneficiaries (current and future generations) (Lydenberg, 2014). This research considers the opportunity for SWFs to manage their dual commitment (financial efficiency and political effectiveness) in a manner that contributes to sustainability.

In this context, the integration of certain non-financial concerns - environmental, social and governance (ESG) criteria - in the strictly financial driven investment decision-making process to create long-term value is known as sustainable investments, and it is becoming a central part of investment strategies in many SWFs. In recent years**,** growing responsiveness has been paid to sustainable investment (Urwin, 2010) in the business world as a response to ESG challenges along sides the financial aspects. The financial crises triggered the global economic system to cause widespread social and environmental consequences, which requires sophisticated levels of government intervention and business strategies. This crisis has raised concerns about the financial institutions' risk omission, ethical behaviour, accountability, and the ability to manage a broad array of beneficiaries. Thus, the financial crises led to increasing attention on how institutions address their responsibilities towards societies, and this resulted in institutions focusing on the integration of the ESG aspects.

Institutional investors have recently demonstrated a growing interest in considering non-financial factors (such as ESG criteria) in their investment process (Sandberg et al., 2009). Supporters claim that this practice (integrating ESG criteria) has many advantages not only for SWFs but also for their home countries (Hoepner, 2010). Their main argument is that SWFs with their enormous investor power and legitimacy have the ability to make efficient use of resources, achieve the fund objectives and fulfil their commitment to beneficiaries, become more accountable, gain respect and trust of beneficiaries, and gain an advantage in the competition for increasingly scarce resources to which their internationally diversified

portfolios are exposed. Consequently, these advantages could allow global economies to flourish, which lead to long-term sustainability for SWFs.

In 2005, the United Nations Environmental Programme - Finance Initiative (UNEP FI) together with Freshfield Bruckhaus Deringer published a report titled *'A legal Framework for the Integration of Environmental, Social and Governance Issues into Institutional Investment'* (UNEP FI, 2005). This report has become the most effective document for promoting the integration of ESG criteria into the institutional investment process. The report argued that intuitional investors are legally required to consider an ESG criterion if there is a general agreement among beneficiaries in favour of this criterion, or the criterion believed to bring financial benefits. Institutional investors, such as SWFs, may also voluntarily apply an ESG criterion if there is no direct financial loss, but otherwise, SWFs are legally prohibited from integrating any ESG criteria in their investment process (UNIP FI, 2005). This conclusion has become widely accepted.

Although the analysis of the UNEP FI (2005) report has provided a lot of conceptual clearness, the report did not provide a practical development as it left many practical uncertainties unsolved (Sandberg, 2011; Urwin & Woods, 2010; Richardson, 2007). In addition, Sandberg (2011) argues that this report does not sound optimistic, as it does not clarify what type of ESG considerations can be formed. Notably, the greatest number of institutional investors ignore ESG consideration. In the context of the 2008 global financial crises and the predicted natural resource crises, it seemed possible that many fiduciaries would look for new approaches to allocate their assets besides the need for a long- term approach (Urwin, 2010). Thus, in 2009, UNEP FI (2009) produced a sequel report termed "Fiduciary II", which provides a legal roadmap for fiduciaries looking for concrete steps to operationalise their commitment to sustainable investments.

The sustainable investment can also be examined within the context of the Corporate Social Responsibility (CSR) or responsible investment literature (see chapter 3 for more details). CSR is the incorporation of Environmental, Social and Governance (ESG) consideration into the institutional investors and decision- making process. The term CSR is often used interchangeably with ESG (Liang and Reeneboog, 2020). CSR/ESG may be defined, consistent with (McWilliams and Siegel, 2001), as activities that seem to advance the promotion of social and environmental issues beyond the best interest of shareholders and legal

obligation. That is, ESG issues and CSR activities work with respect with environmental or social responsiveness in order to create the perception of sustainability investment.

In addition to the rising importance of socially and environmentally responsible investments by SWFs, the sector has been experiencing some transformations on the asset strategies dimension as well. In the early periods, the majority of SWFs portfolios were invested in the traditional asset classes, like government bonds and public equities of some leading advanced countries like the US, the UK, and the EU. However, the globalisation process and the strong flows of financial assets increased the correlations of leading financial markets significantly. In this context, the diversification benefits of the traditional asset classes decreased, and the SWFs portfolios became more exposed to market and sector risks. In order to overcome such risks and to diversify their portfolios further, the SWFs started moving beyond the traditional asset classes and invest in alternative assets classes. Some of these alternative assets are private equity, commodities, venture capital, mutual and hedge funds, and real estate assets, as well as assets in different geographies like emerging markets. Therefore, one can consider the movement towards alternative asset classes as another sustainability measure for SWFs, in addition to their socially and environmentally responsible investments and expenditures.

However, as SWFs expand into alternative asset classes, they might face some managerial constraints. Some of the alternative asset classes require specific expertise and skills and accumulating these factors for a wide variety of asset classes and geographies within a single SWF could be quite difficult and costly. In other words, while portfolio diversification can work to increased SWF sustainability, if SWFs try to diversify their managerial focus on very different asset classes and geographies, they would face some inefficiencies in management. So, keeping management specialisation could be considered as an important strategy for the competitive advantage of SWFs. Then, SWFs can overcome this managerial constraint of focusing on different asset classes and geographies by hiring external fund managers. It can be argued that external managers would bring unique and valuable resources and capabilities to the SWFs, especially in their management of alternative asset classes and new markets. These external managers have expertise in certain assets and countries, and in that sense, they can outperform international investors with limited managerial specialisation. Therefore, the employment of external fund managers emerges as another crucial sustainability dimension for SWFs. Overall, these discussions show that SWFs can improve their

sustainability in different dimensions, including the ESG expenditures, investing in alternative asset classes, and the employment of external managers. Therefore, these developments in the SWFs domain provide strong motivations for the research question on how country strategic resources affect SWF sustainability in these three dimensions.

1.2. Intended Contributions

The above discussions show that SWFs have increasing weight in the global capital markets. These organisations have a strong responsibility to their countries and citizens, and they need to take the interest of both current and future generations into account. In that sense, SWFs face different constraints than mutual funds or hedge funds, which usually focus on short-term profits. Then, in contrast to the usual financial performance measures of the mutual and hedge funds, SWFs should be assessed in different dimensions as well. This argument and its theoretical and empirical underpinnings are among the important contributions of the present thesis. Namely, this research argues that as fiduciary organisations responsible for both current and future generations, the performance of SWFs should not only rely on financial measures. Based on this need for other measures of SWFs performance, the study argues that "SWF sustainability" is an important concept to focus on. This concept is explained by the contribution of three components. Based on the natural-resource-based theory (Hart, 1995; Hart & Dowell, 2011), one dimension of sustainability is socially and environmentally responsible investments and expenditures. In this way, SWFs can contribute to the long-term welfare of society and the environment and fulfil their responsibility for future generations. As another sustainability measure, SWFs need to diversify their assets beyond the traditional asset classes of government bonds and public equities in order to reduce the risk exposure of their portfolios and to provide better returns to their countries. This sustainability measure can also be justified by using the portfolio diversification literature, which displays the benefits of diversifying portfolios and investments.

Lastly, the present thesis emphasises the importance of employing external managers to be able to manage their diversified portfolios more efficiently. In addition, the use of external managers can provide some shields against domestic political pressures as well as political legitimacy concerns in the process of investing in foreign markets. The delegation of some investment decisions to the external fund managers would imply that domestic politicians would have limited space to intervene in the workings and investment strategies of SWFs. In

addition, SWFs, as being publicly funded financial organisations, can face some legitimacy concerns in their investments to foreign countries These countries can think that SWFs are behaving according to the political interests of their home countries and trying to capture strategic assets and resources in their host countries. So, if SWFs manage their portfolios in foreign countries by delegation such investments to the domestic fund managers in these countries, they would be able to lessen the relevant legitimacy concerns. The natural-resource-based theory can also be used to justify the hiring of external managers as they bring unique, complex, inimitable, and valuable resources and capabilities to companies.

Overall, the identification of these three measures as essential components of SWF sustainability is an important conceptual contribution of the present thesis. In addition to identifying these sustainability factors, another contribution of the current research is to offer strong theoretical justification for these factors. In this process, the resources approach to business making is extended to the SWFs domain. This extension happens in two dimensions. Firstly, the resource-based theory is used to justify the employment of external fund managers by SWFs and the natural-resource-based theory is used to justify investments and expenditures in the social and environmental causes. In addition to this first level theoretical explanations, the thesis argues some strategic resources (both tangible and intangible resources) of countries matter also for the sustainability of SWFs. Namely, the resource-based theory can be extended to the domain of SWFs in order to document different country characteristics as valuable resources for SWFs. So, this second level theoretical explanation provides a broader perspective on the factors affecting the competitive advantage and sustainability of SWFs. Overall, this thesis provides valuable extensions of the resource- based theory to the domain of SWFs in two levels, with the second- level being a very new and innovative contribution to the literature. Therefore, the current research makes important theoretical contributions to the literature by extending resources- based theory to the domain of SWFs in various domains.

In addition to the conceptual (i.e., new measures of “SWF sustainability”) and theoretical (i.e., the extension of resources approach to the domain of SWFs), the present thesis also makes important empirical contributions to the literature by presenting detailed research evidence on the relationship between country strategies resources and SWF sustainability. Towards this purpose, the empirical sections of the thesis collect detailed data on 56 leading SWFs for the period of 2007-2017. Then, consistent with the extension of resources theories to the SWFs domain, the study constructs three different measures of SWF sustainability.

Specifically, the study collects information on whether SWFs employ external fund managers, whether they invest in alternative asset classes, and whether they spend on social and environmental responsibility expenditures and investments. Such a comprehensive classification of 56 SWFs in these sustainability dimensions is a unique research effort in the literature, and it provides a comprehensive picture regarding SWF sustainability. In addition, the empirical analysis connects the strategic resources of home countries to the SWF sustainability dimensions using logistic regression estimations. In this way, the validity of the conceptual and theoretical model developed in the following three chapters are assessed, and the relevant research hypotheses are tested using the sample of SWFs. Hence, the thesis supports the development of the conceptual model with its testing based on empirical analysis. In other words, a detailed theoretical model is first constructed and then tested using empirical evidence.

In sum, the current thesis intends to make important contributions to the SWFs literature both in conceptual/theoretical and empirical dimensions. On the conceptual dimension, the resource-based theories are extended to the domain of SWFs, while on the empirical dimension, the developed model is tested using a detailed data set of SWFs. At this stage, it is not argued that the present study fully covers the relevant topics and answers all related questions. In contrast, these efforts should be taken as the initial conceptual and empirical incursions into the topic of SWF sustainability. It is possible to improve both conceptual and empirical dimensions. For example, one can examine the interdependencies between two or three sustainability measures, like investing in alternative asset classes and employing external fund managers. In fact, investment diversification necessitates the employment of external fund managers, so these two sustainability measures are very closely associated. Hence, the SWF sustainability concept and its theoretical model can be improved on different dimensions. Similarly, the empirical analysis constructs dummy variables for the dependent variables and uses four proxies regarding the strategic resources of the home countries. Then, the relevant sustainability measures can be improved by estimating them in a more continuous way. In addition, the choice of independent variable proxies (i.e., the natural logarithm of FDI flows, the human development index, innovation index, and reputations index) can be revised or complemented. Overall, the present thesis aims to construct a strong foundation regarding the concept of SWF sustainability and its empirical relations to the strategic resources of the home countries.

1.3. Research Questions, Aims, and Objectives

There are many reasons for shaping the need to understand SWFs' patterns and behaviours that are theoretically critical. First, SWFs have become key players in the global capital markets (see Figure 1), collectively managing more than $8 trillion as of early 2020 and exceeding the total assets of hedge funds and private equity combined (Aguilera et al., 2016). Hence, SWFs are evidently promoting today's global capital markets, and their size and importance can be expected to rise further in the coming years (Kern, 2007; Balding, 2012; Preqin, 2018). Secondly, during the global financial crises in 2008, these investment institutions played a remarkable role by re-funding most of the Western financial systems and minimised the financial gap that most of the intuitional investors could not fill (Jen, 2009; Drezner, 2008). Thirdly, as global long-term investors with a pool of capital, they can manage more complex asset classes such as private equity and infrastructure (Bernstein et al., 2013; Bortolotti et al., 2015). Fourthly, their investment trends are geared toward different regions, investing in both the advanced industrialised world and non-OECD countries (Fernandes, 2014; Beck & Fidora, 2008). Finally, some SWFs are leading the economic revolution of their national economies as development funds (Al-Hassan et al., 2013; Balding, 2012) that often pursue social and development objectives similar to mutual banks (Wilson et al., 2010).

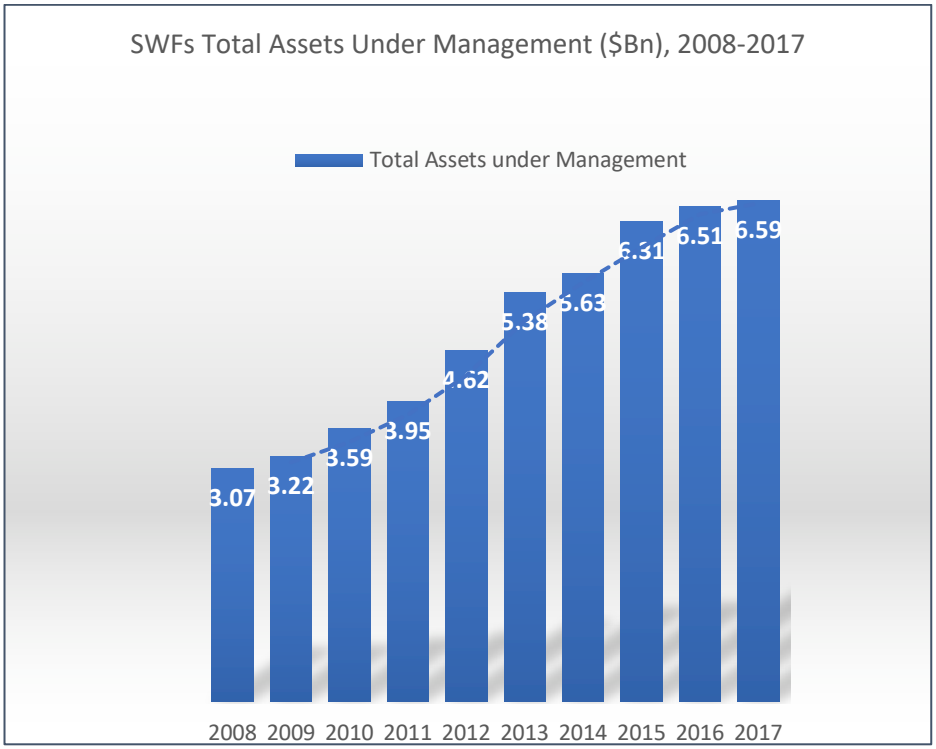


FIGURE 1: AGGREGATE SWFS ASSET UNDER MANAGEMENT, 2008-2017

Source: Author's calculations, Preqin (2018).

Little attention has been paid to understanding why or why not SWFs as institutional investors act in sustainable ways. The literature on sustainability is still limited; much of the literature on sustainability has been more descriptive more than factual in tone. Most of the theoretically oriented research on this subject focused on investigating the relationship between sustainable investment and corporate financial performance (López et al., 2007; Lenssen et al., 2005). Criticism could be drawn from this literature for ignoring factors other than the corporate financial performance that might affect sustainability. Hence, as a call for a more serious theoretical inquiry into this matter, much more attention is needed to the institutional-level factors that may influence whether SWFs act in sustainable ways or not. This research helps to fill this theoretical void by exploring a broad set of institutional conditions under which sustainable investment behaviour is likely to occur. These broad set of institutional conditions under which sustainable investment behaviour is likely to occur may be understood by asking the following research questions:

Research Questions:

Question 1: *What are the key factors that may affect SWF sustainability?*

It is important to understand the emergence of SWFs within the context of the latest global financial developments. Therefore, it would be valuable to study SWFs at the institutional level of analysis in terms of their investment strategies and governance traits. In this context, some relevant questions become, from an institutional behaviour perspective, whether these funds behave as enablers for the fulfilment of the funds' objectives or whether their behaviours are constrained by internal political pressure.

Regarding this first research question on the factors of SWF sustainability, the present thesis conducts a very detailed review of the theoretical models and empirical research findings. So, the relevant conceptual analysis which answers the first research question can be considered as making important conceptual contributions to the SWFs literature. The relevant analysis indicates that three factors stand out as the core components of sustainability in the domain of SWFs. These factors are the investments and expenditures on socially and environmentally responsible projects and causes, the diversification of assets beyond traditional assets classes and towards alternative asset classes, and the employment of external fund managers (especially in line with the efficient management of the alternative asset classes and new geographies). The current research justifies these factors as important components of

SWF sustainability by conducting detailed conceptual discussions and review of the relevant empirical evidence. Then, it combines them under a new conceptual model, mostly based on the resource-based theory. In this way, an important conceptual contribution is made to the SWFs literature.

Question 2: *Which factors mediate and facilitate SWF sustainability?*

After the answers to the first research question document three core components of sustainability in the domain of SWFs, this research question asks what factor would mediate or facilitate SWF sustainability. Namely, this research question is interested in the internal and external factors of SWFs that can have an impact on one or more of the SWF sustainability components. At this point, it should be acknowledged that the list of possible factors affecting sustainability could be quite broad and include many items. This point can be seen by examining one of the SWF sustainability dimensions, namely, investments and expenditures on socially and environmentally responsible projects and causes. The company have a stakeholder perspective and can internalise corporate social responsibility (CSR) activities into its management strategy. Then, such responsible investing and expenditures can arise endogenously in the process of business operations. In addition, the company can have a shareholder theory perspective and focus on such investments and projects as a tool of greenwashing or promoting the brand image. Or as another possibility, there can be some regulatory requirements (such as environmental project requirements on energy and mining companies) and firms can conduct CSR as a regulatory requirement, but not as a voluntary business strategy.

The above example displays that the list of factors affecting the SWF sustainability components can be very large. So, it is not feasible to review such a large list and document their effects on sustainability. In addition, there is already a very large literature (as discussed in the third chapter) that examines the determinants and consequences of CSR activities by businesses. Therefore, going over the same set of factors would not produce much value-added other than examining them in the domain of SWFs. Instead, the present thesis focuses on a unique set of factors at the national level. Namely, it argues that some country characteristics such as reputation, innovation capacity, human development index, and physical capital attractiveness can be important determinants of SWF sustainability components. This is a unique approach and an important conceptual contribution to the relevant literature because

such country-level characteristics are not consistently examined in terms of their effects on the sustainability, performance, and competitive advantage of the country's private and public organisations, including SWFs. To present the case in more concrete terms, one can think of the resource-based theory and its extension to the CSR domain by the natural-resource based theory (Hart, 1995; Hart & Dowell, 2011). In a seminal study, Hart (1995) acknowledged the importance of the resource-based theory and noted that the resources and capabilities of a firm determine its competitive advantage. However, Hart (1995) also argued that the resource-based theory was missing an important dimension, i.e., the environment. Namely, the author stated that businesses should take the social and environmental constraints into account in their business strategies and devise new strategies, capabilities, and strategic resources to account for this missing dimension. In this context, Hart (1995) proposed new strategies like pollution prevention, product stewardship, and clean technologies. In the same fashion, the present thesis argues that some strategic resources at the country level can also be crucial to determine the competitive advantage and sustainability of SWFs. So, this thesis adds the missing part of country strategic resources into the picture. Therefore, the second research question is answered in the context of country resources that matter for SWF sustainability. In this fashion, the resource-based theory is expanded to the SWFs domain and the country strategic resources are added to the list of resources and capabilities that affect sustainability and competitive advantage of companies. Hence, the present thesis makes another important conceptual contribution to the relevant literature by identifying country-level strategic resources that matter for SWF sustainability. These resources are determined as the tangible resource of FDI inflows to the country and the intangible resources of the human development index, innovation index, and reputation index of the country. The thesis argues that these country-level factors can be important determinants of the SWF sustainability components. Then, this hypothesised relationship between the SWF sustainability components and the country strategic resources are examined empirically in the quantitative chapter. Overall, the second research question is answered at both conceptual and empirical levels.

Based on the above research questions, the aim of the present research can be given as follows: to determine the core sustainability components for SWFs and to document their relationships with the country-level strategic resources. In this context, there are various research objectives. One objective is to show the rising importance of SWFs in the global capital markets. Then, a relevant research objective is to show the need for investigating SWF

sustainability along with its components and country-level determinants. These objectives are mainly addressed in the second chapter. After showing the rising importance of SWFs and the need for examining their sustainability, another research objective becomes documenting the core sustainability components for SWFs. Then, the determination of country-level strategic resources and their effects on the SWF sustainability components emerge as the last two research objectives. These research objectives are addressed by reviewing the relevant theories and constructing a conceptual model connecting them to each other, in addition to the empirical testing of the relationship between the SWF sustainability components and country-level factors.

1.4. Outline of the Thesis

The thesis is structured as follows. The second chapter provides a detailed analysis and literature review of SWFs. Existing research on SWFs remains greatly separated across various disciplines: political economy, finance, international law, and organisational theories. This research addresses the difficulties in defining an SWF, as the second chapter presents the SWFs definitions that are used in the rest of this research and discusses the evolving concepts of SWFs. Since the SWFs sources of funds are an essential requisite for presenting the rationale of establishments, their investment objectives are also covered in the subsections of the second chapter. This chapter also illustrates the development of SWFs in the global capital markets, details the growth in number and size of different SWFs, then assesses the reasons for the growth. This chapter concludes with a brief summary of the key features of SWFs that enable answering the question of whether SWFs as large institutional investors that can create value through their investments in sustainable ways. Since, most of the examples related to more than one SWFs globally, this research would emphasise the contribution of each region under institutional context.

After presenting the prominence of SWFs in the global financial markets, their fiduciary duty, legitimacy, investments structures, and sustainable investment strategies in the second chapter, the third and fourth chapters move to the conceptual analysis and development of a new model for SWF sustainability. The third chapter first reviews the leading corporate governance theories like the agency theory, the shareholder value theory, and the stakeholder theory and their implications for some SWF sustainability components. For example, the agency theory is useful to conceptualise the relationship between the governments and SWFs

or the relationships between the SWFs and the external fund managers within the context of the principal-agent framework. For example, in the relationship between state/government or society and SWFs, the public or state becomes the principal and SWFs become the agent. Then, SWFs would need to focus on maximizing the interests of the society, including both current and future generations. Similarly, the stakeholder theory has important implications for the CSR activities of SWFs. Overall, these discussions imply that general corporate governance theories have some implications for the SWF sustainability components examined in the present thesis. However, they are not fully suitable to be extended to the SWFs domain.

In this context, the third chapter argues that the resources approach (i.e., the resource-based theory and the natural resource-based theory) is more relevant for the topic of SWF sustainability. In this context, both theories are explained in detail. Then, it is shown that the resource-based theory is very relevant for the SWF sustainability dimension of employing external fund managers. Namely, this section of the third chapter argues that external fund managers can bring important capabilities and resources to SWFs like expertise in specific asset classes and certain markets as well as technical skills. In addition to such economic benefits of employing external fund managers, there can be some political benefits. The discussions in the second chapter show that SWFs can face legitimacy concerns and negative public or political perceptions in the host countries. Then, instead of directly investing in such countries, using domestic agents and organisations from these countries as external fund managers can contain such concerns and negative perceptions. So, this section of the third chapter shows that external fund managers bring both economic and political advantages to SWFs. Then, the resource-based theory becomes useful to justify the use of external fund managers as an SWF sustainability component. The third chapter also uses the natural resource-based theory to justify the investments and expenditures on socially and environmentally responsible projects and causes. This theory argues that the resource-based theory should be extended to take social and environmental constraints into account. So, the relevant expenditures of SWFs can be identified as another dimension of SWF sustainability.

The third chapter also justifies the use of investing in alternative asset classes as the third and last SWFs component. Toward this purpose, the portfolio theory is utilised, and the empirical evidence on the benefits of portfolio diversification is reviewed. The relevant findings indicate that the traditional asset classes like government bonds and public equity have become more correlated over time due to the intensification of the globalisation and the rise of

cross-border financial asset flows. So, the diversification capacity within the traditional asset classes declined significantly in the last decades. This point was especially evident during the 2008-2009 global financial crisis. Compared to this portfolio diversification literature, the position of SWFs in the early 2000s was in large contrast. Majority of SWFs' portfolios were invested in few government bonds and stock markets, with very limited diversification in terms of asset classes and geographies. However, SWFs started to diversify their assets and markets in the following years and especially after the global financial crisis. This section of the third chapter argues that SWFs should also diversify into the alternative asset classes and markets. In this way, they would be able to manage their risks more efficiently and provide better returns for their societies. Therefore, this section proposes the diversification of portfolios towards alternative asset classes and markets as the third sustainability component for SWFs. Overall, the third chapter reviews the relevant theoretical approaches to justify the three SWF sustainability components.

After identifying the three components of SWF sustainability, the fourth chapter constructs a new conceptual model of SWF sustainability. In this model, the resource-based theory is extended to the domain of SWFs. The unique contribution of this conceptual model is that it complements the resource-based theory with the country-level strategic resources. This theory mainly focuses on the resources and capabilities that a firm possesses, but it does not focus on the role of macro resources. So, the fourth chapter extends the resource-based theory to include the country-level strategic resources among the factors that determine the competitive advantage and sustainability of companies. This new conceptual model implies that one tangible resource of FDI inflows to a county along with three intangible resources of the human development index (showing the quality of human capital in a country), the innovation index, and the reputation index are important country-level strategic resources, they facilitate the sustainability of SWFs. Then, the later parts of the fourth chapter present the data used in the analysis (three dependent and four independent variables for 56 SWFs covering the period of 2007-2017) and the details of the logistic regression models.

The findings of the quantitative analysis are presented in the fifth chapter. This chapter first presents a descriptive analysis of the dependent and independent variables in terms of summary statistics and histograms. Such descriptive statistics are estimated at the full sample level as well as at the levels of commodity and non-commodity sub-samples. Then, the following sub-section in the fifth chapter presents some findings from bi-variate quantitative

analysis. The relevant methods include pairwise correlations, scatter plots and various t-tests. The analysis is again repeated for the cases of commodity and non-commodity SWFs. Finally, the chapter also conducts detailed logistic regression analyses. After obtaining the detailed empirical evidence, chapter five provides a detailed discussion of them and makes comparisons to the findings in the literature. Next, the conceptual and empirical findings of the thesis are overviewed. In the last chapter of the thesis, the academic and policy implications are discussed along with the research limitation and directions for future research.

Chapter 2: Sovereign Wealth Funds and Sustainability

This chapter defines SWFs and offers detailed background information on their main dimensions (purpose, source of funding and institutional strategies) that can affect the investment strategies, hence, their sustainability. Next sub-section 2.2. shows the development of SWFs in the global capital markets in term of their size and growth. Then the following sub-sections 2.3. and 2.4. provide a brief summary of the main features of SWFs that examine whether SWFs act as large institutional investors that can create value through their investments in sustainable ways. Finally, sub-section 2.5. presents a discussion of the investment strategies utilised by SWFs.

2.1. Introduction and Background Information

In recent decades, the global capital markets have witnessed an increase in the numbers and the varieties of institutional investors, with new categories and sub-categories of institutions being incorporated. These institutional investors can be categorised under two main groups based on their ownership structures: i) public investors such as pension funds and sovereign wealth funds (sponsored by the government), and ii) private investors such as hedge funds and private equity (generally controlled by management companies). Among these institutional investors, the Sovereign Wealth Funds (SWFs) stand out as the leading players with a potential to change the global financial topology. In this context, the present thesis focuses on SWFs. However, before providing a literature review of the topic, it should be stated that the absence of comprehensive data (Çelik & Isaksson, 2014) is an important obstacle to document and examine the holdings and investment activities of these institutional investors. However, this study overcomes this data limitation in certain dimensions by collecting fund-level data on their employment of external managers, investments in alternative asset classes, and spending on social and environmental projects. In this way, the thesis makes an important data contribution to the relevant literature as well.

SWFs emerge as innovative investment players (a hybrid between public and private investors) (Santiso, 2009) and they complement other institutional investment actors (Fotak et al., 2008; Ang, 2010), which create an additional step in the link between the income of ultimate provider of money and the performance of the corporation (Çelik & Isaksson, 2014). Considering their unique features and ultimate ownership structures (Gilson & Milhaupt, 2009; Slawotsky, 2008), this chapter provides an overview of these institutional investors (Kunzel et

al., 2011). SWFs are not a recently introduced type of institutional investors (Cohen, 2009; Gilson & Milhaupt, 2009; Johnson, 2007). However, their importance in the global capital market has been a matter of controversy due to the varying definitions of what an SWF is, and the partial disclosure provided by some SWFs (Beck & Fidora, 2008; Truman, 2007; Bortolotti et al., 2015). Initially, the SWFs were established by rich countries with large natural resources like oil (Ang, 2010; Gelb et al., 2014). The term of SWF was first coined by Andrew Rozanov in 2005 (Rozanov, 2005; Truman, 2008; Bazoobandi, 2012). The SWFs have functioned in the global capital markets since the early 1950s. Kuwait Investment Authority, the first SWF, was launched to make global investments on behalf of the Kuwait government in 1953 (Cohen, 2009). As shown in Table 1, as of 2017, the largest SWF was Norway Government Pension Fund-Global, while the other ten most significant funds were from the Middle East and Asian regions (Fotak et al., 2017; Preqin 2018; Alhashel, 2015).

Academic publications diverge to some extent on introducing and defining SWFs. Although SWFs are asymmetrical in composition or character (such as their sizes, ownership types, objectives, and activities) (Monk, 2009; Bernstein et al., 2013), most of the largest and well-founded SWFs are defined as institutional investors controlled by their governments with long-term international and domestic investments intending to maintain stable financial returns (Fotak et al., 2016; Megginson & Fotak, 2015; Bradshow, 2010; Kotter & Lel, 2011). They are neither reserve asset funds supporting domestic currency nor traditional public pension funds, but a different type of entity altogether (Rozanov, 2011; Fotak et al. 2008).

TABLE 1: OVERVIEW OF THE 30 LARGEST SWFS, 2017

No.	Fund Name	Source of Capital	Country of Origin	Year Established	Total Assets ($mn)
1	Government Pension Fund Global	Hydrocarbon	Norway	1990	888,570.00
2	China Investment Corporation	Non-Commodity	China	2007	813,762.00
3	Abu Dhabi Investment Authority	Hydrocarbon	United Arab Emirates	1976	792,000.00
4	Kuwait Investment Authority	Hydrocarbon	Kuwait	1953	592,000.00
6	State Administration of Foreign Exchange	Non-Commodity	China	1997	474,000.00
7	Hong Kong Monetary Authority	Non-Commodity	Hong Kong	1993	467,720.00
8	Government of Singapore Investment Corporation	Non-Commodity	Singapore	1981	350,000.00
9	Qatar Investment Authority	Hydrocarbon	Qatar	2005	335,000.00
10	National Social Security Fund - China	Non-Commodity	China	2000	291,390.00
13	Temasek Holdings	Non-Commodity	Singapore	1974	172,363.00
14	Mubadala Investment Company	Hydrocarbon	United Arab Emirates	2017	125,000.00
15	Abu Dhabi Investment Council	Hydrocarbon	United Arab Emirates	2007	110,000.00
16	Future Fund	Non-Commodity	Australia	2006	98,063.00
17	Korea Investment Corporation	Non-Commodity	South Korea	2005	91,800.00
18	Samruk-Kazyna National Welfare Fund	Hydrocarbon	Kazakhstan	2008	78,000.00
19	National Wealth Fund	Hydrocarbon	Russia	2008	72,460.00
20	National Development Fund of Iran	Hydrocarbon	Iran	2011	70,000.00
21	Alberta Investment Management Corporation	Non-Commodity	Canada	2008	67,896.00
22	Libyan Investment Authority	Hydrocarbon	Libya	2006	67,000.00
23	National Fund of the Republic of Kazakhstan	Hydrocarbon	Kazakhstan	2000	65,700.00
24	Alaska Permanent Fund Corporation	Hydrocarbon	US	1976	57,304.00
25	Bpifrance	Non-Commodity	France	2013	48,668.00
26	Brunei Investment Agency	Hydrocarbon	Brunei	1983	39,300.00
27	State Oil Fund of the Republic of Azerbaijan	Hydrocarbon	Azerbaijan	1999	33,147.00
28	Khazanah Nasional	Non-Commodity	Malaysia	1993	32,680.00
29	Texas Permanent School Fund State Board of Education	Hydrocarbon	US	1854	30,156.00
30	Government Pension Fund Norway	Non-Commodity	Norway	2006	24,249.00

Sources: Author's calculation, League table of SWFs by the size of asset under management based on annual reports and various SWFs-based online sources (Preqin, Sovereign wealth Fund Institute (SWFI), Statista, Sovereign Wealth Centre) with certain qualifications coordinates such as the source of capital (Commodity and Non-commodity), country of origin, year of establishment and estimated asset under management.

Some definitions are broader and more comprehensive than the above description, as in Truman (2007) who prefers defining an SWF as "a separate pool of government-owned or government-controlled financial asset includes some international assets" (p.1). Additionally, Balding (2009) believes that becoming an SWF would be through the combination of development banks, government-owned pension funds, and another investment vehicle that would carry even great value to the group of SWFs.

Although the SWFs concept is still a matter of recent debate and perceived diverse views, the literature fully agrees on two common elements in terms of defining SWFs: They

are (i) long- term investments funds (ii) owned by governments (Jen, 2009; Bortolotti et al., 2015; Aguilera & Santiso, 2016). Beyond these two core features, there are three features that gained general consensus in the literature as well. Namely, SWFs are global investors, without explicit pension obligations which mainly determined by the source of capital (Cohen, 2009; Lyons, 2008; Fotak et al., 2008). Still, these definitions remain indecisive to some extent due to the changing nature of SWFs in the dynamic global financial environment. So, there is no definition that can encompass the meaning of these institutional investors fully. For the purpose of the present thesis, the following definition would serve the purposes of the study: SWFs are government-owned long-term investments funds without explicit pension obligations.

For the purpose of this study, the above definition of SWFs has a broader scope and applicability, so that the role of SWFs can be examined by looking at their investment strategies. In this context, SWFs can be defined as a heterogeneous group of state-managed investment funds with some distinctive characteristics (Bahgat, 2010; Bremmer, 2009; Peterson, 2009; McMichael, 2013; Hemphill, 2009). Figure 2 below provides the main characteristics of SWFs in terms of various dimensions such as the sources of funds, the purposes of funds, their institutional structures, and investment management approaches.

The above definition includes three main elements. SWFs can be better expressed as state-managed funds, which is more related to the process of providing the capacity to engage by other parties. The notion of being state-owned or state-controlled implies in an implicit manner the centrality in power in favour of the government. They can simply act as "intermediary investors" that manage and invest other's funds (i.e., their citizen's wealth) (Çelik & Isaksson, 2014).

Although there are large similarities between SWFs and pension funds, SWFs are not the same entities as pension funds. Therefore, pension funds are excluded from the definition. In terms of similarities, both SWFs and pension funds act as long-term fiduciaries with commitments toward citizens. However, pension funds are mainly financed from pensioners with the periodic stream of liabilities committed to them, whereas an SWF is a wealth fund, meaning that the fund is financed from the surpluses of the nation's wealth dedicated to the whole society (present and future generations). Moreover, the SWFs' long-term orientation contributes to stability (Dixon & Monk, 2012) and indeed strengthens the power of legitimacy in the eyes of citizens as fiduciary investors.

Several funds headquartered in the United States (e.g. Texas Permanent School Fund State Board of Education) and the United Arab Emirates (e.g. Mubadala Investment company) are included in SWFs group, even though they are organised and administrated at State or Emirati level rather than country-level (Megginson & Fotak, 2015). Notably, both the United States and the United Arab Emirates do not have any official country-level SWFs. In addition, the Saudi Arabian Monetary Agency (SAMA) is excluded, because this fund is directly managed by the central bank, hence, with different priorities from most SWFs (Fotak et al., 2008; Preqin, 2018).

FIGURE 2: SOVEREIGN WEALTH FUNDS DEFINITION: FUNDING, OBJECTIVES, STRUCTURE AND INVESTMENT PROCESS

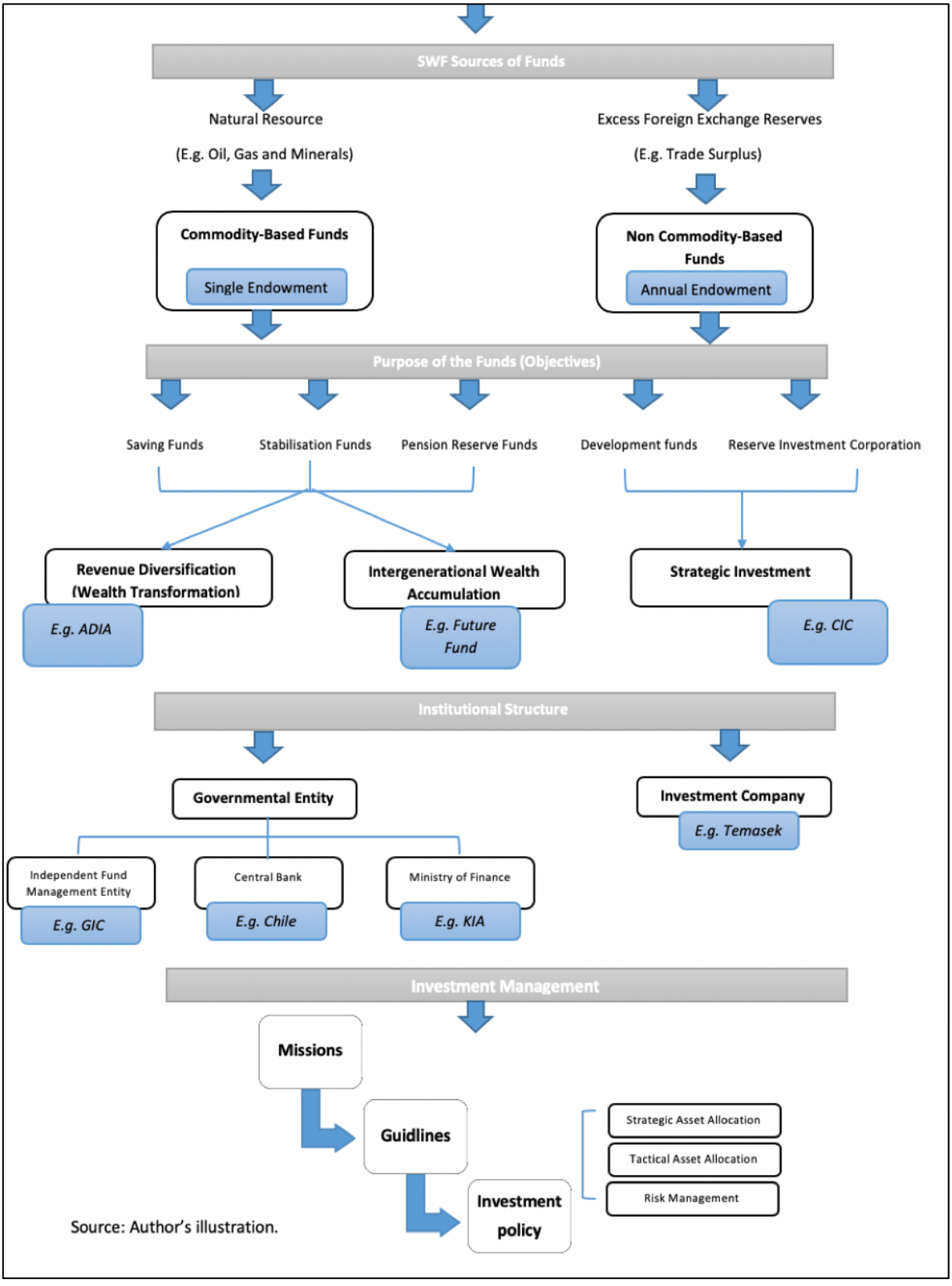


Figure 2 shows that sources of funds and institutional objectives are among the important characteristics of SWFs, in addition to their institutional structures and investment management strategies. SWFs have been established in a range of countries with accumulated wealth to meet specific national objectives. To provide more details and to understand the evolution of the non-traditional institutional investors more comprehensively, it is helpful to provide the logic behind the establishment of SWFs by classifying them based on their sources of funds and investment objectives. So, this introductory sub-section provides some information on these two characteristics.

Sources of SWFs

SWFs generally reflect the availability of excess public revenues and excess foreign exchange reserves from their governments (Griffith Jones & Ocampo, 2009; Kunzel et al., 2011), and the perceived need to manage these funds with a view for meeting specific fund objectives (Kern, 2007). In practice, SWFs can be divided into two general categories based on the source of capital: commodity-based funds and non commodity-based funds (Kern et al., 2008; Reisen, 2008). Commodity-based SWFs are principally funded through natural resources that either owned or taxed by the government. These commodity-based funds or "natural-resource funds" (Gilson & Milhaupt, 2009; Balin, 2009; Beck & Fidora, 2008) dominate the recent growth in SWFs, with approximately $4 trillion in asset under management as of 2016. More than 55 commodity funds have been established at about 40 countries at the state-level, with 30 new funds being established since 2000 (NRGI, n.d.). Commodity-based SWFs constitute 61% of total capital, where most of these funds are positioned in the Middle East such as Kuwait Investment Authority (KIA) and Abu Dhabi Investment Authority (ADIA).

Other than commodity funding, SWFs' capital can originate mainly from the large balance of payment surpluses, so they are named 'non commodity -based funds'. They represent 38% of total capital where most of these funds positioned in Asia, such as China Investment Corporation (CIC) and Korea Investment Corporation (KIC). Countries can have a variety of reasons for establishing non commodity -based SWFs. They have typically multiple objectives for conducting investment through SWFs either domestically or across the border, and their objectives often change over time as the needs of the country shift. So, the following part discusses the objectives of SWFs.

SWFs' Objectives

In addition to the main funding sources of SWFs, their objectives can also vary between commodity and non commodity- based funds (Reisen, 2008). Government controlled vehicles, such as the commodity SWFs, have been set up to achieve multiple goals (Curzio & Miceli, 2010). The International Monetary Fund (IMF) classify SWFs according to their five principal motivations: Saving funds, stabilisation funds, reserve investment corporations, development funds, and pension reserve funds (Al-Hassan et al., 2013; Kern, 2007). Most SWFs are established as either saving funds for future generations or macro-stabilisation funds. This situation includes the cases of the SWFs employed by Arab countries such as Kuwait Investment Authority (KIA) and Abu Dhabi Investment Authority (ADIA) (Kunzel et al., 2011).

Stabilisation and saving funds use the accumulated intergenerational equity to manage excessive revenues more effectively (Kalyuzhnova, 2011; Balding, 2009; Carpantier & Vermeulen, 2018; Reisen, 2008). So, the leading objective of these SWFs is to manage long-term savings of countries in line with the inter-generational goals of society (Bacon & Tordo, 2006). Saving funds, for example, are typically mechanisms to diversify the national wealth away from dependence on certain natural sources like oil or natural gas. The goal is to manage such wealth in an endowment arrangement to benefit future generations (Lee, 2014; Reisen, 2008). As an additional objective, in resource-rich countries, fluctuation in commodity prices can be managed through SWFs. These funds can act as insurance mechanisms against short-term volatility problems in the oil markets. In return, the stability of oil revenues can support stability in the public finances and macroeconomic environment (Arrau & Claessens, 1992; Bacon & Tordo, 2006; Kalyuzhnova, 2011). As an additional benefit of these funds, in periods of stress, SWFs could be a significant shock absorber for the financial markets. In this fashion, many SWFs were used to support their home countries during the periods of instability like the global financial crisis. Given the major economic and financial problems that many countries faced due to the COVID-19 pandemic in 2020, the importance and relevance of SWFs become more evident in terms of stabilisation.

The third type of SWFs in terms of their objectives is the reserve investment corporations such as China Investment Corporation (CIC) and Korea Investment Corporation (KIC). The main objective of these funds is to increase the return on reserves in a competitive

environment or to reduce the opportunity costs of holding reserves. The assets in these funds are counted as official reserves, which are managed separately. The usual investments of reserves in the US and Euro government bonds provide very low returns, so keeping them idle can be quite costly given the large sizes of reserves in these countries. Therefore, SWFs play an important role in terms of reserve management. As another objective, the development funds are set up to help economic and social development purposes through focused socio-economic projects (e.g. privatisation) (Al-Hassan et al., 2013) or by promoting specific industrial policies (Curzio & Miceli, 2010). The last type of SWFs in terms of their objectives is the pension reserve funds, such as the National Pensions Reserve Fund (NPFR) in Ireland and The Government Pension Fund in Norway. These funds utilise sources other than normal pension schemes (Curzio & Miceli, 2010), and are established to meet future needs with regards to pension contingent liabilities on the government balance sheet (Al-Hassan et al., 2013).

SWFs' funding sources, along with their objectives, can form specific patterns. Kimmet (2008) suggests that commodity-based funds tend to have multiple objectives, including macroeconomic stabilisation and saving for future generations, while non commodity- based funds commonly have stand-alone investment objectives. However, development funds and reserve pension funds belong to both types of commodity-based funds and non commodity-based funds (Curzio & Miceli, 2010). It is therefore clear that SWFs are heterogeneous group of institutional investors, characterised by highly differentiated structures, objectives and thus strategies on global capital markets. After providing a broad definition of SWFs and characterizing their main properties, the next sub-section looks at their prominence.

2.2. The Prominence of SWFs in the Global Capital Markets

There is increasing attention in academia, the business world, and politics regarding the rise of SWFs in the global capital markets. These institutions have succeeded to capture the attention in recent years, stimulated by their influence on the global financial system, whether they are large or small in size, old or newly established, and efficiently governed or not (Gilson & Milhaupt, 2009; Das et al., 2010; Hatton & Pistor, 2011; Castelli & Scacciavillani, 2012).

The Aggregate Size of SWFs: Assets under Management (AUM)

A direct way to measure the prominence of SWFs is to look at their sizes. The SWFs size generally refers to the assets under management (AUM) in billions of US dollars. This variable captures the fund capability to identify unrecognised market opportunities and to create yields from investing in different asset classes. The formation of SWFs to manage the nation's wealth is not a new phenomenon as they have existed in the capital market for decades. However, the rise of SWFs continues to grow despite the low oil prices and the market downturn, reaching $6.59 trillion worldwide as of 2017 across 76 SWFs. Although this is a significant figure, the growth has slowed in 2017 relative to earlier years. The rising share of SWFs in the global capital markets suggests that these funds are growing at a faster rate than the hedge funds, pension funds, and private investors (Bortolotti et al., 2015). In terms of estimating the exact size of SWFs, there are some limitations in the estimation of AUM for SWFs as this information goes largely hidden due to low transparency level. Their secretive nature, and the resulting information asymmetries (Kotter & Lel, 2011), make these funds unwilling to reveal any information related to their returns or investment policies (Megginson & Fotak, 2015).

As shown by Figure 1, between 2016 and 2017, the asset size of state-owned investors grew by $800 billion. This growth in assets under management was mostly driven by two funding sources: i) funding from governments and ii) reserves together with targeted investments in long-term yields in a low-interest-rate environment. In previous years, the growth has been pushed by the creation of new SWFs. However, this process slowed down in the last years, with one SWF being set up in each of the last three years. The Ireland Strategic Investment Fund (ISIF) was formed in 2014, utilizing the assets of an existing Irish fund, National Pensions Reserve Fund (NPRF). In addition, the large fall in oil prices in 2014 affected the commodity funds (related to oil-producing countries) negatively in terms of funding. As of 2017, the largest SWF was the Government Pension Fund Global in Norway with a 13.3% global share of the total asset under management, followed by China Investment Corporation (CIC) with 12.2% share, Abu Dhabi Investment Authority (ADIA) with 11.97% share, and the Kuwait Investment Authority (KIA) with 8.94% share (Table 1).

Many of the countries that use SWFs have created more than one SWF (Helleiner and Lundblad, 2008; Pihlman et al., 2011) to achieve specific objectives (Table 1). In line with their different objectives, some countries set up funds for both stabilization and saving objectives. This is especially true for commodity- based funds such as Russia, the United Arab of Emirates and Kazakhstan and some Asian countries like China, and Singapore.

SWFs are highly concentrated in terms of assets under management. The top-ten SWFs hold more than 45% of the total asset. Four regions dominate the global market in terms of total assets: The Middle East, Asia, Europe, and North America. SWFs based in the Middle East and Asia represent 85% of market capitalisation, reflecting the vast concentration of wealth located in these areas. Asia represents the largest share of SWFs' capital, due to China's CIC, which has become the second-largest SWFs in the world. As for Africa's SWFs, they are still in a nascent stage to grow with a much smaller asset base. The growing number of Africa's funds recently is due to commodity abundance in the region.

The increasing size of SWFs in term of assets under management enhance their ability to make changes in their investment portfolio in a flexible way. The considerable size of the capital pool to be invested by the SWFs gives them the freedom to invest without many restrictions. In addition, they do not have the limitations of liabilities as in the case of pension funds. With respect to their fiduciary duties, all fiduciary funds have the same duty; however, larger funds generally have more capital and greater potential for influencing and addressing environment, social and governance (ESG) issues compared to the smaller SWFs (Hawley et al., 2014). These SWFs typically have long-term financial purposes consistent with the generation of long-term value.

SWFs have the necessary size to ensure that they can invest across wide-ranging asset classes. SWFs employ across-the-board investment strategies reflecting their different objectives. They typically allocate their investments into two main asset classes: traditional asset classes (such as public equity and fixed income) and alternative asset classes (like infrastructure, natural resources and private equity). Few SWFs have the skill to operate effectively in all investment domains. For example, some SWFs are better suited to invest in traditional asset classes, whereas others may invest in alternative investments. This point is explored in detail in the following chapter.

The Growth in the Number of SWFs

The variety of SWFs types and the establishment of new funds indicate that SWFs are desired forms of state-managed funds from a public perspective. The number of SWFs in operation have continuously risen since 2000 (Table 2). Sixty-five percent of existing SWFs as of 2017 were created in the last seven years. This development is a sign that governments are now more aware of the value of SWFs in achieving economic and social objectives over the long-term (Figure 2).

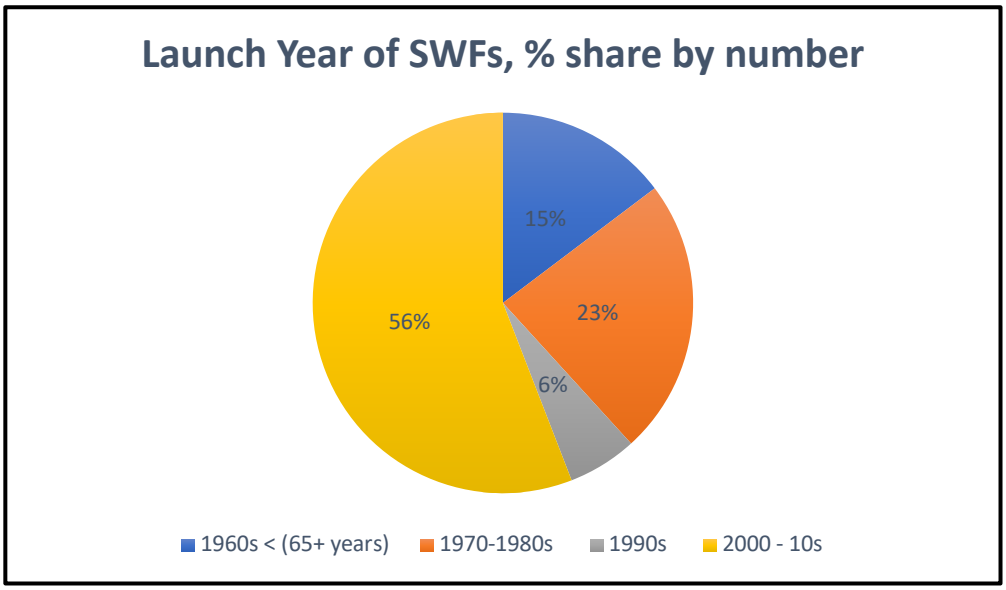
TABLE 2: LAUNCH YEAR OF SWFS, A SAMPLE OF 34 DIFFERENT FUNDS.

Age Group	Classification	Number of SWFs
1960s < (65+ years)	Senior (Top Age)	5
1970-1980s	Middle age	8
The 1990s	Modern	2
2000 - 10s	New	19

SOURCE: AUTHOR'S CALCULATION.

Many SWFs were created from 2005 to 2008, a period which was characterised by high oil prices, reluctance towards foreign capital prior to the global financial crises, and the re-examination of corporate governance in the industry through the Santiago Principles for good governance and transparency. As a notable example, China Investment Corporation (CIC), which was established in 2007 began to operate with $200 billion, but its size increased four times to reach $813 billion in 2017 (Table 2), making it the second-largest funds globally. This type of quick growth brings public attention to SWFs and could also prompt questions about the impact of these funds on global economies. The period after the global financial crises witnessed the inception of some SWFs from emerging economies such as the Nigeria Sovereign Investment Authority (NSIA) that try to diversify their revenue by investing their wealth abroad. Other new but smaller funds were established to counter the growing investment appetite worldwide coming from the Middle East and Asia regions towards domestic economies as in the case of Banque Publique d'Investissement, or BpiFrance in France (CB Insights, 2017).

FIGURE 3 LAUNCH YEAR OF SWFS, PERCENTAGE SHARE BY SWFS NUMBERS.



SOURCE: AUTHOR'S ILLUSTRATION.

Overall, the above analysis shows that SWFs have become important actors in the global capital market in the last decades. Their growing numbers and asset under management have partially changed the landscape of global financial systems, adding new pools of capital to support the growth and development of economies across the world. As the SWF phenomenon has especially reflected the growth of emerging markets (e.g. East Asia) and resource-rich economies (e.g. the Middle East) (Clark and Dixon, 2017), this new power has resulted in some concern over whether SWFs may reshape the international economic and even political order in the long run (Wang, 2016). As discussed above, SWFs have been categorised in various ways over time. One commonly used classification is based on the SWFs' source of capital. Other analysts have obtained their classifications of SWFs based on their investment objectives. The fact that SWFs come in many forms also suggests that they will differ in terms of such characters as well. Based on these points, the next sub-section examines their legitimacy and investment structures.

2.3. Legitimacy and Investment Structures of SWFs

SWFs as institutional investors with distinct common features are organised legal entities (Celik & Isaksson, 2013). The SWFs come in a great variety of forms, and they try to attain the performance of a private corporation using the income of the ultimate owner (i.e., the

state or society). So, in terms of a business perspective, they are a hybrid type of public-private organisation. In some sense, they look similar to the public-private partnerships which have funding coming from the public and management being done by the private sector. Similarly, the funding of SWFs comes from the public, but they try to manage these funds like corporations in line with some pre-set objectives. As SWFs mature and as the literature describing and analysing SWFs continues to develop, some of the primary concerns that initially animated SWFs analysis (such as the SWFs being a sign of shifting power as potential political actors) are examined from different perspectives, as well. In particular, there is a growing literature on the legitimacy of SWFs (Clark et al., 2013; Monk, 2009; Clark & Monk, 2009; Grünenfelder, 2013). The legitimacy of SWFs involves two dimensions: i) the ultimate long-term ownership and ii) the unclear or shifting investment motivations and uses of the funds. SWFs legitimacy is a question of increasing importance to sponsor countries as decreasing oil and gas prices, and the question of whether the role of SWFs may change in dealing with the loss of revenue during financial stresses create uncertainties for both SWFs themselves and the sponsor countries.

The concept of legitimacy has its origins among other conceptual approaches in institutional theory (DiMaggio & Powell, 1983). According to Suchman (1995), legitimacy is a general principle that makes the activities of any entity appropriate and desirable within the socially constructed system of norms, values, and beliefs. It is embedded in social systems, which make the purpose of an institution acceptable to the public, especially in the investment decision-making process (Clark & Monk, 2010a).

In a world where economic and political uncertainty exists, different types of innovative investment players (public and private) emerge, trying to explore options which would allow creating long-term and sustainable investments for communities. SWFs are located as a public investor in the centre of these global market players. SWFs have the potential of creating a strong impact on the global capital markets as a good source of capital and governance. Hence, classifying SWFs in two dimensions of ownership type and investment motivations (reflecting governance traits and investment strategy) offers deep insights about the capability that SWFs are likely to become effective global investors. In addition, this analysis provides some legal context which is important for the legitimacy of these institutions. So, ownership structures, which is examined to some extent in the previous section, and the investment strategies of SWFs matter for the perspectives on their legitimacy as well.

SWFs Ownership

The large sizes of SWFs portfolios, in particular, suggest that SWFs as large asset owners are 'universal owners' (Urwin, 2010). Being universal owners means that large investors are diversified across all asset classes, hence owning a share of the global capital markets through their portfolio (Lydenberg, 2007; Hawley & Williams, 2000).

Universal ownership, a concept developed by two investment managers, Monks and Minow (1995), whose investment approach stressed the need for change at investment companies and proposed larger social and economic purposes for investments. With given fiduciary duties, global large institutional investors like SWFs have an interest in healthy capital markets rather than a narrow focus on profitability. Lydenberg (2014) supported the idea of characterising institutional investors as fiduciaries to involve in long-term investment for social welfare. The long-term investment horizon of SWFs coupled with an absence of short-term liabilities to specific individuals allows them to overlook myopic search for short-term financial return, so they can focus on the long-term value creation instead.

Long-term Commitment

Having a longer-term horizon relative to many other global investors like hedge funds, SWFs with their fiduciary duties aim to work toward the long-term value generation for present and future generations. In return, these characteristics reinforce the positive perceptions and legitimacy of these institutions (Urwin, 2010). This long-term approach is in sharp contrast to that of mutual funds and hedge funds, which generally tend to take short- term perspectives in capital markets (Avendaño & Santiso, 2009; Aizenman & Glick, 2009). Global private investors such as hedge funds and mutual funds are known to have the preference to invest in liquid assets, partly due to their dependence on short-term financing (Ferreira & Matos, 2008). Private investors prefer short-term investing; hence, they invest in money markets for their liquidity as a path to safety and secure return (Kang & Stulz, 1997). As for SWFs, Bertoni and Lugo (2014) claim that SWFs are larger than most of the private investors and have substantial liquidity to invest over long-term horizons, thereby providing appropriate insurance against liquidity shocks. As long-term investors, SWFs are not either seeking short-term returns or concerned with liquidity while investing (Fernandes, 2014). So, SWFs investment activities can be justified by the need to diversify their sources of funds and to save for future generations by creating long-term value. Searching for opportunities with high returns that fit the long-term

strategic plans means targeting more risky assets than do private investors; hence, it can be considered as a riskier investment strategy compared to their peers. So, the risk appetites of the home countries and the SWFs would influence the global investments strategies in terms of how much exposure to create in riskier asset classes.

Furthermore, the long-term investment perspective of SWFs also means that they have great potential in shaping developmental challenges (Drezner, 2008). This characteristic enables them to withstand market pressures, especially in times of crises and financial stress. A short-term focus would create value exclusively for the present shareholders and may result in the loss of value for the beneficiaries (the nation's citizens) over the longer term. Thus, the short-term investment focus could be seen as a barrier to SWFs in making progress towards sustainable investment practices. Emphasis on short-term financial performance means prioritising investments that offer immediate return over sustainability-related strategies (Urwin, 2010). In contrast, the long-term approach represents a distinct type of modern institution that is characterised by a unique structure that considers the ESG aspects in addition to financial performance. However, it should also be noted that these are not mutually exclusive investment strategies.

After displaying the long-term nature of investment perspectives, providing some discussion on the investment motivations would also be valuable to understand the legitimacy and investment structures of SWFs. The academic literature commonly provides four main investment motivations as follows: i) diversify sources of national wealth, ii) increase financial returns on foreign exchange reserve holdings and diversify holdings of an excessive quantity of securities, iii) encourage the accumulation of savings for future generations, and iv) finance economic and social development in the home country (Curzio & Miceli, 2010). When these objectives are examined from the social and economic cost-benefit dimensions, they also strengthen the legitimacy of these institutions as all four objectives are expected to support economic development and social welfare. These four objectives can be categorised into two main motivations: financial and strategic motivations (Aguilera et al., 2016). The distinction between financial and strategic determinants encourages an examination of SWFs' investment structures from different perspectives and helps to understand their varying investment behaviours.

In terms of financial motivation, some SWFs operate fairly similar to their institutional investor counterparts in that; they invest in global, diversified portfolios to maximise their long-term returns subject to an acceptable risk level (Balding, 2012; Bernstein et al., 2013; Chhaochharia & Laeven, 2009; Fernandes, 2014). In this way, they might seek to invest internationally to protect themselves from domestic political pressures and thereby differentiate themselves from SWFs that pursue non-financial goals. Moreover, as Lim et al. (2009) argue the pursuit of purely financial goals might help the sovereign economy diversify revenues from non-renewable resources. So, there are not many concerns about legitimacy or governance issues in the investment structures based on these financial motivations. It can be expected that the management strategies and structures of these financially motivated SWFs could be quite different from those of non-financially motivated SWFs.

Strategic motivations, on the other hand, can be defined as those adding to the sovereign value (Clark 1995). Sovereign strategic goals encompass several strategies such as assisting national industrial-planning (Dyck & Morse, 2011), securing natural resources or establishing alliances with foreign industry leaders. Governments can deploy SWFs as a means to engage in international relationships with other countries and strengthen national security. Broad development aims can entail legitimate goals within the global financial arena, given that they are in accordance with the Generally Accepted Principles and Practices for SWFs. However, strategic capital allocations can range widely. For instance, Clark et al. (2013) show how SWFs can be tools of facilitating autonomy and sovereignty for governments or a powerful form of insurance against the global economic pressures that create currency and commodity fluctuations.

Thus, as long as strategic motivations are used to support sovereign targets, they do not create any issues of legitimacy for the SWFs. However, one should also be careful of the cases where SWFs can be used for personal gains of the ruling class or political elites in countries with low transparency and low governance quality. One can give the example of 1Malasia Development Berhad Scandal (MDB) the Goldman Sachs-backed Malaysian state investment fund, where politicians used the funds for their personal gains (Case, 2017). In such cases, major concerns on the legitimacy of SWFs can arise. This situation might be especially relevant for less-developed and autocratic countries. In this context, the recent literature manifests varied views regarding the purposes of SWFs. As the SWFs objectives are generally neither clearly stated nor disclosed openly (e.g., the case of the CIC and the QIA) and given their public

ownership structures, SWFs can be described as being vague and thereby raise suspicions on the objectives they pursue while investing in the capital market. Chhaochharia and Laeven (2009) and Kotter and Lel (2011) suggest that besides maximising returns, SWFs engaged in other political objectives that do not conform with the principles of portfolio theory. For example, Pozen and del Sol (2019) note that the China Investment Corporation (CIC) has a strong interest in, and financial support for the Belt and Road Initiative of China. This initiative has both economic and political components. So, it can be implied that SWFs are used to increase the political influence of their home countries (Avendano & Santiso, 2009). Similarly, Bernstein et al. (2013) suggest that SWFs are politically driven; confirming the findings of Knill et al. (2012) which show the political motivations in SWFs decision-making. Still, Bortolotti et al. (2015) find that in general SWFs cross-border investments are free of these political considerations. This result is consistent with the findings of Dinc and Erel (2013), as well. Overall, these discussions show that while the legitimacy of SWFs can be strong from the perspective of their sponsor countries (as long as they are not used for personal gains or crony capitalism), they might still face some legitimacy and security concerns by other countries.

2.4. Fiduciary Duty, Sustainable Investments, and SWF Sustainability

The above parts provided discussions and literature review regarding the definition, characteristics, prominence, legitimacy, and investment structures of SWFs. So, they form detailed background information on the research topic of the sustainability of SWFs. Based on these discussions, the current part gets closer to the issues of SWF sustainability. Towards this objective, first, the topic of fiduciary duty is discussed as it relates to a crucial property of SWFs in terms of being agents of the public. So, the fulfilment of fiduciary duty can function as an important criterion for the sustainability of SWFs. Secondly, one can also take a perspective from the sustainable investment point to assess SWF sustainability. At this stage, it should be noted that sustainable investments and SWF sustainability are two distinct notions. Sustainable investments refer to the investment strategies that support (or at least does not conflict with) social and environmental sustainability purposes. Quite distinctly, SWF sustainability refers to the assessment of performance, namely whether SWFs are sustainable in terms of management structures and investment strategies. Literature mainly focuses on financial indicators of sustainability like profitability or return on investments, while a unique contribution of the present research is to develop non-financial performance measures, called

"SWF sustainability". In this context, the employment of external managers, investment in alternative asset classes, and focus on social and economic expenditures are chosen as the relevant SWF sustainability measures. However, it can be seen that as long-term value-creating organisations, some focus on sustainable investment would be expected to improve SWF sustainability through asset diversification as well as ESG goals. Therefore, this part also provides a discussion of sustainable investment within the context of SWFs strategies and sustainability.

Fiduciary Duty

Over the past decades, SWFs and other institutional investors dominated the global capital markets. SWFs, as large investors, hold considerable diversified financial assets; thus, they are central to the financial welfare (Hawley et al., 2011). The emergence of SWFs makes it hard to ignore the interaction or involvement with other market players such as banks, financial vehicle investors, or even investment funds. Additionally, the global financial crisis of 2008-2009 clearly reveals the importance of these activities in both local and global economies in the modern era. Therefore, displaying the legal background of SWFs and documenting its relations to SWF sustainability are important to get a comprehensive understanding of the research topic regarding the effects of the country-level strategic resources on the sustainability of their SWFs.

The common legal concept behind the establishment of SWFs is stated with the concept of 'fiduciary duty'. SWFs as fiduciaries are bound to manage assets in accordance with the interest of their beneficiaries. A focus on fiduciary duties in the investment process of institutional investors is critical for rebuilding stable financial systems and meeting social needs more effectively. Understanding these duties provides a framework covering investment time-horizons, strategies, and objectives. As societies confront an increasing degree of governance challenges in meeting their current and future demands, there is a substantial need to follow a more logical perspective on fiduciary duties and responsibilities. This need is particularly severe in the capital markets, where the dramatic growth of institutional investors such as SWFs and hedge funds have been noticed in the last decade (Waitzer & Sarro, 2012). As a general definition, fiduciary duties are the legal principles that protect society, particularly beneficiaries, from being exploited by fund executives, public authorities, and private-sector elites. The general rule states that institutional investors could be restricted by fiduciary

obligations towards their beneficiaries in the form of trustee-trust relations. Although Institutional investors could have similar obligations, differences exist in interpreting fiduciary duty. Therefore, the core issue of SWFs responsibilities to beneficiaries is critical to sustaining the funds' objectives and promises. In other words, getting a proper understanding of fiduciary duty is instrumental in examining SWF sustainability in terms of employing external fund managers, investing in alternative asset classes, and spending on social and environmental projects.

Although the legal structure and local culture could affect the way fiduciary principles are formed, prudent asset investment and the loyal act of presenting beneficiaries' interests are keys to build-up a healthy trustee-trust relationship (Richardson, 2011). Prudent investment approach requires fiduciaries to exercise skills with due care that are in accordance with risks and opportunities when dealing with the assets of beneficiaries. Typically, financial prudence refers to the set of guidelines, rules, and provisions that support any financial decision related to the fund's investment and asset allocation (Tsani, 2013). A well-functioning market economy requires prudent investors that have an interest in allocating their fund revenues to the most profitable ventures. So, making the best possible use of funds comes with an aim to achieve long-term value, increasing market efficiency, and strengthening corporate governance.

From an intergenerational perspective, the fiduciary duty highlights the focus on investment practices with long-term perspectives. It takes the interests of different beneficiary groups (like the present and future generations) into account with a social balance between them. SWFs as fiduciaries have to ensure that their investment decision-making process balances the allocation of capital between generations. Hence, intergenerational wealth accumulation requires going beyond the financial criteria for assessing the performance of SWFs. Therefore, the perspective of fiduciary duty is helpful to motivate non-financial criteria for the assessment of SWF sustainability.

Concerns could be raised that fiduciary duty is essentially a duty to maximise short-term returns which are confined narrowly to risk - adjusted returns that do not reflect the whole impact and alignment with the beneficiaries' interests (Smith, 1999). For example, modern portfolio theory is not consistent with the prudent investor approach, since it requires investments to be decided in terms of their risk-return portfolio in the context of the

performance of the whole portfolio (Haskell, 1999; Hawley et al., 2014; Fabozzi et al., 2002; Richardson, 2007). On the other hand, the loyal act duty entails fiduciaries to manage funds by taking different beneficiaries' interests into account rather than their own interest. It is also required that fiduciaries are equitable between the interest of beneficiaries from different time periods (like the present versus future generations) (Ingley & Van der Walt, 2004). Based on the traditional view of fiduciary duty, SWFs main responsibilities can be counted as creating a risk-adjusted return that would maximise the financial benefits of their beneficiaries. This limited concept implies that fiduciaries are prohibited from integrating non- financial criteria into their investment process, either because it is not one of the fund's objectives (out of their prudent investment management) or their loyal act obligation (ignoring the beneficiaries' interest when assigning their own principles) (Hoepner, 2011). Overall, these discussions show that arguments based on fiduciary duty can be used to motivate the generation of non-financial criteria for the assessment of SWFs. One of such non-financial dimensions in SWF sustainability is the concept of sustainable investment.

Sustainable Investment Concept

Sustainable investment criteria have gained importance in the whole asset management industry (Urwin & Woods, 2009). State-managed funds such as SWFs that engage in citizens' wealth accumulation may consider these criteria since they have obligations to the countries' future generations. Thus, they have to construct their portfolio allocation and asset strategies in a sustainable way. In recent years, SWFs and other institutional investors have shown more interest in the environmental, social, and governance (ESG) objectives in their investments. An early movement in this dimension, the "Socially Responsible Investment (SRI)", was generally associated with certain ethical acts. This approach had a narrow capacity to be implemented by Sovereign Wealth Funds, where a conflict with fiduciary duty exists (Keller, 2009). This is compounded by the belief that investment decision-makers may not be able to secure the highest financial returns in terms of their fiduciary responsibility to their beneficiaries by prioritising environmental or other social aspects and limiting investment choices (Bernstein, 2007).

More recently, the notion of "responsible investment" has emerged with major support by the investment community whose dedicated investment strategies are associated with producing ESG benefits but are expressed as business-oriented initiatives (Richardson, 2011).

The term ‘responsible investment’ is still widely used and adopted by many leading pension funds, even though, related concepts such as sustainability or sustainable investment are vying to replace it. The “Sustainable investment” approach adds to the content of responsible investment the property of efficient long-term financial outcomes consistent with the fund mission and a goal of producing beneficial outcomes for future generations in a fairly and equivalent way with current generations (Urwin, 2010; Hawley et al., 2014). So, this study adopts the definition of Urwin (2010, p.3), “the long term investing that is efficient and intergenerational fair”, as a way to enhance the SWFs’ strategies in accordance with the fiduciary principles of care and loyalty. The strength of this concept is the comprehensive insight generated from the idea that fiduciary duty supports sustainability. Sustainable investment is the fiduciary duty of investors to integrate non-financial (ESG) factors into their investments process. Therefore, fiduciary duty, sustainable investment, and SWF sustainability become intertwined in a fundamental way.

SWFs, Fiduciary Duty, and Sustainable Investment

SWFs, as organisations seeking to simultaneously achieve the often-conflicting goals of financial efficiency and political effectiveness, have emerged as new forms of “fiduciary-capitalism”. From this perspective, SWFs are institutional investors that are legally bound to the duty of care and loyalty with a priority to fulfil their beneficiaries’ needs (Rogers, 2014). Previously, the practice of non-financial criteria was related to ethical or religious mandates; so, it was not an investment strategy (Richardson and Cragg, 2010; Sparkes & Cowton, 2004). Several SWFs, such as the New Zealand Superannuation Fund and the Norwegian Government Pension Fund, previously mandated ethical investments in their portfolio strategies (Clark & Monk, 2010b). Nevertheless, like private investors, SWFs face a legal obligation (to meet their investment objectives) of yielding profits, which could imply staying indifferent in dealing with external risks such as climate change and natural resource depletion (Hoepner et al., 2011). A tension, therefore, emerges between the political and financial priorities of SWFs. At the present time, increased attention to integrating environmental, social, and governance (ESG) criteria in the investment strategy has changed the old view to some extent (Gifford et al., 2011; Derwall et al., 2011). According to The United Nation’s Environmental Programme Finance Initiative, the integration of ESG criteria does not replace the funds’ investment processes; but, rather enhances it (UNEP FI, 2009). This is an important point as there could be a synergic relationship rather than an adversarial one. Many ESG investments may be the best performers

in the future, often being at the forefront of technological change and challenging existing principles with new ways of thinking, like electric cars.

The way in which SWFs, as institutional investors, approach ESG aspects is gaining a growing interest worldwide. The funds' asset managers should be prepared to realise and react to risks and opportunities arising from ESG-linked considerations to protect the beneficiaries' assets they invest. So, it is important to understand the driving factors for SWFs sustainable investments with a view to assessing their capacity to contribute to ESG aspects. As public investment institutions controlled by governments, SWFs have the particularity to be public fiduciaries. Their fiduciary responsibilities to society through increasingly long-term investments suggest a normative direction to ESG considerations besides the financial mandates, which can thereby help institutionalise fairness between generations and sustainable investment in the context of the financial market. In this context, the current study puts forward the idea that SWFs can play a role in adopting ESG aspects under the holistic approach of sustainable development[1]. The topic addressed in this research has a particular interest to policymakers, academics and economists since it links one of the important participants in the global financial market; SWFs, to the paradigm of sustainable development. Indeed, the next logical step in the evaluation of SWFs would be giving them an outright mission to invest in a sustainable manner (Richardson, 2011). Overall, these discussions show that there can be a close association between sustainable investment and SWF sustainability. Sustainable investment and ESG-focused investment strategies can be used to achieve intergeneration fairness and can contribute to the sustainability of SWFs.

SWF Sustainability

The previous parts showed that fiduciary duties and sustainable investments could be instrumental in assessing SWF sustainability. However, the concept of SWF sustainability is broader than these two dimensions, and it is necessary to characterise SWF sustainability before moving into an analysis of it. There are some common features of SWFs that may affect the degree to which SWFs act in sustainable ways. The focus is on the four specific

[1] The concept of sustainable development is defined as "development that meets the needs of the present without comprising the ability of future generations to meet their own needs" (World Commission on Environmental and Development, 1987).

characteristics that may determine the incentives for SWFs to act in a sustainable fashion. Investors are part of a wider social environment, and the rules, norms, culture and institutions that prevail in that environment can influence their behaviour. Indeed, investors do not exist in a vacuum; rather, they operate in an intuitional context that creates challenges and opportunities (Gjolberg, 2009). The literature considering the structural factors that may affect the SWF sustainability is in its early stages. So, the focus is mainly on the Corporate Social Responsibility (CSR) and responsible investment, particularly on the importance of national or inter-institutional context for theoretical grounding (Hawley, 2015).

The investment environment is dynamic, so the SWFs are set in a unique position to flourish within the volatile economic landscape. The inherent characteristics of SWFs could place them in a central position, making them unique in the institutional investors' world. The SWFs size, age, source of capital, and purposes may all influence its asset allocation, hence their investment behaviour. In terms of decision-making, investment strategy is deliberately generated from having a strong investment philosophy that aligns with the funds' long-term value creation and beneficiaries' benefits. A clear investment approach takes the source of money and their usage into account in forming the asset allocation strategy (Martellini & Milhau, 2010).

Institutional theory is considered to be one of the dominant approaches to understand organisations (Greenwood et al., 2011). Institutional theory suggests that institutionalised activities are the outcome of connected processes at three levels: individuals, organisational and inter-organisational levels of analysis. At the individual level, asset managers' norms, habits, and traditions account for institutionalised activities. At the institutional level, corporate culture, shared belief systems, and political processes support the given ways of managing institutionalised structures and behaviours. At the inter-organisational level, pressures emerging from governments, industry alliances, and societal expectations (e.g. rules and norms) are shown to be important (Berger & Luckmann, 1967; Thornton et al., 2015).

As definitions vary and because of the low level of disclosures, significant differences between funds could arise with respect to institutional characteristics and investment objectives. Hence, it is important to look at the characteristics of different SWFs in a way to determine the most influential factors that make SWFs act sustainably. As explained in the following parts, the present thesis identifies three dimensions of SWF sustainability as

investing in alternative asset classes, employing external fund managers, and spending on social and environmental projects. A second important context is the legal context focusing on an institutional level and inter-institutional level together. Commodity-based funds are among the largest and well-established funds rather than non-commodity funds, which is charged to maintain macro stabilisation and saving purposes. So, by looking at their most controversial policy-related features of ownership and investment motivations, one can attain information regarding SWF sustainability. In addition, this analysis can be conducted for both commodity and non-commodity funds to get a more comprehensive picture.

Based on these discussions, various non-financial criteria can be formed to assess the sustainability of the SWFs. The information provided on the fiduciary duty and sustainable investments imply that one such criterion would be the investments in social and environmental causes, with R&D potential for future sustainable product development, so that the SWFs provide a balanced investment portfolio between the current and future generations. In addition to this criterion, the current research proposes two other criteria. One is the employment of external managers by the SWFs. According to the Resource-Based Theory of the Firm, resources unique to the firm are very crucial for the competitiveness and sustainability of companies. External managers or external directors on the company boards are considered to be such critical resources for firms. Then, the use of external managers can be used as another criterion for SWF sustainability. This point is investigated in detail in the following chapter. Finally, the investment theory implies that having diversified portfolios is the optimal way to avoid excessive risk-taking. This point can also be used as another criterion for SWFs sustainability, and it is explained in the following sub-section. In this fashion, three non-financial criteria are formed to assess the sustainability of SWFs.

2.5. SWFs' Investment Strategies

The above sub-sections showed the importance of fiduciary duty and sustainable investments for SWF sustainability. These discussions established the use of sustainable investments as a relevant criterion in this research. Another criterion is established as the diversification of investments. This point is examined in the current sub-section, where various investment strategies are discussed in detail.

While the evidence on the investment strategies of SWFs is limited due to the limited disclosure and transparency in the sector, there are still some studies that examined general investment strategies. For example, Chhaochharia and Laeven (2008) is an early study examining foreign equity investments by SWFs. Given the data limitations, they focus on 12 larger SWFs at the time. This paper has two relevant findings for the current research. Chhaochharia and Laeven (2008) state that "SWFs largely invest to diversify away from industries at home but that they bias their investments toward countries with similar cultural origins (such as religious affinity), suggesting their investment rules are not entirely driven by pure profit maximising objectives" and "the long-run performance of equity investments by SWFs tends to be poor, consistent with imperfect portfolio diversification and potential governance problems between incumbent management and SWF shareholders" (pp.30-31). So, the paper identifies limited diversification of assets and poor governance as important properties of these 12 SWFs. These points are exactly the dimensions that this research aims to use as non-financial performance criteria for SWFs. The first of these criteria is whether SWFs have enough diversification into different asset classes (covering also different regions) and the second of these criteria is whether SWFs have more professional management and governance. For this second point, the more concrete case of employing external managers is chosen as the relevant criterion. Here, external managers are defined as economic players who are not internal to the structure of SWFs, but independent under a limited contract with SWFs. Overall, the results of Chhaochharia and Laeven (2008) support the arguments in this research that SWF sustainability should be assessed using non-financial measures as well.

Another earlier study on the investment strategies of SWFs is Lam and Rossi (2010). In this paper, the authors based on their analysis of the leading SWFs, Lam and Rossi (2010) argue that "SWFs in oil-exporting countries may invest in asset classes that are very different from countries of SWFs that demand natural resources. A uniform policy for all SWFs on investment strategies may not be applicable" (p.316). So, the type of SWFs can have an important consequence for the investment strategies that an SWF follows. In addition, the authors mention that SWFs can play a favourable role in terms of strengthening financial stability as they smooth commodity income streams and increase market depth and liquidity. In addition, low leverage and long-term focus are other major benefits of SWFs in the global capital markets. Based on these points, Lam and Rossi (2010) see the rising share of SWFs in the financial system as a positive development.

In another study, Bernstein et al. (2013) examine transaction-level data from 29 SWFs. They examine the investment strategies, home bias, and the role of politicians and external managers in these transactions. Regarding external managers, 43% of SWFs from Asia and from Europe have external managers, while this share is only 13% for the Middle Eastern SWFs. When the investment strategies of SWFs are examined, it is found that FX reserves are the most common investment strategy followed by government physical assets, oil and commodity revenues, and other strategic assets. In contrast, domestic development relevant assets and pension funding are the least frequent forms of investment strategies. As a very crucial finding for the current research, Bernstein et al. (2013) show that funds with external managers have a lower tendency to display home bias in their investment decisions, while the involvement of politicians increases the level of home bias. In addition, the existence of external managers leads to higher growth in the price-to-earnings ratio, while the involvement of politicians has the opposite effect. Overall, these results imply that external managers can be used as an important non-financial performance measure to assess the sustainability of SWFs. While this measure of external managers is not directly related to financial performance, the results of Chhaochharia and Laeven (2008) and Bernstein et al. (2013) show that they can indirectly affect financial performance positively. Therefore, these results strengthen the case of using external managers as a sustainability measure for SWFs.

In a more recent study, Gbadebo-Smith (2018) provides very valuable information on the investment strategies of SWFs. In contrast to the above studies, this study examines a much larger sample of SWFs, thereby covering the majority of the sector. Gbadebo-Smith (2018) notes that SWFs have an asset under management size of $7.4 trillion at the time. With that asset size, they had a 6% share in the global fund management industry as of 2016. The leading players were mutual, insurance, and pension funds, with SWFs ranking in the fourth place.

In terms of the number of SWFs, Middle East was ahead of Asia with a 26% share relative to 23%. However, in terms of assets under management, Asia dominated by a 44% share, while the Middle East followed with a share of 34%, and Europe followed with a share of 16%. In terms of investment strategies, Gbadebo-Smith (2018) lists the following four categories “(1) cash and equivalents; (2) fixed-income securities; (3) global equities; and (4) private markets, which included alternative asset classes such as real estate, infrastructure, and private equity/direct investing”. At this point, the author finds that the fund type has significant effects on the investment’s strategies of SWFs.

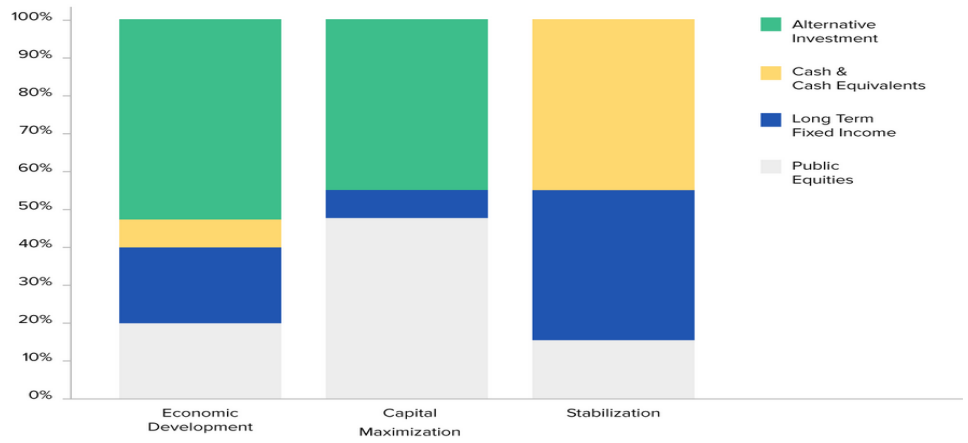


FIGURE 4 INVESTMENT STRATEGIES OF SWFS BY PURPOSE. SOURCE: GBADEBO-SMITH (2018).

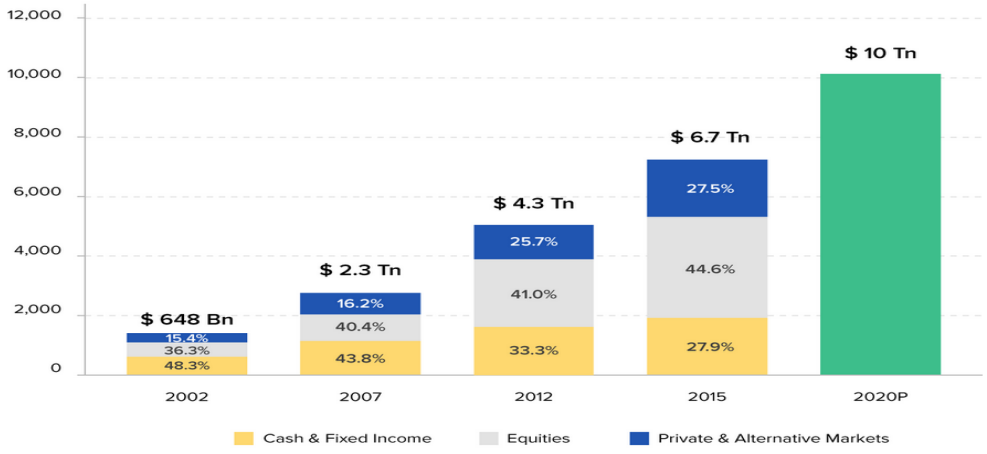


FIGURE 5 INVESTMENT STRATEGIES OF SWFS BY ASSET UNDER MANAGEMENT. SOURCE: GBADEBO-SMITH (2018).

As shown in Figure 4, funds that focus on economic development purposes invest around 20% of assets in public equities, with another 20% on long-term fixed-income assets, and 10% on cash and cash-equivalent assets. Then, as the largest investment item, the remaining 50% is allocated to alternative investment classes such as real estate, infrastructure, and private equity/direct investing. When one examines the case of SWFs with a focus on capital maximisation, it is found that alternative asset classes still have the largest proportion with their share being close to 50%. These SWFs do not hold any cash and cash-equivalent assets and hold an only limited share of long-term fixed assets. Instead, their largest investment category is public equities, with a share close to 50%.

Once the stabilisation SWFs are considered in terms of their investment strategies, the picture changes completely. As shown in Figure 5, these funds do not have any alternative asset classes in their portfolios, while cash and cash-equivalent is the largest investment category with a share of close to 50%. It is followed by long-term fixed income with around a 35% share, while the remaining 15% share is invested in public equities. These points imply that fund type has a strong effect on the patterns of investment strategies. This relationship is understandable, given that funds focused on capital maximisation versus funds focused on stabilisation purposes would attain their fund objectives through different asset classes. Therefore, this dimension regarding fund type should be kept in mind when examining the investment strategies of SWFs. As another relevant point, the overall investment mix of the SWFs sector would depend on the composition of different SWFs types. Figure 5 also shows the evolution of sector-wide investment categories. It is found that the share of alternative asset classes increased from 15% in 2002 to 28% in 2015. In the same period, the share of equities also increased from 36% to 45%, while the share of cash and fixed income declined from 48% to 28%. So, this pattern implies that SWFs diversified their portfolios from low-return and less-risky assets towards equities and alternative asset classes. This dynamic pattern also implies that the weight of capital maximisation and economic development SWFs increased in the sector over time. Overall, Gbadebo-Smith (2018) provides very valuable information on the investment strategies of SWFs, and the given structure can be utilised in the current research as well. In this context, the following discussions provide some relevant information on the investment strategies of SWFs in general and by using the existing data in the research.

Long-term Oriented and Intergenerational Equity

As large state-managed investors, SWFs have a marked effect on both local and global economies. SWFs allow countries to manage accumulated revenues derived from commodity or trade surpluses. The principal feature of SWFs as long-term investors exerts legacy pressure on them to meet citizens' obligations. They embrace a vital belief that managed independently by the government for the whole society benefits.

What might mark SWFs differently from other investment players is their sovereignty. Sovereignty means that they have a longer-term horizon than numerous investors. SWFs, with their fiduciary duty, aim to work toward the present generation and leave legacy toward future generations. This approach is in sharp contrast to that of mutual funds and hedge funds which

normally tend to take short-term perspectives. Furthermore, the long-term investment view in SWFs also means that they have great potential in shaping developmental changes. Recognising this time-orientation nature of investments is crucial in determining SWFs' responsibilities to help utilise decision making in terms of creating value-added. Adding value to all fund beneficiaries involves a greater commitment to the citizens of both current and future generations. In contrast, the limited attention to future generations is a governance deficit, which is formed by placing more weight on the present generations at the expense of future generations (Clark & Urwin, 2008).

Global private investors such as hedge funds and mutual funds have interest to place most of their investments in liquid assets, consistent with the demand for short-term liquidity from money markets (Ferreira & Matos, 2008). These private investors prefer short-term investing; in such condition, they invest in money markets as a means of safe playing tendencies and secure earnings (Kahn & Stulz, 1997). In contrast, SWFs have substantial liquidity to invest over a long-term horizon, so they are less concerned with the short-term liquidity and return issues. Therefore, having longer-term investments becomes an important investment strategy for SWFs, and this point can be used in assessing SWF sustainability.

In-home vs Cross-border Investments

SWFs attempt to invest for the long term in financial assets with different macroeconomic and political exposures than their domestic economies and the best way to achieve this is to invest in global equities, especially those of developed economies. Many SWFs are very large funds based in relatively small economies; so, they are forced to invest abroad in order not to create monumental asset price bubbles that would result from channelling investments into domestic stocks, bonds, and real estate.

Over the last decade, the investment environment has changed, so have SWFs' portfolios and their institutional structures. This has been mainly driven by the need to meet their objectives despite decreasing returns. Thus, in-home investment activities have increased over the long-term. Many SWFs started taking a greater degree of exposures in home countries. This has been to achieve better alignment with the fund's objectives and as a reaction to high external management fees in the industry. As portfolio risks increased and 'secure asset' return has decreased in the last decade, the responsibility of risk managers has become more challenging. Within this context, in-house investments help SWFs compete not only for

investment opportunities but also for the best experienced professional managers who will provide a competitive advantage in the local markets. Therefore, the right balance between domestic and overseas investments can be used as another factor in the diversification strategies of SWFs.

Asset Allocation Patterns

SWFs have the necessary size to ensure that they can invest across wide-ranging asset classes. SWFs employ wide-ranging investment strategies reflecting their different objectives. They typically allocate their investment in two main asset classes of traditional and alternative asset classes. Exposure to different asset classes such as traditional and alternative classes offers further diversification through risk/return exposure and varying investment horizons. Few SWFs have the necessary skills to effectively operate in all investment domains. So, some SWFs are better suited to invest in traditional asset classes, whereas others may have the ability to invest in alternative investments. Therefore, giving an overview of different asset classes that SWFs invest can be informative.

Based on a hand- collected dataset consisting of 1272 investments transactions made by SWFs from 2007 to the end of 2017, this sub- section analyses the key trends that have recently emerged regarding SWFs' asset allocation patterns across different asset classes and regions. The empirical data conducted from five different sources: Preqin, Sovereign Wealth Centre, FEEM Monitor, Zypher and Sovereign Investment Lab and it is accompanied with data gathered on mergers and acquisitions from BLOOMBERG over two years (see section 4.3 for more details).

Traditional Asset Classes

Traditional asset classes, such as public equity and fixed income, are features in many of these institutional investments. Public equity is one of the key components of many SWFs' investment strategies, offering the chance for liquidity and portfolio diversification. Remarkably, some SWFs (like in Norway) can allocate more than 80% of their total asset to public equity, indicating the employment of low-risk strategies by these funds.

Virtually three-quarters of SWFs have a preference for global equities, as maintaining a global equity portfolio can diminish risk against idiosyncratic developments through diversification. North America and Europe are preferred regions for SWFs investing in public

equity. The high levels of market transparency with relatively stable political environments in these developed economies create some opportunistic investments. For example, the Kuwait Investment Authority (KIA) increased its exposure to Europe at the expense of its exposure to Latin American equities. In addition, half of the SWFs investing in public equity prefer to allocate some of their capital to emerging markets. The great ability to grow in these markets can offer SWFs the potential of having a sizeable return, in addition to diversifying their portfolios from their economies. So, by investing in different traditional class assets like public equities and fixed income assets at a global dimension, SWFs can diversify against idiosyncratic macroeconomic shocks. As SWFs continue to grow and develop, seeking further diversification, and manage sophisticated asset classes to improve their return, they are expected to expand their investment portfolio to incorporate other asset classes as well. There may also be a correlation with their ability to attract external management with the skills to identify and manage these alternative investment classes given the relatively higher risk involved with the investment. The ESG investments are likely to fall within this category, and hence this is an area where SWFs desire for sustainable investment forms part of the diversification in investment classes.

Alternative Investment Classes

The amount invested by SWFs in alternative assets has expanded in recent years (Hentov and Petrov, 2015), indicating the experience and development of these investors as a way to diversify their portfolio further to achieve their investment objectives. Alternative assets include private equity, private debt, real estate, infrastructure, natural resources, and investments in hedge funds. Nearly three-quarters of SWFs invest in more than one alternative asset class. Investing in alternative asset classes seems to give SWFs the potential for high risk-adjusted returns. Moreover, alternative investments relevantly support the long-term investment horizons compared to other institutional investors like mutual and hedge funds.

Historically, asset managers were able to generate sufficient returns and moderate diversification by only investing in traditional assets such as public equities and fixed-income assets. However, the global financial crisis in 2008 exposed these low-risk strategies as being insufficient. Looking for greater profits and diversification, many SWFs started to increase their portfolio allocation to alternative investments, thereby adding more risks to their portfolios. These points demonstrate that, given the current low return environment, SWFs

need more complex investment strategies, so that they can produce the returns achieved previously. In addition, many SWFs have similarly turned to alternative investment classes to compensate for the shortage from low earnings in liquid assets.

Private Equity Investments

Investing in private equity has, for many years, delivered a significant return for SWFs (Cumming et al. ,2017). The highest proportion of investments among alternative assets is in private equity. Larger SWFs seem to have a higher probability of allocating more assets to private equity than their smaller counterparts. Remarkably, Government Pension Fund Global in Norway does not invest in private equity due to restrictions imposed by the government of Norway. This is an example whereby the fund managers are not totally free to meet their fiduciary responsibilities because of the constrained environment presented by stakeholders (Cumming et al., 2017). Some SWFs tend to exclude private equity from their investment strategy. SWFs that prioritise liquidity or anticipate a period of economic stress are likely to minimise their exposure to private equity. Russia's Reserve Fund (RSF) also does not invest in private equity; instead, it focuses its investment on liquid assets in terms of foreign currency reserves.

SWFs investing in private equity are based in several regions across the world. The Middle Eastern and Asian SWFs are the main investors in this class (Preqin, 2018). This is mainly due to a large number of SWFs based in these regions. Most SWFs investing in private equity are commodity-based funds, some of which have been affected by the falling in oil prices after 2014 (Fotak et al.,2017). So, they have a small annual increase in assets under management since 2014. However, stabilised oil prices in the 2017-2019 period, coupled with the growing proportion of capital investments in private equity, had an expanding influence within the alternative asset class. Yet, another major shock to oil prices and the global economy, the COVID-19 pandemic that started in early 2020 has the potential to restrict the growth of SWFs significantly.

Europe is the most attractive region for SWFs investments in private equity ahead of North America. Both Europe and North America possess some of the world's well-established and large private equity managers; hence, offering attractive fund strategies and opportunities for SWFs. Despite being a region with many of the largest SWFs, the Middle East invests

mostly in emerging markets (Clark, et al. 2017). In addition, some SWFs in the Middle East utilise domestic private equity investments to support social and economic initiatives.

Securing high returns from investing in private equity may be a concern for fund managers and can be seen as an increasingly competitive endeavour. From a diversification perspective, investing in private asset classes illustrates the competitive advantage of being a leader as an asset owner, where the portfolio diversification is driven by the underlying objectives of the fund. External managers can still offer attractive yields in an investment environment where institutional investors are also seeking high returns. The increased competition in the global market shows the potentials of asset managers in generating considerable returns over the long-term, unlike the short-term volatility seen in traditional asset classes.

Real Estate

Real estate is an essential asset class that continues to attract a large number of SWFs. This choice is generally due to the nature of real estate investments as a long-term commitment for many countries which aligns with the long-term investment horizon of these funds. Twenty-eight percent of SWFs invest in real estate. This proportion includes some of the largest SWFs worldwide, such as the Kuwait Investment Authority (KIA) and Government of Singapore Investment Corporation (GIC). Traditionally, larger SWFs have shown preferences for investing in real estate, due to their greater capability to run a diversified global portfolio and as an indicator showing the importance of this asset class for them. Conversely, smaller SWFs are less likely to allocate to real estate, indicating the limited scope available for these funds and the high barriers to entry for real estate investments.

Many SWFs investing in real estate are commodity-based funds, as real estate investments offer an effective way of achieving long-term investment horizons and diversifying from volatile oil prices. The Middle East and Asia are the regions investing the largest amounts in real estate. A considerable proportion of SWFs also invest in North America, most likely from the domestic investment by North American funds. Other regions represent smaller portions of SWFs investing in this asset class. Nigeria Sovereign Investment Authority (NSIA) is also an active investor in real estate.

By investing in real estate, SWFs try to scope for investment opportunities and reduce geographic concentration risks through regional diversification. North America and Europe are

the key regions for real estate investment by SWFs. Fewer SWFs prefer geographies outside these regions. This preference could be related to the less mature markets or weaker legal structure in other regions. As another characteristic, real estate investments in similar regions can help vitalise both social and economic initiatives of a country. Temasek, a Singapore-based fund, has access to several real estate development projects in China, such as Sino-Singapore Guangzhou Knowledge City (Preqin, 2018). In addition, most SWFs in the Middle East have a preference for domestic real estates, such as the Qatar Investment Authority (QIA) and Abu Dhabi Investment Authority (ADIA). Although SWFs could face challenges by increased demand and limited supply in certain markets, real estate is expected to remain an attractive asset class for many long-term funds. The importance of this asset class is mainly due to its relatively stable income stream and portfolio diversification.

Infrastructure

Infrastructure is an asset class that can offer long-term returns to many SWFs. They can use their sizable capital to stimulate their domestic economies. It is also an effective way for many funds to fulfil their development objectives. Due to SWFs' limited liability and the ability to hold out illiquid assets, investment in infrastructure seems attractive and suited to many of them. SWFs of all sizes prefer to incorporate infrastructure investment in their portfolios. The long-term investment objectives can be served through investing in infrastructure, which enables funds to finance their nations' public and physical essentials such as telecommunications along with physical and health care infrastructures (Schubert, 2011). With their large asset under management, SWFs provide the opportunity to fund the gap created by a lack of public sector investment and support the development and sustainability of the country by meeting social, economic and environmental objectives.

Seeking worldwide investment opportunities, thirty-two percent of SWFs maintain an international portfolio of infrastructure investments, illustrating the importance of global diversification (Schubert, 2011). Most of the SWFs investing in infrastructure prefer Asian assets. This decision is likely to come as a way to support domestic infrastructure projects. In addition, emerging markets are also attractive destinations for many SWFs due to the continued demand for infrastructure in these countries. Infrastructure investments in emerging countries present an opportunity for higher growth, diversification, and additional return on investments from the faster-growing markets compared to developed markets.

Natural Resources

Allocation of investment portfolios to natural resources occupies a significant portion in SWF strategies. Sixteen percent of SWFs currently invest in the natural resource asset class. Most commodity-based funds derive their initial revenues from the extraction of oil and other commodities, recognising the value of additional natural resource investments not only in energy but also in agriculture, water, and metals. Although many large funds are more likely to invest part of their portfolio in natural resources, the largest funds tend to invest in other alternative investments such as real estate and infrastructure as well.

The Middle East funds represent the largest portion of global SWFs investing in natural resources worldwide. Funds from this region can have local access and knowledge, especially in energy-related investments. The majority of SWFs investing in natural resources have a preference in energy more than any other natural resource assets. The exposure to energy assets could be a reflection of the available investment opportunities in energy. Natural resources as an asset class tend to be more diversified than other alternative investments as investment opportunities depend on the location of natural resources across multiple regions.

Private Debt

The global financial crises prompted the upsurge of the private debt markets. As the public debt markets stagnated in the last decade after the global financial crisis, SWFs were attracted to the private debt asset class as a new source of capital. It is also a high-risk class, but with potential for high and stable returns. However, the lack of detailed disclosure makes it hard to give more comprehensive information on this asset class.

Hedge Funds

A small number of SWFs are investing in the hedge fund asset class. China Investment Corporation (CIC) is an example of such funds, which allocates billions of dollars to this asset class. Hedge fund investment is one of the least employed asset classes among SWFs, which prefer traditional investment or other alternative investments as real estate and infrastructure. SWFs have been investing in hedge funds worldwide for a number of years, with the largest proportion based in Asia, followed by North America and the Middle East. Abu Dhabi Investment Authority, Kuwait Investment Authority, and Alberta Investment Management have all been investing in Hedge Funds for over a decade. North America, the centre of the

hedge fund industry, generate capital from SWFs based in the region such as Alaska Permanent Fund Corporation, New Mexico State Investment Council, and Wyoming State Treasurer's Office.

North America is a base for most established and largest hedge funds, offering a range of investment opportunities. North American funds prefer to invest domestically. Alberta Heritage Savings Trust Fund, for instance, has a global investment mandate but focuses on North America due to simple access and links to the region. Most of the SWFs focus on emerging markets investment, as a host of opportunities for high returns from investing in hedge funds. Exposure to emerging markets offers a way of diversification away from developed markets to high-growth markets. SWFs are still attracted to hedge funds as a result of their ability to further diversify and identify unique chances to achieve their investment objectives. As SWFs recognise the value that could be brought from investing in hedge funds, this asset class is likely to remain active as an important source of capital to these funds.

Far too little is known about the details of SWFs investment strategies and asset allocation patterns, with the notable exception of the activities of some SWFs such as Norway Pension Fund Global. The investment figures and financial returns achieved by SWFs has so far defied analysis and remains opaque. Despite the lack of truly comprehensive data, this research has gained some insight into the of SWFs investment activity and provide detailed discussion about their investment key trends and asset allocation patterns.

2.6. Conclusion

This chapter provides detailed background information and discussions on the sovereign wealth funds (SWFs). In this way, it aims to put the research questions of this study within a general framework of the literature. As the research is interested in the sustainability of SWFs, the relevant discussions focused on some SWFs dimensions that have information content regarding this sustainability topic. The initial parts of the chapter examined various definitions of SWFs. The most important properties of SWFs are that they are public fiduciary entities with specific fund objectives on behalf of the state or society. In addition, they have limited liabilities, and their funding comes from public sources (like commodity incomes or budget/trade surpluses). In that sense, they are quite different from private funds like mutual and hedge funds and from public funds like pension funds. All of these fund types have significant liabilities in their balance sheets that might force them to keep some short focus on

their investment strategies. In contrast, SWFs can focus on long-term returns and value created in a more flexible way due to the lack of direct liabilities. While the initial SWFs were established as early as the 1950s, the SWFs terminology and this sector gained prominence since the 2000s. These funds can be categorised on various dimensions, such as sources of funds (like commodity versus non-commodity), purposes of funds (like saving funds, stabilisation funds, pension reserve funds, development funds, and reserve investment corporations), and their institutional structures (like being a governmental entity or an investment company). These categorisations are important because they can affect the investment strategies of SWFs and as a result, their sustainability assessments.

When the relevant quantitative data (while it is difficult to get detailed information on SWFs due to limited disclosure and transparency) is examined, it is found that their weight in the global capital markets has been increasing since the early 2000s. The majority of existing SWFs were established in the last two decades, and the high growth of commodity prices, as well as trade balance surpluses of some developing countries, has been instrumental in the strong growth of assets under management by SWFs. So, they have become permanent and important players of financial markets. As SWFs are public institutions, their rising involvement in the capital markets with neoliberal settings creates some debates regarding their legitimacy and political motivations. Some advanced countries, like France, considered the investment strategies of certain SWFs, especially from the Middle East and Asia, as being hostile and politically motivated. So, they tried to counterbalance the importance of foreign SWFs by establishing their own funds. While such concerns are raised occasionally, the general literature accepts SWFs as legitimate international investors. They are considered as fiduciary agents that aim to achieve certain sovereign targets like capital maximisation, stabilisation, or developmental purposes. So, they try to manage their funds coming from public sources in a way to benefit their stakeholders, including present and future generations. In this context, they have also much longer investment horizons relative to other international investors like mutual funds or hedge funds.

An important consequence of fiduciary duty to all generations is that sustainable investments are very important for SWFs. As these institutions try to take the benefits of future generations into account in an equitable way, they are not supposed to focus on short-term returns at the expense of long-term benefits. These concerns also cover environmental, social, and governance (ESG) issues. Therefore, this research argues that sustainable investments

should become a non-financial criterion to assess the performance and sustainability of SWFs. In addition, the literature review shows that SWFs might be facing low diversification and poor governance in their current frameworks. More recent studies show that diversification of assets increased over time, especially into alternative asset classes and private equity. However, SWFs from some regions still do not employ external professional managers to improve their corporate governance. These studies also show that low diversification and low involvement of external members are associated with higher home bias and lower fund performance. In this context, the current research paper aims to use asset diversification and external managers as the other non-financial criteria of SWF sustainability. The point on external managers is justified in more detail in the next chapter regarding the resource-based view of companies. This approach argues that resources unique to the firms are the leading determinants of competitiveness and sustainability for companies. External managers can be counted among such resources. Therefore, using them as a sustainability criterion makes sense. Lastly, the chapter also provides a detailed discussion of investment strategies utilised by SWFs. It is found that the type of SWFs matters greatly for investment strategies. For example, SWFs focused on economic development make large investments on alternative asset classes, while stabilisation SWFs focus more cash and cash-equivalent assets, along with fixed-income assets. Over time there has been a diversification from traditional to alternative asset classes. Then, whether sufficient asset diversification exists within SWFs is used as another SWF sustainability measure.

Chapter 3: Resource Management and the Resource-Based Theory

3.1 Introduction

The previous chapter presented detailed information and discussions on the various dimensions of SWFs. The topics of fiduciary duty and sustainable investments are shown to be very crucial to assess the sustainability of SWFs. Specifically, based on the relevant analysis, it is argued that investments in social and environmental causes can be used as a measure of SWF sustainability. The analysis in the previous chapter also indicated that the existence of external managers and the diversification of assets towards alternative asset classes could be considered as other possible measures of SWF sustainability. However, these discussions lacked strong theoretical justification. Therefore, this chapter tries to offer a theoretical foundation for the research topics of the current thesis.

When examining company-related issues like firm performance, competitive advantage, and corporate governance, researchers generally employ various theoretical approaches such as agency theory, shareholder approach, stakeholder approach, the resource-based view of firms, and the natural resource-based view of firms (Eisenhardt, 1989; Donaldson & Davis, 1991; Hill & Jones, 1992; Shapiro, 2005; Wernerfelt, 1984; Hart, 1995). While these theories are developed as substitutes of each other, to some extent, in terms of providing a theoretical understanding of corporate behaviour and performance, they also provide complementary information on various firm dimensions. So, it is possible to motivate the choices of two dependent variables, i.e. the existence of external managers and ESG-related investment strategies, based on these theories or a combination of them. However, this chapter argues that the most appropriate theoretical framework is the resource-based theory. This theory views the board properties and especially the existence of independent or external directors and managers as very crucial resources for firms. Instead of having homogenous (in terms of various dimensions such as gender, age, ethnicity, profession, skills, networks, etc.) boards and managers, having some diversity in these management levels would provide firms with unique skills, perspectives, and networks. Therefore, according to the resource-based theory of the firm, external managers can be considered among the most important resources of companies. Accordingly, this theory becomes the most appropriate conceptual approach to motivate the choice of external managers as a proxy for SWF sustainability.

Similar arguments can be put forward regarding the choice of ESG-related investments as another measure of SWF sustainability. Sustainable investment topics, CSR issues, and ESG activities can also be motivated by various theories, like the stakeholder theory. According to this theory, society and environment are among the key stakeholders for firms and managers should take the interests of these stakeholders into account in the decision-making and impact-analysis processes. The stakeholder theory argues that the suggested broader perspective would improve the long-term sustainability and competitive advantage of companies. However, as in the case of the variable of external managers, there is a more appropriate theoretical approach. Namely, the resource-based theory, and especially its variant the natural-resource-based theory, provides a very relevant conceptual framework. The natural-resource-based theory assumes that there are limitations in the environment, and the existing business model does not take such limitations into account. Then, a concrete risk of irreversible damage to the environment develops, which would create major social, economic, political, and business costs. Therefore, this theoretical approach advocates a major transformation of the business world in more environment-friendly ways. Then, the choice of the ESG investment strategies as another sustainability measure for SWFs can be motivated in detail by this theory. Overall, this chapter argues that the resource-based theory is the most appropriate conceptual framework to justify the research process and the choice of two dependent variables. To detail and support this argument, the following sub-section 3.2. reviews the relevance of other corporate governance theories, like the agency theory and stakeholder theory, for SWF sustainability. Then, the following sub-sections 3.3., 3.4., and 3.5. provide details of the resource-based theory and the natural resource-based theory. They focus on the dimensions of external managers and ESG investments as two leading measures of SWF sustainability. Then, sub-section 3.6. justifies the choice of investing in alternative asset classes as the last SWFs by reviewing theoretical and empirical studies. So, these parts form the core of the current chapter. After providing an explanation of the three SWFs dimensions, sub-section 3.7. introduces the six research hypotheses of this research. Finally, the last sub-section 3.8. concludes the chapter by summarising the main SWFs dimensions.

3.2. Corporate Governance Theories and SWF Sustainability

3.2.1 Agency Theory

The agency theory is a leading corporate governance theory in economics and business literature to study firm behaviour and performance (Shankman, 1999; Bonazzi & Islam, 2007). It is based on a crucial property of modern corporations, i.e., the separation of ownership and management (Monsen, 1969; Fama & Jensen, 1983). Except for small family firms, this separation has been an important feature of modern corporations. It is seen as a necessary feature of globalisation and internationalisation. As firms grow in size, scope, and geography, their operations become much more complex. In such demanding conditions, it would be very difficult for owners of firms to actively manage the vision and strategies of their companies. While founding owners might be very able entrepreneurs, firms usually outlive their founders, and there is no guarantee that the next generations of owners will be as able as the founders.

So, in addition to the issues of growing complexity, the declining fit of owners for managerial duties can be another factor necessitating the separation and ownership in modern firms. So, these challenges can be addressed by hiring professional managers or directors that would lead the daily operations of the company and manage its functioning. In that sense, the agency theory is also relevant for the management of SWFs. While SWFs are founded on behalf of society and its citizens (including present and future generations), the politicians might have a large weight in the decision-making process of SWFs. In other words, they might behave as if they are the owners of SWFs, especially in countries with limited legal protection and weak governance. The literature review in the previous section displayed that the involvement of the politicians in SWFs management would lead to higher home bias in investments and lower financial performance (Chhaochharia & Laeven, 2008). Then, this situation can be considered a case of no-separation between the so-called owners (i.e., politicians at the behalf of the public) and managers (i.e., politicians again). As owners might be unfit for effectively managing SWFs, they can lead to less diversification and lower performance. Viewed from this perspective, the agency theory would suggest the separation of ownership from management or removal of politicians from the decision-making process. In this context, agency theory becomes a relevant theoretical approach to understand SWFs performance and sustainability.

Agency theory can also provide other insights into SWF sustainability and performance. According to this theory, when ownership and management are separated, new challenges emerge for firm performance and corporate governance. The main challenge is

called the principal-agent problem (Grossman & Hart, 1992; Stiglitz, 1989). In modern companies, owners or shareholders (who are called the principal) hire managers or executives (who are called the agent) to manage the firm on their behalf. In this business relationship, managers are expected to maximise the returns for the owners. Namely, the task of executives is to follow the interests of shareholders. However, there are major information asymmetries in this business relationship. Managers will accumulate internal information over time, and managers might not have access to such strategic information. In addition, managers might try to maximise their benefits rather than following the owners' interest. Since verifying these situations would be very costly, like extensive monitoring, owners are left at a disadvantageous position relative to managers. There is large literature examining the nature of the principal-agent problem, its consequences for firm performance, corporate governance, and macroeconomic developments, and measures to address the principal-agent problem. For example, the relevant literature suggested connecting executive compensation to the firm performance (like stock market returns), so that the interests of managers and owners would be aligned (Garen, 1994; Haubrich, 1994). However, some studies also argued that this association between executive compensation and stock market performance led to a short-term focus on investment strategies and accounting manipulations (Zhu, 2018). Other studies also argued that this short-term behaviour was responsible for the financial crisis of 2008-2009, implying that the principal-agent problem can be very costly for societies (Bebchuk & Fried, 2009).

The above framework of the principal-agent problem can also be considered as being relevant for SWFs and the research topic in the current thesis (Eaton & Ming, 2010; Aguilera et al., 2016). One relevant dimension emerges from the view of owners/principals as the public (including present and future generations) and politicians (who have some weight in the decision-making process) as the agents. So, politicians would be given the duty of managing SWFs in a competitive and sustainable way to benefit the whole society. However, it is possible that politicians would use their managerial positions or decision-making powers to benefit themselves or people that are connected to them politically. One can give the extreme example of 1MDB, the Goldman Sachs-backed Malaysian fund, where politicians used the funds for their benefit (Case, 2017). 1MDB fund was established to finance infrastructure and other development projects in the country, so it resembled development SWFs examined in this research. However, politicians, who were the managers on behalf of Malaysian people, used it

for their interests. Then, the principal-agent problem becomes very relevant for the SWFs in such cases where politicians or managers might be tempted to use the existing framework for their benefits at the expense of the public. Then, this situation would suggest connecting the compensation of managers (including the politicians) from SWFs to the general benefit of the society. Such objectives can be achieved by increasing transparency and accountability at SWFs. Another such way would be the employment of external managers and connecting their compensation to the long-term financial and non-financial performance of SWFs. Therefore, the measure of external managers can be justified within the framework of the agency theory and the principal-agent problem.

3.2.2 Shareholder and Stakeholder Theories

In addition to the agency theory, one can also relate the shareholder and stakeholder approaches to corporate governance of SWFs. The shareholder view assumes that the responsibility of managers and firms is only to their shareholders (Smith, 2003). So, they are required to maximise the shareholder returns, which is in line with the agency theory as well. This approach is advocated by Friedman (1970) who stated that "the social responsibility of business is to increase its profits" (p.32). This position implies that businesses should only focus on profit maximisation and should not be concerned with other objectives. It is argued that in this way, businesses would maximise their contribution to society as well. However, given many forms of market failures, market power, and negative externalities associated with the business activities, the shareholder approach fails to account for such factors in the decision-making process. So, the investment strategies that can be optimal for individual businesses and sub-optimal for society. Some leading examples include pollution and child labour which might be good for profits, but they are costly for society. Therefore, the stakeholder approach, in contrast to the shareholder approach, argues for a broader perspective in the decision-making process (Freeman, 2010). All economic, environmental, and social entities that are affected by the actions of a company would be the relevant stakeholders (such as employees, clients, suppliers, public, and environment). Then, the firms need to take the interests of all stakeholders into account in a balanced way.

One can argue that such a broader perspective under the stakeholder approach would affect the financial performance of firms negatively. However, the relevant literature finds that the stakeholder approach and relevant CSR activities can, in fact, increase the performance of companies through various channels (Saeidi et al., 2015; Mishra & Suar, 2010). As the

consumers are empowered in recent periods and as their awareness on social and environmental issues increased, firms need to adjust their strategies according to these developments. So, firms that fail on social or environmental fronts could face consumer reaction and would lose reputation and customer loyalty. As such factors like loyalty and reputation are very important properties for the competitive advantage of firms and sustainability of their strategies, especially in the long-run, firms need to act according to the stakeholder approach in order to improve their performance. So, the stakeholder approach proposes a longer-term approach to firms' strategies.

The above debate points between the shareholder and stakeholder approach are also relevant for SWFs. The shareholder approach would suggest focusing only on short-run profit maximisation as the major objective of SWFs. However, the stakeholder approach would suggest a longer-term focus that takes the interests of various stakeholders (like environmental and social causes as well as future generations) into account. From that theoretical perspective, SWFs investments into the environmental, social, and governance purposes as well as economic development objectives could be seen as competitiveness and sustainability criteria. In addition, this approach would necessitate taking the interests of future generations into account, so, longer-term value creation would be a major investment strategy for SWFs. Therefore, the theoretical framework of the shareholder approach can also be utilised to justify the research question and strategy of the current thesis.

Overall, the leading theoretical perspectives regarding firm behaviour, competitive advantage, sustainable strategies, firm performance, and corporate governance can be employed to provide an analytical perspective to the research question. Among these theoretical approaches, the agency theory and the principal-agent problem are valuable to understand the possible problems in the management of SWFs like the conflict of interests that politicians or domestic/internal managers might have in the decision-making process. In this framework, there is always the possibility of politicians and internal managers behaving in terms of focusing on short-term returns and following self-interest rather than the interests of all beneficiaries (including future generations). A policy measure to address this principal-agent problem would be the employment of external managers and connecting their compensation to the overall performance (including non-financial measures as well) of SWFs. Therefore, the use of an external manager variable as a criterion to assess the SWF sustainability can be easily justified by the agency theory. In this context, the stakeholder

theory is another conceptual framework that can be used to examine the research question. Stakeholder approach argues that corporations should not focus on short-term profit maximisation for shareholders, but they should have a longer-term perspective and take the interests of all stakeholders (including society, environment, and future generations) into account. Therefore, this approach justifies the investments of SWFs in ESG activities. Therefore, the stakeholder approach can be used to support the establishment of SWFs expenditures or investments on social and environmental dimensions as another criterion for the assessment of SWF sustainability. Overall, this introductory sub-section shows that agency theory and stakeholder approach are relevant conceptual frameworks to study the research question and SWF sustainability. However, the main theoretical approach that fits the current research more effectively is the research-based view of the firm, as explained in the following sub-section.

3.3. Resources Approach

3.3.1. Resource-Based Theory

This sub-section explains the resource-based view of the firm. In a seminal study, Wernerfelt (1984) proposes a resource-based view of the firm, in addition to the standard output-based view. These two views (i.e., products and resources) are like two sides of the same coin as they provide information on firm strategies and performance. Regarding the definition of resources, Wernerfelt (1984) states that "By a resource is meant anything which could be thought of as a strength or weakness of a given firm. More formally, a firm's resources at a given time could be defined as those (tangible and intangible) assets which are tied semi-permanently to the firm" and "Examples of resources are: brand names, in-house knowledge of technology, employment of skilled personnel, trade contacts, machinery, efficient procedures, capital, etc." (p.172). The author notes that similar to entry barriers in the strategy literature, resources can be used to construct barriers and thereby, promote the competitiveness of firms. In another seminal paper, Prahalad and Hamel (1990) focused on the concept of 'core competencies. These competencies can be tangible and intangible resources as well as ways of doing business and organizing activities. Prahalad and Hamel (1990) suggest three criteria to identify such competencies as i) "a core competence provides potential access to a wide variety of markets", ii) "a core competence should make a significant contribution to the perceived customer benefits of the end product", and "a core competence should be difficult for

competitors to imitate" (p.83). This last point is especially important, so that core competencies act as barriers to entry and ensure the competitive advantage of firms.

Another seminal paper on the resource-based view of the firm is Barney (1991), which defines resources as "all assets, capabilities, organisational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness" (p.101). In contrast to the simplistic views of firms with very homogenous structure and resources in the same sector, this approach assumes that resources might be distributed in a heterogeneous way, and some of them might be strategic. Then, the author identifies four characteristics of resources that would create sustained competitive advantage. These properties are being valuable, being rare, imperfectly imitable (including unique historical conditions, causal ambiguity, and social complexity), and low substitutability. The author mentions the example of a charismatic leader or high-quality top management as examples of strategic resources with low substitutability. It would be difficult to replicate or copy the same board or managers to another company, so successful managers can be important resources for their companies.

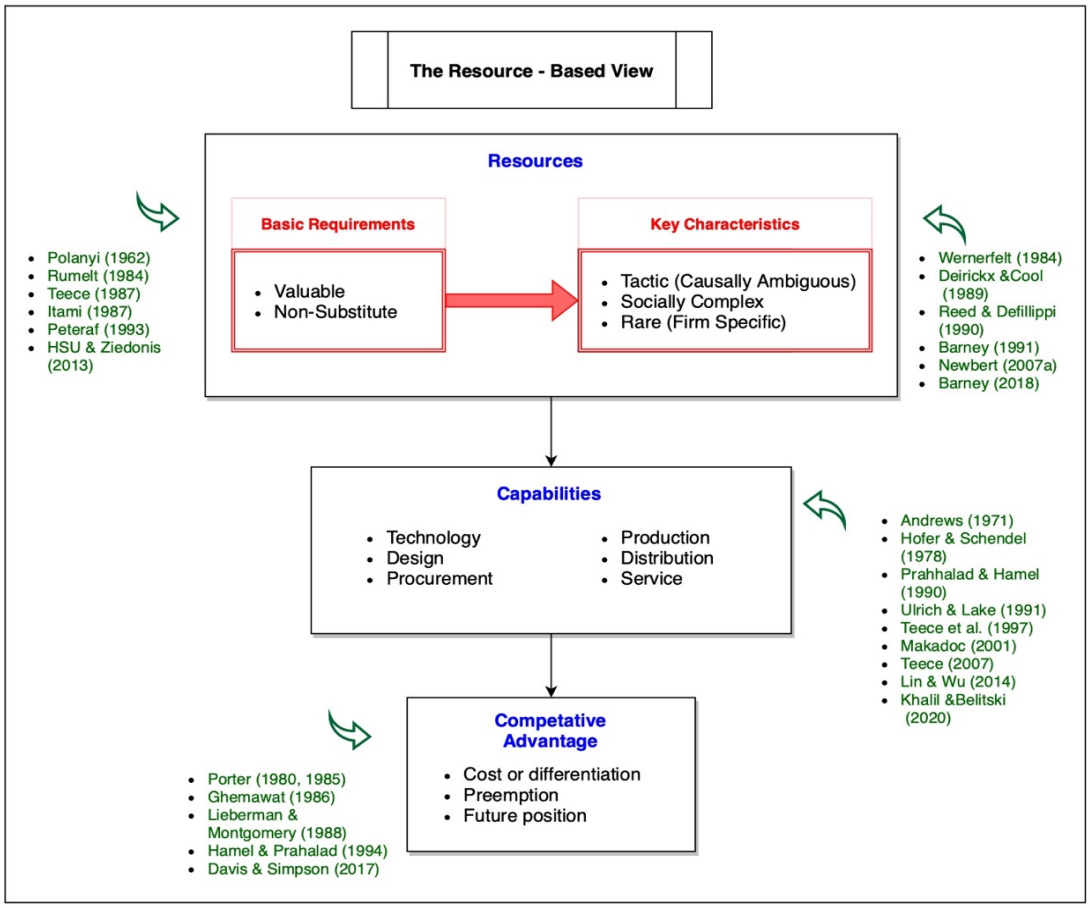


FIGURE 6 RESOURCE-BASED VIEW OF THE FIRM. SOURCE: ADOPTED FROM HART (1995)

Hart (1995) provides a graphical representation of the resource-based view of the firm, as presented in Figure 6. In this setup, the final aim of a firm is to attain some competitive advantage relative to rivals and sustain it. Such sustained competitive advantage would be based on some resources and capabilities with certain characteristics. The main requirements for the resources are being valuable and non-substitutable. Then, three important characteristics of resources that would create competitive advantage are being tacit (i.e., the causal mechanism from resources to the competitive advantage is not very clear to the outsiders), rate, and socially complex. In the framework of Hart (1995), resources with the above requirements and characteristics are combined with the relevant capabilities (including technology, design, procurement, production, distribution, and service) to create sustained competitive advantage. Hart (1995) summarises this point by stating that "competitive advantage can be sustained only if the capabilities creating the advantage are supported by resources that are not easily duplicated by competitors" (p.988). Among the resource characteristics, being tacit and socially complex are mostly based on employees and managers of the firm, as they involve skills, practice, learning-by-doing, experience, and networks. So, having the right employees and managers can be major sources of competitive advantage. This point is very relevant for the current research, as it confirms the importance of external managers for the SWFs sector.

3.3.2. Natural-Resource-Based Theory

Hart (1995) notes that the standard resource-based view of the firm still lacks an important dimension, which is the ecosystem, nature, or the environment. Hart (1995) states that "strategy and competitive advantage in the coming years will be rooted in capabilities that facilitate environmentally sustainable economic activity – a natural-resource-based view of the firm" (p.991). According to the author, the rising trend of business activities and economic productions in the existing business systems is not consistent with the ecological capacities of the earth. If the current production, waste disposal, and gas emission trends are maintained in the coming decades, the world climate will face permanent destabilisation with major economic and social costs. So, there is a need to change the existing business models. Therefore, Hart (1995) argues that the resource-based view of the firm should also incorporate environmental concerns and constraints into its theoretical framework. In this context, the author mentions three nature-related dimensions of pollution prevention, product stewardship, and sustainable development as the relevant strategic capabilities.

The first strategic capability of pollution prevention in the natural-resource-based view of the firm as advocated by Hart (1995) focuses on minimizing emissions and waste. So, it involves continuous improvement in the design, production, and recycling processes. In addition, pollution prevention as a strategic capability would lead to competitive advantage by lowering costs. The second strategic capability of product stewardship aims to lower the life-cycle costs of products and would require stakeholder (like consumers and suppliers) involvement in the process. In this way, the firm can deter the rivals and thereby, create further competitive advantage. The third and last strategic capability is sustainable development. This is a much broader dimension and focuses on the broad effects of firms and economic growth. This dimension would be expected to create some competitive advantage by establishing a favourable future position for the company. Overall, the natural-resource-based view of the firm offers important insights on how to incorporate environmental issues in a competitive way into firm strategies.

Both the resource-based view of the firm and the natural-resource based view of the firm are very relevant for the current research. In the resource-based theory of the firm, resources and capabilities are the main instruments of a firm to create sustainable competitive advantage and improve its performance. If these resources are valuable, rare, imperfectly imitable (including unique historical conditions, causal ambiguity, and social complexity), and has low substitutability, then their value-added and relevance for companies would increase further. It can be seen that some of these properties fit intangible resources like human capital, unique information about certain products, sectors, and geographical markets, and business networks very well. One such specific intangible asset for firms would be independent directors and external managers. These top-position employees would bring external and independent expertise, experience, skills, knowledge, and networks to the firms. This situation holds in the case of SWFs as well. The previous section displayed that SWFs started to diversify their asset base towards overseas and unconventional asset classes. However, such moves require important managerial capabilities such as collecting information about these new investment strategies (especially investing in foreign countries), assessing the relevant information, and devising relevant portfolio allocation and risk management decisions all necessitate significant managerial and human capital as well as intimate knowledge and experience in these sectors. Under these conditions, the employment of external managers who have a high level of experience and close information in these new asset classes would be the best strategy to move

forward. Therefore, the resource-based theory becomes very relevant for the research questions and process of the current study. Then, the next sub-section reviews the vast literature on the importance of board characteristics, and especially the role of independent directors and external managers. In this way, the choice of the external manager variable as a proxy for SWF sustainability is established firmly.

Similarly, one can motivate the choice of ESG or CSR activities or sustainable investments as another dependent variable in the current study through the natural-resource-based theory of the firm. This theory advocates a greater role of three factors, i.e., pollution prevention, product stewardship, and sustainable development, as the relevant strategic capabilities that would create sustainable competitive advantage in the long-run and improve the firm performance. At this point, a crucial question is about the level and scope of ESG or CSR activities. When the relevant studies are examined, it is seen that CSR activities have increased significantly over time with many public companies publishing regular reports for these types of activities. However, whether the existing framework of CSR would generate the expected positive impact and reverse some unfavourable developments, such as climate change and global warming, is not very clear. In fact, some studies argued that the usual CSR practices are not more than greenwashing strategies of corporations and brands. Namely, the businesses might be turning the required ESG activities into business-as-usual CSR policies. Therefore, it is important to make a difference between low-impact CSR activities and high-impact CSR strategies. This chapter argues that the natural-resource-based theory provides a perspective on how to devise ESG strategies that address the real environmental problems in effective ways. These strategies would be three strategic capabilities that Hart (1995) proposes. In other words, pollution prevention, product stewardship, and sustainable development serve as the criteria of whether firms or SWFs behave in sustainable ways. Therefore, based on these discussions, it can also be argued that the natural-resource-based theory is the most appropriate conceptual framework to motivate and justify the use of ESG investment strategies as a measure of SWF sustainability. This point is examined and supported through a literature review of CSR activities and their adequacy in the sub-section 3.5.

3.4. Resource-Based Theory and External Managers

This sub-section argues that the conceptual framework of the resource-based theory can be used to motivate and justify the employment of external managers by SWFs, and this choice would be a major dimension of SWF sustainability. However, when these two topics of resource-based theory and external manager employment by SWFs are examined, it is seen that there is a lack of research connecting these two topics. So, the proposed relationship does not already exist in the literature, and there is a need to establish an endogenous and fundamental link between them. When these two topics are examined, it is found that there is a large literature examining the relevance of independent or external directors for joint-stock companies within the context of the resource-based theory. In addition, there is a separate field where few studies examine the role of external manager employment by SWFs. However, there are no studies that make a formal connection between these two research fields. In this context, this section examines these two research fields and makes a fundamental connection. It extends the resource-based theory to cover the case of external managers in the context of SWFs. In this effort, external managers are positioned as a strategic resource for SWFs to sustain their competitive advantage. Then, this connection both motivates and justifies the choice of external managers as a measure of SWF sustainability. Towards these objectives, the sub-section first reviews the role of boards and the importance of independent or external directors on the boards for firm performance within the context of the resource-based theory. The relevant discussions are expected to provide a background analysis to the examination of external managers in the context of SWFs. So, the conceptual model of the resource-based theory and the empirical evidence on the role of external directors will be transferred to the external manager context for SWFs.

3.4.1. The Resource-Based Theory and Independent/External Directors

The board of directors are among the most important dimensions of corporate governance in modern corporations. They play important roles in the companies in terms of providing guidance for the firm strategies and monitoring the activities of the top management. Theoretical arguments, such as the resource dependence theory, suggest that factors including the quality, decomposition, independence, and diversity of the board of directors would improve the firm performance.

The evolution of modern corporations has been instrumental in the rising importance of the board of directors. As the size of companies grew significantly and as the scope of their

operations became more complex, their management required a more professional approach than the usual management by the founding families. While the main form of corporations in the 19th century was family businesses, this form became less feasible given the rise in size and scope of companies. This challenge was addressed by the separation of ownership and management. Namely, families started to employ professional non-family executives to manage their companies. In this way, the efficiency and performance of the firms are expected to increase. While the separation of ownership and management was a necessity for many large corporations, this development also created its challenges. In the new corporate governance structure, the shareholders or owners of the firms are called the principal, and the executives are called the agent. Then, the relationships and tensions between the principal and agent form the core of corporate governance theories are studied widely in the literature (Ross, 1973; Jensen & Meckling, 1976; Fama & Jensen, 1983; Mitnick, 2015).

The main tension between the shareholders and managers arises in terms of the alignment of their respective interests. The shareholders would be interested in the maximisation of their interest, which would coincide with the maximisation of the firm value in a sustainable way. However, the interests of the managers might not align with this general objective. For example, the managers might try to increase their benefits and perks at the expense of the firm value. In addition, managers might be inclined to increase firm value in the short-run even if it implies a decline in the long-run firm value and sustainability. So, serious principal-agent problems can arise in modern corporations. Normally, the shareholders would provide close monitoring of managers to avoid the emergence of such agency problems. However, the complexity and size of many corporations make it difficult for shareholders to effectively monitor managers. In this process, various developments take place at the expense of shareholders and in favour of managers. Namely, the managers would accumulate internal information on the conditions, profitability, and sustainability of the firm. However, such information would not be easily accessible to the shareholders. Then, a case of asymmetric information is generated (Gomez-Mejia & Wiseman, 1997; Ballwieser et al., 2012). Similarly, the shareholders cannot easily identify whether a company outcome is due to the skills and strategies of managers or due to external factors. In other words, a case of costly state verification develops (Vives, 2000). So, it becomes very difficult for shareholders (especially when ownership is widely dispersed) to overcome the challenges of asymmetric information and costly state verification so that they can easily understand the actual situation in their

companies and thereby monitors managers. There are various proposals that try to lessen such agency problems in corporations. One strand of the literature focuses on executive compensation and aims to align the interest of managers with that of shareholders by connecting compensation to firm performance (Murphy, 1999). As another corporate governance solution, the board of directors can function on behalf of the shareholders to collect relevant information on the state and performance of the company and to monitor the behaviour of managers. Therefore, the board of directors can play important roles to lessen agency costs and to improve firm performance according to the agency theory (Hillman & Dalziel, 2003).

While the agency theory confirms the role of the board of directors for corporate governance, it does not have direct consequences for its properties like size, composition, meeting frequency, independence, or diversity. In this regard, the resource-based theory (along with the complementary resource-dependence theory) stands out as a more relevant theoretical approach. As explained in the previous sub-section, the capabilities and resources of companies are the main factors that determine its competitive advantage and sustained high performance. According to the resource-dependence theory of Pfeffer and Salancik (1978), the board of directors is a crucial entity within companies that can provide unique and valuable resources. Hillman and Dalzile (2003) note that the main resources and capabilities that the board of directors can provide include advising, legitimacy, providing communications with external organisations and obtaining external support. Then, both the human capital of the board members and their relational capital (i.e., their business and social networks) are important factors that determine how effectively the boards can provide these resources and capabilities to their companies. Therefore, the composition and characteristics of boards become very crucial in corporate governance as well.

Given the importance of boards and their characteristics for corporate governance, there is a large literature that examines their effects on firm performance. The literature looks at various board characteristics such as the board size, the meeting frequency, the duality and CEO and Chairman, the board independence, the board diversity, and the role of different committees (like remuneration or auditing committees). Regarding the dimensions relevant for the current research, the literature finds that board independence (generally measured by the proportion of external or independent members on boards) has a positive effect on monitoring efficiency and thereby, firm performance. Similar findings are registered in the case of board

diversity as diversity implies that there are unique and more valuable resources within boards relative to homogenous boards.

Rosenstein and Wyatt (1990) is a leading study that examines the impact of outside or independent board members. The authors find that “Management plays a dominant role in selecting outside directors, inviting skepticism about outsiders' ability to make independent judgments on firm performance. Our examination of wealth effects surrounding outside director appointments finds significantly positive share-price reactions” (p.175). So, this is an early study showing the positive effects of external members for shareholder wealth and firm value. As another important study, Beasley (1996) shows that as the share of external members on board increase, the likelihood of accounting fraud declines. This is an important finding which shows that independent board members increase their monitoring activity and efficiency so that the harmful activities of managers would be contained. As another relevant finding, the literature also shows that after a poor performance, there is a tendency for boards to become more independent (Hermalin & Weisbach, 1998). So, companies try to use board independence as an important corporate governance tool to improve firm performance and sustainability. In another study, Byrd and Hickman (1992) show that firms with a higher share of independent board members obtain higher abnormal returns after tender offer bids. This finding also shows that board members play a major role in increasing firm value. Positive effects of board independence are also shown in the case of developing countries like China and Chile (Lefort & Urzua, 2008; Liu et al., 2015). Overall, the corporate governance literature shows that external or outside board members provide important benefits to companies.

The above empirical findings are consistent with the resource-based theory in the sense that external members would bring unique and valuable resources to the companies, and they would be less constrained by the managers. As a result, the monitoring efficiency of the company would increase and thereby, the firm performance would improve. This theoretical perspective on the benefits of external directors for firm performance can be extended to the domain of the employment of external managers by SWFs and SWF sustainability. The next part examines this issue within the context of the resource-based theory.

3.4.2. External Managers in the Context of Resource-Based Theory

Given the data availability and transparency issues, the literature on the role of external managers is much more limited. The literature review in the second chapter mentioned a few papers that examine the effect of external managers on the financial performance of SWFs. There are also some reports and papers that make discussions on the decision to employ external managers by SWFs and selection criteria and processes. However, there is no literature comparable to the role of external board members, which is widely studied in both theoretical and empirical dimensions. This part reviews the employment of external managers by SWFs and their impact on the funds. Then, the aforementioned resource-based theory is extended to the SWFs domain in order to provide a conceptual framework for external managers.

Palma et al. (2010) is a relevant study that focuses on the employment of external managers by SWFs. The authors start their discussions by noting that SWFs might not be perceived as normal market players in the countries that they make investments. The foreign ownership of SWFs (from the perspective of host countries) and the possible role of non-business strategic investments by them can raise some concerns for the activities of SWFs in other countries. In this context, the use of external fund managers is proposed as a possible solution to the possible tensions between SWFs and the host countries. Specifically, the external managers would be from the host country, and they would be subject to the regulations in the country. In this way, the concerns of host countries in terms of non-business strategies of SWFs could be lessened. In this study, the research hypothesis is that "SWFs could partly allay the concerns about possible political motivations behind their activities by investing through fund managers located in the recipient countries" (Palma et al., 2010, p.110). This study is indirectly related to the research question in the current study. The use of external managers is not for performance or sustainability purposes, but for political concerns. Still, if the use of external managers contains possible political tensions regarding the SWFs investments in host countries, it can be considered as an important resource for SWFs to improve their sustainability in different markets. Therefore, this dimension can be put in the framework of the resource-based theory.

Kunzel et al. (2008) is an early study that examines the issue of external managers by SWFs shortly. These authors use survey data from 21 SWFs and study the institutional and operational characteristics of these organisations. They find that around two-thirds of SWFs focus on long-term saving and stabilisation purposes. In close to 60% of organisations, SWFs'

boards determine the specific objectives, while in the case of 40%, government officials determine the investment objectives. In terms of the governing body representation, a very balanced picture emerges. Namely, in one-third of SWFs, there are no officials in the governing body, while another one-third has officials with minority representation and another one-third has officials with majority representation. In addition, 63% of SWFs have advisory committees, and 32% have supervisory committees. In terms of investment strategies, all of them have fixed-income assets in their portfolios, followed by public equities (with 67% of SWFs), private equities (with 40%), real estate (with 40%), and commodities (with 27%). Regarding the management of portfolio risks, Kunzel et al. (2008) find that "the most common risk measures and methods to manage financial risks are credit ratings, value-at-risk models, tracking error, duration, and currency weights". So, SWFs try to limit credit risk by diversifying their assets, and they aim to contain liquidity risk by investing in liquid assets and markets. In addition, hedging is used to contain the currency risk of investing in different countries.

Regarding the employment of external managers by SWFs, Kunzel et al. (2008) note that only two out of 21 SWFs do not use external managers. So, this strategy is very common among SWFs. The authors state that "External managers are used in cases where the managing agency does not have sufficient expertise in managing specific assets, or where it is not cost-effective to manage them in-house due to the external managers' economies of scale and extensive research capabilities". So, the main motivation for the use of external fund managers is the unique and valuable resources and capabilities that they can bring to SWFs. Hence, this motivation becomes very relevant to the theoretical framework of the resource-based theory. Kunzel et al. (2008) also find that external managers are continuously reviewed in terms of their performance and investment strategies. In terms of fee structure, both flat and performance-based measures are used very extensively. Overall, this paper provides valuable information on the utilisation of external managers by SWFs, but it does not make any discussions regarding theoretical frameworks behind their utilisation. Aguilera et al. (2016) make some discussions regarding the role of external managers in SWFs. They note that a large majority of SWFs used external managers before the global financial crisis. However, due to their high fees and low performance during the crisis, some SWFs tried to conduct related strategies in-house. In addition, there can be some agency problems between SWFs (i.e., the principal) and external fund managers (i.e., the agent). So, the perspective of Aguilera et al. (2016) provides a more balanced view of external managers in terms of their benefits (like

insulation from political pressures and the expertise in complex investments) and disadvantages (like agency problems and high fees). Still, both papers by Kunzel et al. (2008) and Aguilera et al. (2016) do not make any discussions on the underlying theoretical frameworks.

Bernstein et al. (2013) examine the role of external managers on SWFs performance in detail. Specifically, these authors examine the case of 29 SWFs and 2,662 transactions, covering the period of 1984-2007. In around 10% of acquisition transactions, external managers were involved in the management of SWFs. Similarly, external managers were also involved in less than 10% of home and regional investments. So, the propensity to utilise external managers' investment strategies seems to be very low by the sample of SWFs examined by Bernstein et al. (2013). The authors also check if the presence of external managers affects home bias in investments. They find "a 27.3 per cent lower share of domestic investments when external managers are employed" (p.228). This is an important result as SWFs can be inclined to use their funds to help inefficient home firms and industries. Then, external managers act as capabilities (in the context of the resource-based theory) that avoid such inefficient investments and improve the sustainability of SWFs. This paper also does not make any references to the possible theoretical underpinnings of the role played by external managers.

Das et al. (2009) also review the issues related to SWFs like the timing of SWFs setup, their objectives, rules on funding, withdrawal, and spending, and institutional structure. The authors also examine which factors become important in the decision to use external asset managers. The authors mention that there can be many factors for using external managers. In this context, Das et al. (2009) list some rationales and motivations for employing external managers as follows: *"External managers could bring expertise and access to new markets. External managers may have skills that an SWF lacks, or they may provide a means of lowering operational risk due to lack of adequate human or information technology resources. They may have skills and established systems for undertaking investment activities in specialised instruments and markets for which the SWF does not wish to develop a capacity or has operational constrains. Most importantly, delegation of the execution of investments to external managers allows the SWF to focus on the SAA—which is the predominant source of return—and manager selection. For advanced asset classes, the acquisition of in-house expertise can be especially costly and not efficient especially in low-income countries. External*

managers can also be subject to greater competition and harsher regimes for ending mandates, then internal managers. If a similar portfolio is already managed internally, the external managers may also provide an additional benchmark for evaluating SWF's own investment activity. Finally, external managers can also play a role in the training of the SWF staff" (p.18).

The above quote from Das et al. (2009) is very useful as it displays various resources and capabilities that external managers provide to SWFs. These include expertise, access to markets, skills, better human capital, better information technologies, skills in specialised instruments and markets, lower costs and higher efficiency in advanced asset classes, flexible contracts, and training capacities. Overall, these capabilities and resources are very valuable, and they can be unique to some external managers. Therefore, obtaining these resources and capabilities by using external managers become a rational way for SWFs to improve their profitability and sustainability. So, these points discussed by Das et al. (2009) fit very conveniently into the resource-based theory.

In addition to the above academic studies, the practical experiences of various SWFs also provide valuable information regarding the use of external funds. For example, Monk (2011) examines how SWFs decide on internal versus external managers. According to the author, there are both advantages and disadvantages of using external managers. For example, asset management fees (which can be around 50 basis points) and agency problems can emerge as the main disadvantages of using external fund managers. In contrast, external managers can provide unique and valuable skills, technical capabilities, and expertise, especially in certain asset classes and markets like alternative assets and complex markets. In addition, they might decrease possible tensions in SWFs investments in host countries. Then, each SWF should assess these advantages and disadvantages of using external managers for their own cases.

In this context, Monk (2011) examines the case of the California State Teachers' Retirement Fund (CALSTRS). While this fund is not considered as an SWF for the purposes of the current research, its behaviour and decisions can still provide valuable information. In its decision whether to use external fund managers, the CALSTRS considers "Transparency and liquidity of the underlying markets" as a major factor. In certain asset classes like public equity and debt markets, there is enough transparency and liquidity in these markets and obtaining information and analysis is relatively easy and less costly. Then, funds can manage such assets with their internal managers easily. In contrast, asset classes like private equity and

real estate are less transparent and liquid markets. So, they require unique and focused expertise in these markets. Then, it might be optimal to outsource the management of investments in these asset classes to external managers. This argument on the transparency and liquidity of the underlying markets can be assessed from the perspective of the resource-based theory. The above argument implies that the unique and valuable resources and capabilities of external managers become more relevant in the case of more complex and less transparent markets. So, for SWFs that have limited investments in such asset classes, the need to employ external fund managers could be limited as well. As explained in the previous section, SWFs has been moving toward alternative assets classes. This trend implies the use of external managers that can be valuable for these SWFs. A similar argument can be made in terms of geographical diversification as well. There is a trend in the SWFs sector towards foreign markets, like advanced country funds moving to the emerging country assets and developing country funds moving towards new regions like Latin America. Then, such investments would require asset managers with close expertise and the relevant skills in these specific markets. The natural candidates would be the domestic asset managers working in these countries and markets. For example, Eichholtz et al. (2001) show that domestic real estate companies perform better than international property companies in their markets. So, this finding implies that SWFs can use domestic real estate funds and asset managers in their investments for foreign countries. As an example of such a strategy, in 2016, Qatar SWF started to diversify away from the European markets to Asian and the US market by using external fund managers. In addition, "QIA was keen to strengthen its involvement in "responsible investing", a style of asset management which emphasises protecting the environment, consumers and human rights" (Al Sayegh & Arnold, 2016).

Overall the above academic studies, the relevant research evidence, and examples of practical SWFs strategies show that the use of external managers can be an important dimension of the SWF sustainability. In accordance with the resource-based theory, external managers can provide unique and valuable resources and capabilities for the SWFs in their investments to more complex and less transparent asset classes and regions. While there is a large literature on the application of the resource-based theory (like the role of independent or outside board members), there is no application of it to the domain of SWFs. In addition, the literature on the SWFs does not make use of resource-based theory in detail. So, there are research gaps in both strands of the literature. This thesis fills these research gaps by extending

the resource-based theory into the SWFs domain. As explained in this section in great detail, the use of external fund managers presents such an area where the resource-based theory can be applied in the context of SWFs. Another area that the resource-based theory (or more specifically, the natural-resource-based theory) can be applied to the SWFs domain is the dimension of sustainable investments. This dimension is explained in the following subsection.

3.5. Natural-Resource-Based Theory and Sustainable Investments

The second dimension of SWF sustainability proposed in the current research is sustainable investments by SWFs. In other words, by investing in sustainability schemes (both social and environmental), SWFs would support the long-term interests of their citizens and governments. In this way, SWFs would also be sustainable organisations. Therefore, in addition to the first criterion of employing external fund managers, the second criterion of sustainable investments stands out as an important dimension of SWF sustainability. While the literature touches on the issue of sustainable investments by SWFs (Richardson & Lee, 2015; Lo Turco, 2014), the relevant studies do not provide any theoretical justification for such measures. One important contribution of this study is to use the natural-resource based theory (which is an extension of the resource-based theory) to justify the use of sustainable investments as a measure of SWF sustainability. The sustainable investments can be examined within the context of the corporate social responsibility (CSR) or responsible investing literature. This section reviews the current state of the literature on CSR and firms' performance. The relevant discussions show that the current framework of CSR activities and strategies are not sufficient to address sustainability as companies can turn CSR into business-as-usual. Based on this finding, this section proposes the use of the natural-resource-based theory for a more comprehensive approach to sustainable investments and CSR strategies. Then, the relevant theoretical discussions are extended to the domain of sustainable investments by SWFs. As a result, this sub-section provides a theoretical justification for the use of sustainable investments as a measure of SWF sustainability within the context of the natural-resource-based theory.

The seminal study by Bowen (1953) argued that businesses have responsibilities beyond profits. Since then, the CSR topic has attracted growing attention in both academic circles and the policy arena. The European Commission (2011) provides a broad definition of CSR as "a concept whereby companies integrate social and environmental concerns in their business operations and their interaction with their stakeholders on a voluntary basis". Three

dimensions are important in this definition: stakeholders, social and environmental concerns, and voluntary basis. So, there is no obligation for firms to conduct CSR activities, while there can be some social pressures. This can be considered as an important weakness of the existing CSR strategies. The firms should also define their stakeholders and be in interaction with them. In the case of SWFs, the main stakeholders are very broad and cover the current and next generations. Finally, the third characteristic of CSR is that it should be about social and environmental issues. One weakness of such a broad characterisation is that businesses can focus on only limited CSR features and create a false sense of comfort about the leading global challenges like rising inequality or climate change. In other words, the voluntary nature of CSR and the ability of firms to focus on narrow parts of social and environmental issues can lead to the limited contribution of the existing CSR activities and strategies to the real sustainability problems.

Examining the CSR topic from both theoretical and empirical perspectives would be valuable to understand the relevance of the natural-resource-based theory for sustainable investments. The conceptual perspective on CSR can be categorised under four groups of maximizing profits, conducting business activities responsibly, incorporating social demands into business structures, and accepting social responsibility as an ethical obligation (Carroll, 1979; Carroll and Shabana, 2010). The first and oldest approach assumes that the maximum contribution of business to society and social welfare comes from maximizing behaviour. In this approach, by following their self-interests, firms would improve economic efficiency, and the economic resources would be allocated in an optimal way. So, the profit-maximizing behaviour would create the highest possible economic growth, and in return, this efficient and high economic growth would maximise social welfare. The second conceptual approach to the CSR issue is based on the social power of the businesses as corporations do not only affect economic developments, but they also have significant effects on social and political developments. In addition, this power of businesses is obtained from the framework that operates within. Namely, the social and political system enables businesses to acquire such powers. However, with power comes responsibility. Hence the businesses should use their power responsibly (Davis, 1960). This approach advocates a social contract between businesses and society (Donaldson, 1982).

The third conceptual approach can be considered as a continuation of the above second approach. It developed in response to the rising social and environmental issues with the

collapse of the existing social contract. It is called the stakeholder approach as it argues that businesses should take the interests of all stakeholder into account in their decisions and strategies (Freeman, 1984). The fourth conceptual approach takes a similar but more ethical perspective on the social and environmental responsibility of businesses. It assumes that the businesses are ethically obliged to follow social and environmental welfare even if it implies lower profitability (Frederiksen & Nielsen, 2013).

In addition to the above conceptual frameworks examining the CSR issue, there is also a large literature examining the empirical implications of CSR activities and strategies. For example, Dixon-Fowler et al. (2013) examine the performance of firms with information on environmental activities. The paper conducts a meta-analysis of 39 studies from different sectors. The authors find a significant positive relationship between environmental CSR scores of firms and their financial performance. In addition, small firms benefit more than large firms and US firms benefit more than firms in other countries. In another meta-analysis paper, Revelli and Viviani (2015) review 80 studies that invest in socially responsible investment projects. The paper identifies that globally, there is no real cost or benefit to investing in socially responsible investments but that the level of performance clearly depends on the methodological choices made by researchers to consider the matter or the ability of fund managers of socially responsible investments to generate performance. Albertini (2013) focuses only on papers that examine environmental CSR activities. The author reviews 52 papers with this CSR dimension and finds a positive relationship between environmental performance and financial performance. Busch and Friede (2018) conduct a second-order meta-analysis. In other words, the authors examine 25 other meta-analysis papers on the topic, and they use meta-analysis method to derive their results. Therefore, their results can be expected to be very robust. The paper finds a highly significant, positive, and bidirectional relationship between CSR and financial performance. Their results do not change when they consider potential publication bias, apply fewer conservative variances, or conduct sensitivity analyses. In addition, they do not detect statistically significant differences between the effects of environmental and social-related responsibility activities.

The above discussions showed that CSR activities could improve firm performance. However, this literature takes a very business-centric approach and focuses mainly on how CSR affects financial performance. There are two missing components in this literature. The first component is the lack of studies looking at the effects of CSR on non-financial

performance indicators, like sustainability. The second related component is the limited evidence on whether and to what extent the existing CSR activities and strategies are helping social and environmental issues. It is natural that social and environmental activities and projects by corporations would have some impact on the intended dimensions. But the evidence is very limited regarding the size of such effects. In addition, the real missing dimension is whether the realised effects are enough to address major social and environmental issues like income inequality and climate change. To put the sustainability issue in a realistic context, one would need to provide some answers to these questions. In return, these answers are important to devise the strategy of sustainable investments for SWFs and the use of this criterion as an SWF sustainability measure.

There are studies that see major problems with the existing CSR activities and strategies. According to Allen and Craig (2016), traditional CSR is largely ineffective to address real challenges like social inequality or climate change. Many corporations might be using CSR for greenwashing their activities. The voluntary nature of CSR activities and the ability of corporations to report only favourable results imply that firms can hide behind CSR reports and argue that they do their share of responsible business. Then, it is very difficult whether the reported activities represent enough portfolio to address major challenges and even whether firms keep their promises in terms of CSR activities. So, the traditional CSR can create a wrong sense of taking responsibility and doing enough for major social and environmental challenges. This situation would fail to be sustainable and avoid the formation of public pressures as society would be greenwashed by extensive CSR marketing. Overall, this situation would be a worse situation compared to no CSR activities and strategies. At least, in the absence of the traditional CSR, the urgency of major social and environmental problems would be felt more clearly, and there would be public and political pressures to address these problems. Hence, CSR might be masking the real problem and the need for more effective steps.

The dangers of voluntary and unchecked CSR are especially evident regarding the urgency of some problems like climate change. There is almost no evidence on the speed of current CSR activities being enough to address the relevant challenges. For example, if the current global economic activity level and the gas emission levels are sustained in the coming years, the global warming can reach to thresholds where there would be permanent worsening in climate, and it would not be possible to reverse these negative effects. This point is stated

by Slawinski and Bansal (2012) as follows “Prior research often categorises corporate environmental responses on a spectrum that ranges from reactive to proactive. Such research subordinates the role of time, yet time is central to organisational responses to environmental issues such as climate change” (p.1537). So, the lack of time dimension emerges as a major shortcoming in the existing CSR activities and strategies. In addition, businesses usually try to convert major challenges like climate change and global warming into more manageable business problems (Wright and Nyberg, 2017). Namely, businesses frame the grand problems in a new structure, and then localise and normalise the problem and turn it into small but manageable problems. In this way, they avoid the major problem and behave as if they are doing their share of responsible business behaviour. The above discussion shows that the voluntary nature of CSR and the ability of corporations to pick only favourable points to report and advertise their sustainability actions makes the traditional CSR very ineffective. The companies can use CSR mainly for greenwashing, while at the background, they might continue environmentally and socially harmful operations. Under these conditions, there is a need for a stronger framework for the social and environmental sustainability of business organisations. This point is also important for the case of SWFs. In this context, the current research proposes the natural-resource-based theory as a more relevant theoretical concept to assess the sustainable activities, strategies, projects, and investments of business corporations, including SWFs.

Strategic Capability	Societal Driving Forces	Key Resources	Competitive Advantage	State of Research Development
Pollution prevention	Minimize emissions, effluents, and waste	Continues improvement	Lower costs	Strong empirical evidence in favour of NRBV
Product stewardship	Lower product life cycle cost	Stakeholder integration	Reputation/ legitimacy	Growing area of research but much to be accomplished
Clean technology	Make quantum-leap improvement	Disruptive change	Future position	Little research to date
Base of the pyramid	Meet unmet needs of the poor	Embedded innovation	Long-term growth	Growing body of practitioner-oriented research but academic attention needed

TABLE 3: THE NATURAL-RESOURCE-BASED THEORY OF THE FIRM. SOURCE: HART AND DOWELL (2011).

Table 3 shows the main dimensions of the natural-resource-based theory (NRBT). It is seen that there are four components, including pollution prevention, product stewardship, clean technology, and the base of the pyramid. The third dimension of the NRBT is clean technology. Hart (1995) considers that the first two dimensions of pollution prevention and product stewardship are the greening of existing technologies. While they are important for sustainability, there is a need to move beyond them so that the great challenges like climate change can be addressed. These points of Hart (1995) are crucial for the current research. As shown above, the traditional CSR activities and strategies provide incremental improvements, but they are not enough to produce a transformation in addressing major challenges. So, there is a need to move "beyond greening" or beyond CSR. According to Hart and Dowell (2011), clean technology offers such a possibility. The main driving force behind clean technology is the necessity of making quantum-leap improvements in technological infrastructure. In order to ensure such transformative technological progress, firms need the ability to create disruptive

change efficiently. In return, such firms would obtain future competitive positions in the business world. However, there is little research or policy on this dimension of NRBT. It can be argued that SWFs can be a driving force for clean investment technologies through their sustainable investments.

Overall, the natural-resource-based theory of the firm offers a feasible conceptual framework to examine sustainability issues in corporations, and it significantly improves over the existing CSR strategies. It has both greening strategies of pollution prevention and product stewardship. In addition, NRBT moves beyond greening strategies by incorporating clean technology and the base of pyramid approaches. Then, these points provide the missing components of CSR to address the major social and environmental challenges like rising inequality and global warming. As a result, the RBT and NRBT approaches provide theoretical justification for sustainable investment. This research extends the relevant theoretical approaches to the SWFs domain by arguing that by investing in socially and environmentally responsible strategies covering product pollution, product stewardship, clean technology, and the base of the pyramid, SWFs can also improve their sustainability.

3.6. Investing in Alternative Asset Classes and Diversification

The previous chapter displayed that the two SWF sustainability dimensions of employing external managers and making investments in ESG projects and causes can be justified theoretically by using resource-based theory and natural resource-based theory. By extending these resource-based theories to the domain of SWFs, the current thesis provides some conceptual contributions to the SWFs literature. The third SWF sustainability measure used in the thesis is the situation of investing in alternative asset classes other than the traditional asset classes of cash, stocks, and bonds. This strategy can be examined under the diversification topic in investment or portfolio theory. It can be expected that investing in alternative asset classes could lead to lower portfolio risk and thereby increase the sustainability of investors. Skidmore (2010) argues that moving beyond the primary or traditional assets classes could be very helpful for diversification purposes. This process involves both moving into alternative asset classes like real estate and natural resources or different geographies like emerging country assets. In addition, the author notes that incorporating different investment strategies like hedge funds or private equity could be considered as moving beyond traditional asset classes.

According to Skidmore (2010), the low correlation of alternative asset classes with traditional assets makes them very attractive for diversification purposes. As the globalisation level of countries increases and the flows of financial assets become very quick almost all day around, the traditional assets classes become more connected to each other. So, it is possible that a change in the price of US government bonds would affect the price of government bonds in many other countries. Similarly, equity markets are closely correlated over different regions. Under such conditions, diversification possibilities decline in the traditional asset classes. Therefore, the importance of alternative asset classes increased under such conditions. Skidmore (2010) notes that there can also be regulatory benefits of investing in alternative asset strategies like hedge funds. Some funds might be less subject to disclosure requirements and thereby can participate in a more diverse set of assets types and investment strategies. However, going beyond traditional assets also carry some risks or trade-offs. One leading issue is the lower liquidity of some alternative assets like real estate and natural resources. So, such assets require usually longer-term investment horizons. In addition, the valuation of such assets can be difficult or very volatile at certain times. Then, investors need to evaluate the benefits of investing in alternative asset classes and related risks.

Solda (2016) also emphasises the importance of alternative asset classes for diversification purposes. Specifically, the author states that "In a global economy, traditional asset classes are increasingly linked. On the opposite, in many cases, the performance of an alternative asset is often strongly dependent on the characteristics of the individual investment instead of being highly correlated to an overall market. This lack of correlation is what makes this group of asset classes interesting because the low correlation level (sometimes closed to zero) within it and the other types of investments can help raise the diversification level of the portfolio and its returns" (p.52). The author lists real estate, natural resources, art objects, precious metals and gems, and frontier markets as some examples of alternative assets. In the case of real estate, the investors do not need to directly buy and hold real estate assets but can make investments in funds specialising in these assets. Especially, the real estate investment trust (REIT) can be attractive and more liquid alternatives. These organisations were initially established in the US, but their size stayed limited due to some regulatory restrictions. Then, starting from the 1990s, their sizes increased significantly, and they spread to many other countries (Block, 2011). Overall, there can be various ways of investing in alternative asset

classes and the relevant investors, including SWFs, need to evaluate the benefits of entering into alternative classes and the specific types of such assets and investments.

Campbell et al. (2001) is an important study that examines the implications of diversification. The authors investigate the volatility dynamics of firms, industries, and markets in the US for the period of 1926-1997. They note that there were not any changes in the volatility trends of industries or markets. However, the volatility of firms displayed an upward trend, doubling from 1962 to 1997. As another finding, all volatilities had positive correlations with each other, and they also had positive autocorrelations. In addition, the correlations of individual firm return declined significantly in the same period. Based on these findings, Campbell et al. (2001, p.25) concluded that "declining correlations among stocks imply that the benefits of portfolio diversification have increased over time". So, this paper shows that diversification can benefit the risk management of investors significantly. While there can be important benefits of diversification, Statman (2004) notes that many investors hold portfolios with limited diversification. One barrier in front of diversification can be the difficulty of managing such diversified portfolios. In addition, some behavioural factors can be at play for limited diversification.

In recent periods, and especially after the global financial crisis, there have been views that international diversification does not provide enough protection. During stressful times like economic crises, the correlations of different assets can increase and thereby, limit the benefits of diversification. So, the benefits of diversification can be at its lowest level when the investors needed them the most. Asness, Israelov, and Liew (2011) note that while such rises in asset correlations occur during the crisis periods, diversification strategy still provides significant benefits. The authors use data for 22 countries covering the period of 1950-2008 at a monthly frequency. They construct two portfolios, i.e., one home-biased portfolio and one equally weighted global portfolio. These portfolios show that in the short run, there can be periods where the global portfolio performs worse than some individual country portfolios. So, the benefits of diversification can be limited in the short run, especially during crises. However, over the medium and long-run diversified portfolio consistently dominates the individual country portfolios. Since real benefits of investments are accumulated not over the short-run but over the long-run, this result implies that diversification, at least over global portfolios compared to home-biased portfolios, improves the sustainability of investments. In addition, Cosset and Suret (1995) show that international diversification can also provide protection

form political risks. Overall, these studies show that investing in other asset classes and portfolio diversification can be important factors for risk management and sustainability for the relevant investors. These arguments would also apply in the case of SWFs, implying that investing in alternative asset classes can be used as an important measure of SWF sustainability.

The issue of diversification attracted some attention in the SWFs literature as well. As an early study, Len (2007) estimated that in the early 2000s, "95% of the official reserves [of SWFs] in the world are invested in sovereign bonds and agencies denominated in USDs, EURs and GBP" (p.5). However, the author argues that this is not a viable strategy, and in the long-run SWFs would diversify in two dimensions. The first dimension would be moving from traditional asset classes to alternative asset classes like corporate bonds, private equities, and real estate. The second dimension would be moving from the US, UK, EU, and Japanese markets towards G-20 and emerging countries. Similar to the above studies, Len (2007) also notes that the liquidity of these alternative assets and markets can be a major factor in the speed and scale of moving into these alternative assets. Epstein and Rose (2009) also examine the investment strategies of SWFs in the 2000s. They note that the SWFs were heavily exposed to government bonds, and especially the US government bonds. However, later in the decades, they started to diversify towards equities. For example, by 2007 SWFs held 20% of the London Stock Exchange, 10% of Blackstone Group, 9.9% of Morgan Stanley, and 9% of UBS. These authors also argue that other than the economic benefits of diversification, there can be important political and legitimacy benefits. Specifically, Epstein and Rose (2009) argue that "The greater the number of nations in which SWFs invest, the more beholden they become financially to an open and peaceful world economy … Moreover, by scattering sovereign assets around the globe, where they can be attached in appropriate circumstances by domestic authorities, SWFs make a credible commitment to the rule of law" (p.132). This is a critical point that is unique to the domain of SWFs and not considered in the general portfolio literature. As SWFs are fiduciary agents of their countries, it is natural that some political or legitimacy issues arise in their extension into the foreign markets. Then, a broad diversification in terms of alternative asset classes and different countries can lessen these concerns and create additional non-economic benefits. Therefore, diversifying their portfolios and moving to alternative asset classes and regions would improve the sustainability of SWFs significantly. Overall, these studies show that diversification creates both economic and non-economic (like

political or legitimacy) benefits for SWFs. Therefore, this thesis takes it as the third measure of SWF sustainability in addition to the employment of external fund managers and investment in alternative asset classes. After establishing the critical importance of these three measures, the next part provides a consolidated view of the hypothesis development used in the thesis.

3.7 Hypothesis Development

The conceptual model presented in the following chapter and the relevant country-level strategic resource variables allow to make detailed research hypotheses that can be tested using SWF-level data. The conceptual model presented in chapter 4 (see Figure 7) shows that strategic resources would affect SWF sustainability positively. This point is motivated in great detail by the previous two chapters, and the resource-based theory is extended to the SWFs domain to construct a new conceptual model of SWF sustainability. Based on this model, it can be assumed that each component of the country strategic resources (i.e., intangible resources and tangible resources) would directly have a positive impact on each component of SWF sustainability. Consistent with this assumption, six research hypotheses are presented as follows:

Impact of Strategic Resources on the First Dimension of SWF Sustainability:

The relevant theoretical and empirical discussions showed that asset diversification is a crucial strategy for all investment decisions. In this context, SWFs were poorly diversified at the beginning of the 2000s, with their portfolios being highly biased towards few advanced country traditional asset classes. However, this approach is not consistent with a long-term perspective of SWFs. It can be argued that countries with higher levels of strategic asset resources would be aware of this problem more intensively, and they would be inclined to diversify their portfolios towards alternative asset classes. Then, the following set of research hypotheses can be put forward:

Hypothesis 1a: The intangible strategic resources (i.e., the human development index, the reputation index, and the innovation index) have positive effects on the incidence of SWFs investing in alternative asset classes.

Hypothesis 1b: The tangible strategic resource of the FDI inflows has a positive effect on the incidence of SWFs investing in alternative asset classes.

Impact of Strategic Resources on the Second Dimension of SWF Sustainability:

This set of research hypotheses is related to the relationship of four country-level strategic resources for the second SWF sustainability dimension of employing external fund managers. The relevant discussions above imply that as the intangible resources of a country improve, they can produce positive effects on the sustainability of SWFs in those countries. For example, the human development index and innovativeness of a country can provide unique and valuable resources for its institutions, including SWFs, in terms of being more competitive and sustainable. As a result, the following two research hypotheses are put forward regarding the second SWFs dimensions.

Hypothesis 2a: The intangible strategic resources (i.e., the human development index, the reputation index, and the innovation index) have positive effects on the incidence of SWFs employing external fund managers.

Hypothesis 2b: The tangible strategic resource of the FDI inflows has a positive effect on the incidence of SWFs employing external fund managers.

Impact of Strategic Resources on the Third Dimension of SWF Sustainability:

The last SWF sustainability dimension of spending on socially and environmentally responsible projects and causes implies that social and ecological sustainability should be included in the investment strategies of organisations, including SWFs, more firmly. When the existing sustainability frameworks are examined, it is found that they are not enough to address major challenges like climate change. Then, it becomes clear that there is a need for a more effective and active framework of social and ecological sustainability in business life. The relevant theoretical and empirical discussions show that spending on socially and environmentally responsible projects and causes should be a fundamental component of SWF sustainability. The new model of SWF sustainability developed in the first part of this chapter implies that the strategic resources of countries would affect this dimension of sustainability positively as well. Based on this model, the following set of research hypotheses are developed.

Hypothesis 3a: The intangible strategic resources (i.e., the human development index, the reputation index, and the innovation index) have positive effects on the incidence of SWFs spending on social and responsible projects and causes.

Hypothesis 3b: The tangible strategic resource of the FDI inflows has a positive effect on the incidence of SWFs spending on social and responsible projects and causes.

Overall, these six research hypotheses cover all aspects of the relationships between the three SWFs dimensions (i.e., external fund managers, investing in alternative asset classes and spending on social and environmental projects) with the four country-level strategic resources (i.e., Human development resources, innovation, reputation and FDI).

3.8 Conclusion

This chapter argues that the resource-based theory of the firm can be extended into the domain of SWFs to justify the employment of external fund managers and the investments in ESG activities. There are various theoretical approaches to justify such measures ranging from agency theory to the stakeholder approach. However, the discussions show that the resource-based theory provides a more comprehensive and relevant justification for the use of external managers and sustainable investments. Regarding the use of external fund managers by SWFs, the literature lacks any theoretical framework. However, there is a large literature on the employment of outside and independent directors in the corporate governance literature. This literature argues that to contain the agency problems under the conditions of ownership-management separation, the board of directors becomes an important corporate governance mechanism. In this context, the properties of the boards like their size, meeting frequency, board independence, and board diversity are shown to matter for firm performance. However, it is also possible that the CEO and top management can try to put pressure on the board through their appointment and position termination decisions as well as CEO-Chairman duality. In this context, the external and independent directors are seen to constrain such negative effects of top management on boards. Another important benefit of external directors is that they bring unique and valuable resources and capabilities to the companies. Therefore, the resource-based theory is a leading theoretical approach justifying the employment of external and independent board members by corporations. When the same issue examined in terms of the employment of the external fund managers, it is seen that the limited literature lacks a theoretical examination of the issue. Hence the current research extends the resource-based theory to the domain of SWFs and argues that external managers can bring unique and valuable resources and capabilities to SWFs. These capabilities are especially important when SWFs extend to new asset classes and regions. It would be difficult for SWFs to manage such a diverse set of assets and markets internally. Hence the employment of external managers stands out as a

feasible strategy. In addition, domestic fund managers usually have superior performance in their markets. So, as SWFs move towards alternative asset classes and new markets, the use of external managers becomes an important tool for improving SWF sustainability.

In addition to the extension of the resource-based theory to the domain of SWFs in terms of external managers, it's another variant, i.e. the natural-resource-based theory, can also be extended to the domain of SWFs in the context of sustainable investments. When the topics of sustainable investments and responsible business making are examined, it is found that the CSR literature dominates the relevant discussions. In this literature, the shareholder approach argues that the main responsibility of businesses is to make profits and constraining profit-maximizing behaviour through CSR would be harmful to profits as well as social welfare. In contrast, the stakeholder theory argues that firms should take the interests of all stakeholders, including society and the environment, into account in their business strategies. While the stakeholder approach provides a useful justification of CSR activities, the empirical literature shows that the traditional CSR strategies are not enough to address major social and environmental issues. In this context, the natural-resource-based view emerges as a more comprehensive and relevant theoretical approach to justify socially and environmentally responsible business strategies. This theory has the greening dimensions of pollution prevention and product stewardship (i.e., the management of environmental impact over the lifecycle of products). It also has the dimensions of going beyond greening in terms of clean technologies and the base of the pyramid approach. In return, these two components offer strong business frameworks to address the major environmental challenge of climate change and the major social challenge of rising inequality, respectively. Then, the analysis extends this NRBT to the domain of SWFs in the context of social, environmental, and governance investments. Then, 6 research hypotheses are developed on the relationship between four country-level strategic resources and three dimensions of SWF sustainability. Overall, the analyses in this chapter show that the resource-based theory can be extended into the domain of SWFs to justify the use of external managers and sustainable investments as leading measures or dimensions of SWF sustainability. Chapter 4 provides a theoretical framework combining these points along with the dimension of investing in alternative asset classes in the domain of SWFs.

Chapter 4: Methodology.

This chapter first develops a new conceptual model of SWF sustainability and connects the strategic resources of countries to the sustainability of SWFs. Then the following sub-section 4.2. explains the details of research philosophy, methodology and strategy used in the empirical analysis. The next sub-sections 4.3. and 4.4. discuss the data collection process conducted in this study and provide details of the quantitative method used.

4.1. Extending Resource-Based Theory to the SWFs Domain

Through conducting a systematic literature review in the previous parts, it is found that SWFs appear to be multilevel phenomena (Poole & Van der Ven, 2004), whereby the role of these investment vehicles is explained using fund-level variables, country-level variables and the interaction of both. SWFs exist within an institutional environment in which their countries as owners could determine in part the expectations for their practices and performance. Namely, SWFs have some nationally provided resource base and aim to provide a good and sustainable return on these assets. They operate like profit-maximising financial organisations, but they are also affected by the characteristics of their countries. Therefore, the proper understanding of the sustainability issue in the SWFs domain should consider both fund-level and country-level factors as well as the interaction of them.

Literature suggests that there is a need for empirical research to be provided on the resource-based view (RBV), including the natural resource-based theory (NRBT), and sovereign wealth funds. Attempting to contribute to this theoretical gap on SWFs, the present thesis takes a fresh approach by assessing their role in the global capital markets. Building on the strategic management aspects of a resource-based perspective, the aim is to identify the association countries' strategic resources and their wealth funds' sustainability. To be able to take a deeper look into this relationship, a valid model is necessary, which includes meaningful and feasible data and econometric techniques. Based on the detailed analyses and discussions in the preceding chapters, the current thesis presents a new model of SWF sustainability, alongside the data and methodology employed in order to assess the relationship between countries' strategic resources and their wealth funds' sustainability. Therefore, this study attempts to improve upon the prior empirical literature on this topic focusing on the impact of a country's strategic resources on their wealth fund's sustainability. The study argues that a

country's strategic resources are reflected in fund-level outcomes, i.e., they play a mediating role in SWF sustainability.

As discussed in the preceding chapters, the existing literature in strategic management has paid insufficient attention to how the institutional environment context is related to fund-level performance. This study constructs a framework within a given domain seeking to demonstrate how the country's environmental context may constitute a core component in understanding SWFs' roles in the global capital markets. The study assumes that countries possess strategic resources, which contribute valuably to the sustainability of each country's wealth funds, which ultimately support the competitiveness of the funds' positions in the global capital markets. Overall, this research explains how a country's strategic resources shape the wealth fund's potential source of sustainability. This study draws attention to the question of to what extent a country's strategic resources contribute to the wealth fund's sustainability. Such a linkage (top-down effect model), as presented in Figure 7, allows for better understanding across disciplines on multidisciplinary topics and tackle major real-world problems.

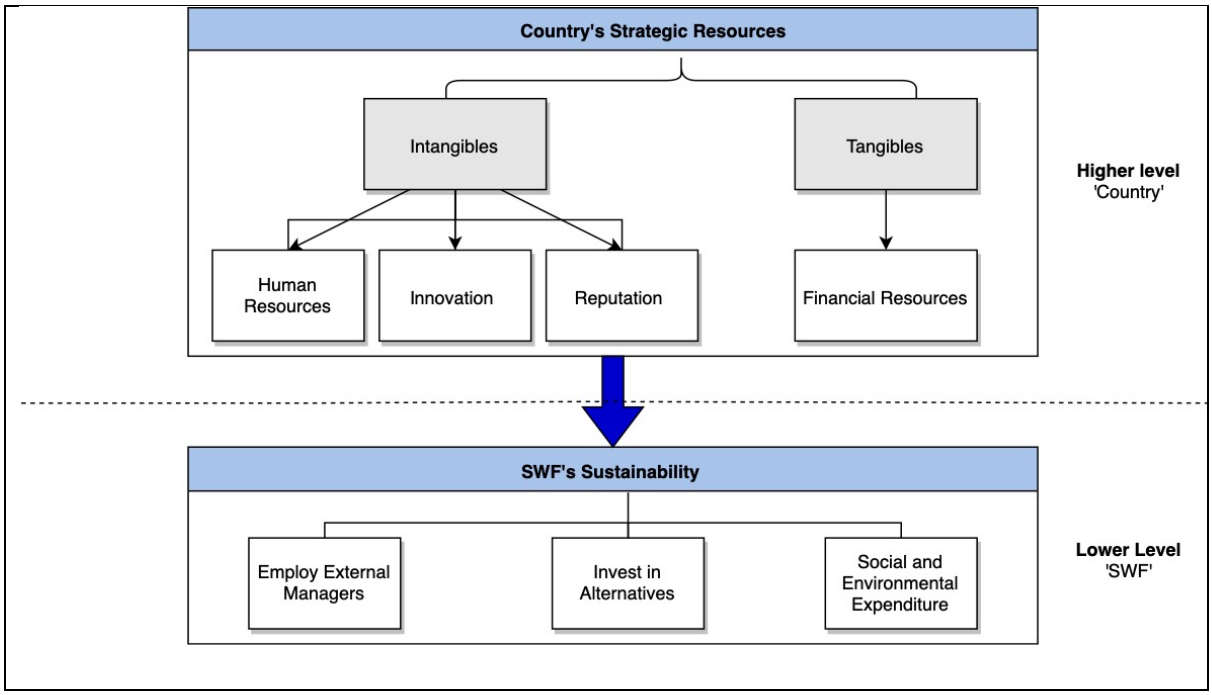


FIGURE 7 CONCEPTUAL MODEL FOR SWF SUSTAINABILITY

Source: The Author's Own.

Beyond the use of the theory as a conceptual tool, a valid model should have predictive value. This research, therefore, adopts an existing theoretical model within a given domain that can be used to guide future empirical work. Theory and associated propositions are developed around two major themes: a country's strategic resources and wealth fund's sustainability.

According to the RBV, differences in fund performance are primarily the consequence of differences in a country's endowment of resources, especially strategic resources, as they are difficult to acquire or develop, to replicate and to be imitated by competitors (Barney, 1991; Surroca et al., 2010). Although the RBV is aimed at explaining SWFs competitive advantage and performance, some studies apply the resource-based logic for explaining how strategic resources influence other conceptualisations of SWFs performance, like sustainability (Bansal, 2005). Giving the importance of social and ecological problems, incorporating these concerns into the RBV logic may be helpful for identifying new sources of competitive advantage such as strategic resources.

In this respect, for attempts to assess the sustainability of the SWFs, the main drawback is the limited information for most of them. For instance, any attempt to look into more sensitive information of the SWFs, such as investment figures or financial returns, would immediately exclude most of the funds from the sample. Publication of sensitive information on SWFs' investments, returns, and asset allocation remains intermittent. The availability of the data allows for the assessment of the SWF sustainability to be based mainly on the rules that affect their decisions rather than on the actual investments and their financial returns. So, the present thesis collected fund-level data on various dimensions of SWFs and thereby, it makes an important contribution to the SWFs literature on data dimension.

From a traditional perspective, SWF sustainability can commonly refer to as financial performance, such as market or accounting measures (Kotter & Lel, 2011; Fernandes, 2014). As such, the financial benefits of SWFs performance are often associated with their success. However, the notion of sustainability embraces a wider dimension of interpretations. In recent years, interest in non-financial performance measures has grown by a large number of works of literature. The increased attention to non-financial performance reflects the increased requirement of information for managing and the decision-making process, because of strong competition and the constantly changing environment of SWFs.

In this respect, when measuring SWF sustainability, it should be acknowledged perfect measures of sustainability will not be obtained due to the above limitations. Available financial performance measurement might suffer from measurement errors and selection bias due to their nature and the way they are constructed. The explosion of interest in the SWFs performance has led this research to suggest alternative views of sustainability measures dealing with much qualitative (dummy) nature of non-financial performance measures. Being constrained by the availability of data, dummy variables options emerge as a valid alternative, which can provide some initial insight into the relationship between a country's strategic resources and SWF sustainability. This alternative can address the question of whether the SWF sustainability can be associated with the country's strategic resources. The employment for dummy variables controlling for the mere presence of SWFs offers limited insights. However, it should be kept in mind the limited data available on SWFs. Any attempt to get information on SWFs has come up against severe data limitations. After an extensive search, few qualitative data have been collected on SWFs.

Assessing the SWF Sustainability

One of the main aspects of SWFs that have generated significant debate resulting in an abundance contradictive conclusion is their sustainability. SWF sustainability refers to the level of the wealth fund's long-term investing that is "inter-generationally efficient and fair" (Woods & Urwin, 2012). Given the sensitive nature of information regarding performance, few SWFs publish figures on their financial conditions or on their returns on investments. Moreover, many SWFs remain relatively mature, and little information is available on the outcome of their investment decisions. Hence, any attempt to calculate their financial performance would leave the analysis subject to the evidence from a few SWFs which disclose such information.

Based on that, the aim of this part is to identify the set of sustainability criteria. This approach allows a comparative analysis of the SWFs while at the same time, it allows for a comparison of a larger set of SWFs without being restricted to actual financial or investment return figures. In order to build indicators of sustainability, the following criteria are identified and assessed. The previous chapters provided detailed reviews and discussions on why these criteria are crucial to assess SWF sustainability.

Investing in Alternative Asset Classes

This criterion assesses whether SWFs invest in alternative asset classes such as private equity, infrastructure and real estate. Alternatives represent the investment related to the country's long-term development and adding value rather than simply aiming to maximise the financial return. The main argument in support of investing in alternatives is that it can provide portfolio diversifications. Investment in alternatives ensures the combination of low correlation with other financial instruments (such as traditional investment in equities and bonds) that can prove a diversification opportunity with positive returns for fund managers, hence affecting the fund's sustainability.

The literature provides detailed discussions and evidence on the possible benefits of portfolio diversification, both in terms of alternative asset classes and different markets. In the early 2000s, the majority of SWFs assets were invested in the advanced country government bonds. Later, there were movements towards the traditional assets of cash, bonds, and stocks. However, the intensification of globalisation and increased flows of financial assets across regions makes these traditional assets highly connected to each other (Epstein and Rose, 2009). Namely, correlations between traditional assets in different markets have increased significantly in the last couple of decades. As a result, diversification of opportunity of traditional assets declined, and their riskiness increased. One way for SWFs to overcome such risks is to diversify their portfolios beyond traditional assets classes, i.e., into alternative asset classes (Len, 2007). Such assets include private equities, commodities, precious metals, gems, art collections, natural resources, and real estate. Depending on the country and fund characteristics, SWFs can focus on some of these alternative assets like commodities, natural resources, or real estate. As another relevant point, instead of investing directly in these assets, SWFs can invest in specialised indices or funds that have their portfolio on these alternative asset classes. For example, in terms of real estate investments, putting assets into real estate projects in different countries can be very difficult to manage internally and can lead to some political concerns in those countries as well. Then, instead of such risky and inefficient ways of expanding into the real estate assets, SWFs can invest in real estate investment trust (REIT) in different countries or utilise external domestic managers to make relevant investments (Solda, 2016). Overall, these discussions and evidence from the literature show that investment in alternative asset classes is an important criterion for SWF sustainability.

- *Employing External Managers*

This criterion investigates whether SWFs employ external managers or not. The main argument in support of using external managers is that it transfers investment decisions of the SWFs on the hands of experts. This ensures that investment decisions are made in line with the fund's stated objectives, hence affecting the SWF sustainability. External managers can ensure that investment decision relies on market developments and not on political choice. They are offering long-run value-added services to the SWFs in terms of asset allocations, risk management and knowledge sharing. The presence of external managers allows for freedom of investment decisions from political schemas.

The resource- based theory provides important conceptual support for the employment of external fund managers by SWFs. this theory becomes the utmost applicable conceptual approach to motivate the choice of external managers as a proxy for SWF sustainability. The relevant discussions in the third chapter show that external managers can bring important capabilities and resources to SWFs (see sub-section 3.4.2 for more details). This is especially true when SWFs diversify into alternative asset classes and regions. It would be very difficult for SWFs to manage such diverse asset classes and regions within their internal structures. It would require extensive investments in irreversible fixed infrastructure and accumulation of relevant expertise and experience. In addition to such initiation costs, the management of such diverse portfolios can create managerial difficulties and inefficiencies as well. Therefore, using the expertise of external fund managers becomes a feasible strategy when diversifying the portfolio. While the associated fees might be somewhat high for SWFs, there are no fixed costs, and SWFs have the flexibility to terminate a contract or change the external fund managers. The literature shows that local managers or investors focusing on specific markets usually perform better than international investors in those markets (Eichholtz et al., 2001). So, using external fund managers when diversifying into different markets becomes a very profitable option. One can argue that these benefits of employing external fund managers are mostly on financial performance. So, there is no additional information on SWF sustainability. However, the relevant discussions showed that employing external managers (especially domestic fund managers in their own local markets) has some additional benefits. The investments of SWFs can be a debated topic when they invest in foreign countries. As highlighted by Bernstein (2013), there can be some negative political and public perceptions regarding such investments, and different agents can raise concerns on the legitimacy of SWFs in their countries. However,

if the expansion into these countries happens through the employment of domestic fund managers from these markets, the political and legitimacy concerns would be contained to a large extent. So, there are very important non-financial benefits of using external fund managers as well. Then, due to both financial and non-financial factors, the employment of external managers stands out as an important measure of SWF sustainability. So, the use of external managers and investments in alternative asset classes can be used jointly and reinforce their effects on SWF sustainability.

- *Social and Environmental Expenditure*

This criterion looks at whether part of the SWFs' expenditures or investments is allocated to social and/or environmental schemes. Given the growing importance of social and environmental problems, inserting social and ecological challenges into the SWFs can be a source of competitive advantage, which intern can be a source of sustainability. In the previous chapters, the detailed literature review and discussions on the importance of social and environmental expenditures and investments show that such strategies by businesses are important dimensions of social and environmental sustainability. As the fiduciaries of their societies, SWFs have responsibilities toward both current and future generations. This intergenerational perspective implies that SWFs cannot behave like financial institutions or corporations with a biased focus on short-term profits. As a result, the long-term investment focus of SWFs and their sensitivity to social and environmental sustainability issues. Therefore, SWFs need to take the sustainability effects of their investments for the current and future generations. This unique feature of SWFs implies that they should be active organisations on social and environmental responsibility dimensions.

In terms of theoretical discussions on the importance of social and environmental investing, the natural resource-based theory (NRBT) provides a very appropriate framework. The NRBT argues that socially and environmentally responsible business activities like pollution prevention, product stewardship, and clean technology can present new capabilities to the companies in terms of creating and maintaining competitive advantage. Based on these theoretical points, it can be argued that social and environmental responsibility would also improve SWF sustainability (See section 3.5). Therefore, both for gaining competitive advantage and protecting the interest of future generations, investing in social and

environmental causes stands out as another important measure or criterion for SWF sustainability.

These three measures stated above, which represent the SWFs' characteristics and the investment strategy of them, are admittedly crude characteristics of organisational structures as an outcome of the SWF sustainability. The variables portray the social and environmental features in addition to economic ones which represent a broader conceptualisation of sustainability, and these measures are recorded as discrete or dummy variables. The investment strategy and structure of the fund would most probably remain unchanged unless otherwise stated. Such measures are reported from 2007 until 2017 in the current sample.

Explanatory Variables: Country's Strategic Resources

In addition to the above three fundamental measures for assessing SWF sustainability, the quantitative analysis also includes some explanatory variables to control for the resources and capabilities provided by the country characteristics. The theoretical perspectives and empirical findings in the literature to date have the keystone of the attempt to construct a valid model on the relationship between a country's strategic resources and wealth fund's sustainability. Under a wide categorisation, the work to date identifies two main groups of strategic resources, namely intangible resources and tangible resources. Table 4 provides a summary of the explanatory factors.

From a research perspective, although empirical studies in strategic management are growing rapidly, most studies concentrate on isolating only a few resources – namely intangible assets- within a single context to examine one resource's effects on SWF sustainability. However, some scholars suggest that broadening the scope of resources beyond just those that are intangibles may be empirically beneficial to resource-based view research (Foss, 1997; Anderson & Kheam, 1998). Foss (1997), for instance, claims that there are various examples where tangible resources – such as physical or financial resources- bring funds sustainability. In this respect, tangible resources need to be included to empirically test RVB. Therefore, testing the relationship between intangible resources, tangible resources and SWF sustainability in the same study may help to more precisely validate the main prescription of the RBV and more appropriately untangle the true source of sustainability.

The selection of strategic resource indicators is based on several grounds: i) The indicators are very carefully constructed using a large pool of data and data sources, ii) the

indicators cover the period 2007-2017; therefore, they appear appropriate to assess the impact on SWFs, with the latter being a relatively recent trend across countries, iii) the indicators are widely used in the literature; therefore obtained results can be compared to the previous finding. iv) The indicators offer large country coverage, and v) the indicators are comparable over time and across countries.

Determinants of Strategic Resources	**Channels**	**Sources**
Tangible		
Financial Resources	Foreign Direct Investment (FDI)	World Bank (WB)
Intangibles		
Human Resources	Human Development Index	United Nations Development Programme (UNDP)
Innovation	Global Innovation Index	World Intellectual Property Organisation (Specialized Agency of the United Nation)
Reputation	Country RepTrack Index	Country RepTrack

TABLE 4: EXPLANATORY VARIABLES

Measurement of Strategic Resources

- *Innovation*

The innovation measurement indicates the capability to generate new products, technologies and market ideas. The main argument is that innovation has a direct impact on the competitiveness of SWFs and thus their sustainability. The process of innovation transforms SWFs fundamentally by enhancing their internal capabilities, making it more flexible and adaptable to market pressures, hence enhance their performance.

The intangible of innovation has been measured using the Global Innovation Index. This index has 81 indicators including political, environment, education, infrastructure and business

sophistication at the country level. Most studies look at innovation from research and development (R&D) perspectives. R&D has long been associated with the innovation capacities of corporations. In general, it should be emphasised that R&D measure only one part of the total input to the innovation process. Non- R&D inputs are crucial to the successful exploitation of new ideas and technology. Further, data on R&D may not be relevant to countries without an R&D function (Surroca et al., 2010). For instance, some countries introduce major or minor innovation despite the lack of formal R&D expenditure.

- *Human resources*

This measurement specifies the development of the employee in the country in terms of skills and abilities. Skilled employees have the knowledge and motivation to understand market problems, identify solutions and therefore improved sustainability-related practices. They are seen as a value-added and important feedback mechanism for ensuring the reduction of SWFs future performance decline due to their lawsuits, unionisation and health and safety finest. Human resources are measured using the Human Development Index. This index represents three tiers of human development, namely life expectancy, education and per capita income.

- *Reputation*

This measurement involves measuring the "Global perception of the extent to which a wealth fund is held in high esteem or regard" (Weiss et al., 1999). This suggests that country reputation is a general attribute that reflects the extent to which external stakeholders see the SWFs as 'good or 'bad'. The main argument is that country with good reputation provide valuable intangible asset which allows SWFs to achieve sustainability. To measure reputation, data is used form Country RepTrack provided by Reputation Institute for the period from 2007 to 2017. This annual reputation index covers the 50 most reputable countries based on the criteria of trust, admire, respect and good feeling (Reputation Institute, 2013). The complete data contains country-year observations. However, the sample of countries changes from one year to the next, and data are not available for all countries in all years. Given the requirement of this analysis, only countries that have SWFs are included in this research. This reduces the number of observations to 290 out of 616. The sample provided as a form of secondary data analysis is limited.

In order to meet this critique (missing values), several attempts have tried to employ alternative measures of reputation. Unfortunately, any attempt to employ these has been ruled out given the lack of data available for the sample of countries employed in the present research. For instance, Linaburg-Meduell Transparency Index was used as an alternative to measure reputation. This measurement has a lot of missing data ending up drawing inaccurate inferences about the SWFs' sample data. However, the reputation index fulfils the requirements of reliability when it produces consistent results during data analysis procedures (see chapter 5 for more details).

The management and development of intangibles are also conditioned by tangible resources, such as financial resources.

- *Financial Resources*

This measurement includes those factors containing financial value as an asset. Financial resources are measured through foreign direct investment (FDI), which is the ratio of net inflow as a percentage of the balance of payment in US dollars.

4.2. Research Philosophy, Methodology, and Strategy

In terms of the research methodology, the present study conducts a detailed conceptual analysis of the relevant theories and establishes a new conceptual model of SWF sustainability. So, the relevant conceptual analyses conducted in chapters three and four follows a qualitative research methodology (Bell et al., 2018; Saunders et al., 2019). In this research methodology, the relevant theories are identified for the components of SWF sustainability, and these theories are extended to cover the SWFs domain and the country-level strategic resources (see chapter3 for additional information). In this part of the research methodology, the resources approach becomes the most relevant theory to study SWF sustainability. This theory sees the resources and capabilities that a firm possesses as the main determinants of competitive advantage and sustainability. So, this theory and its variants (i.e., the natural resource-based theory) are very relevant to study SWF sustainability. These models are reviewed in detail and then extended to the domain of SWF sustainability by documenting the core components. These components are identified as the diversification of portfolio towards alternative asset classes, the employment of external asset managers and the expenditures and investments in social and environmental projects and causes.

A similar conceptual and qualitative research methodology is followed to determine the country-level strategic resources and to connect them to the SWF sustainability components. This part extends the resource-based theory to the SWFs domain and includes the county-level strategic resources as an important part of the new theory. Overall, the conceptual analysis and qualitative research methods are used to derive a new conceptual model of SWF sustainability. This model can be considered as a valuable contribution to the literature and can be used to study the sustainability of SWFs and other organisations in different contexts. The conceptual analyses are completed in the third and fourth chapters. This research methodology in the first part of the thesis corresponds to an interpretivist research philosophy and inductive research approach.

The second part of the research methodology involves detailed quantitative analysis using data for 56 sovereign wealth funds for the years between 2007 and 2017. So, this period covers the global financial crisis in 2008 and 2009.

4.3. Data Collection

Critical analysis of SWFs asset allocation is not an explicit aspect. Several reasons behind this difficulty, the diversity of funds makes SWFs hard to compare, and the lack of transparency among some of the largest SWFs is a further complication. Nevertheless, obtaining data from leading SWFs- specific database, a data series of 56 SWFs from six different regions (Middle East, Europe, Asia, Africa, Oceania and North America) have been created covering approximately 70% of global SWFs asset under management (AUM). Yet Latin America and the Caribbean are not covered in this study since these funds are still not mature and without any specific investment strategies. Asset classes categorised into seven groups: equity, private debt, private equity, real estate, infrastructure, natural resources and hedge funds.

To analyse the investment strategies of SWFs, the data has been integrated from multiple sources. Starting with information about the funds themselves, establishing a profile for each fund using information published by Priqin, Sovereign Wealth Fund Institute, Statista, Sovereign Wealth Centre, funds websites and annual reports. At the fund 'institutional' level, the key variables gathered associated with their characteristics are assets under management, objectives, age, source of fund. These measures of the characteristics of the fund are listed as a combination of continuous, binary and dummy variables that might allow analysing the data

more properly and carefully. In addition, these measures stated as of 2017. Secondly, focusing on the fund behaviour, investment deals that SWFs made has been examined manually build upon searching Preqin, Sovereign Wealth Centre, FEEM Monitor, Zypher and Sovereign Investment Lab and it is supplemented with data gathered on mergers and acquisitions from BLOOMBERG to ensure the data collected of high standard. Such process is time- consuming and required two years of intensive work.

The absence of inclusive information about SWFs investment strategies and asset allocation due to limited disclosure and transparency is challenging. Though, this study overcomes this data constraint in certain dimensions by obtaining fund-level data from five different sources generating insight and detailed analysis on SWFs investment strategies (see sub-section 2.5).

Dependent Variables: SWF Sustainability

In order to assess the new conceptual model on SWF sustainability, the sample includes seven main variables. Three of them are related to the SWF sustainability components. Namely, they measure whether SWFs invest in alternative asset classes, employ external fund managers, and make any social and environmental responsibility expenditures and investments. Under normal conditions, it would be desirable to have these variables as continuous and detailed measures. For example, knowing the number of external fund managers employed by SWFs and the share of portfolio delegated to the external fund managers as well as the performance and tenure of these external fund managers would be very valuable information to assess the sustainability of SWFs on that dimension. Similarly, in the case of alternative asset classes, which assets SWFs make investments and the share of alternative asset classes and different regions (i.e., the extend of portfolio diversification) in the total portfolio would be very valuable pieces of information. Lastly, in the case of socially and environmentally responsible projects and expenditures, information on their numbers, sizes, and impact analysis would be very valuable to use in the quantitative analysis. However, due to the low data transparency of the SWFs sector, obtaining such detailed information on the SWF sustainability dimensions is not possible. Instead, the present thesis is able to collect broad information on these dimensions like whether SWFs spend on ESG projects or not, whether they employ external fund managers or not, and whether SWFs invest in alternative classes or not. In other words, binary (or dummy) variables are constructed for the case of three SWF sustainability components.

The limited variation in the dependent variables (constructed as dummy variables) can be considered as a research limitation, but the analysis technique used (logistic regression) still provides valuable insights on the effects of the independent variables on three SWF sustainability components (see chapter 5 for more details).

Independent Variables: Country's Strategic Resources

In the case of independent variables, the data availability is better because they are at the country level. The tangible strategic resource variable of foreign direct investment (FDI) inflows to the country is relatively common and easy to obtain public variable from resources like the World Bank. Similarly, the intangible resource variable of the human development index (HDI) is another very common variable obtainable from the United Nations. The innovation index for the sample of countries also exists for the most observations year-country pairs. However, the sample is limited to some extent on the reputation index dimension.

4.4 Quantitative Methods

Once the sample data set is formed, various quantitative methods are implemented on it to produce relevant empirical evidence on the conceptual model (Wooldridge, 2010). These quantitative research methods include descriptive statistics (such as summary statistics of the dependent and independent variables as well as their histograms), bivariate analysis (such as pairwise correlations, scatter plots, and t-tests) and regression analysis. On the last quantitative dimension, the binary nature of the dependent variables restricts the available options. In that context, the logistic regression model (Long &Freese, 2006) is used to see how the independent variables affect the likelihood (or the odds ratio) of having some sustainability measures as positive, like employing external managers and investing in alternative asset classes. The relevant logit regression equations are given below.

Where $Y_{Alternative\_Assets,it}$ an observed dependent variable (outcome) that represents investing in alternative asset classes by SWF i in time t, $Y_{Ext\_Fund\_Manag,it}$ an observed dependent variable that represents employing external managers by SWF i in time t, and $Y_{Social\_Environmental,it}$ an observed dependent variable that represents spending on social and environmental projects and causes by SWF i in time t.

Model equations:

$$Y_{Alternative\_Assets,it} = Pr\left(\frac{p(invest)_{it}}{1 - p(invest)_{it}}\right) = \beta_0 + \beta_1 Ln(FDI_{it}) + \beta_2 Innovation_{it} + \beta_3 Reputation_{it} + \beta_4 HDI_{it} + \varepsilon_{it}$$

$$Y_{Ext\_Fund\_Manag,it} = Pr\left(\frac{p(employ)_{it}}{1 - p(employ)_{it}}\right) = \beta_0 + \beta_1 Ln(FDI_{it}) + \beta_2 Innovation_{it} + \beta_3 Reputation_{it} + \beta_4 HDI_{it} + \varepsilon_{it}$$

$$Y_{Social\_Environmental,it} = Pr\left(\frac{p(spend)_{it}}{1 - p(spend)_{it}}\right) = \beta_0 + \beta_1 Ln(FDI_{it}) + \beta_2 Innovation_{it} + \beta_3 Reputation_{it} + \beta_4 HDI_{it} + \varepsilon_{it}$$

In the above equations, *p(invest)* refers to the probability that an SWF invests in alternative asset classes, *p(employ)* shows the probability that an SWF employs external fund managers, and *p(spend)* displays the probability of an SWF spending on social and environmental projects and causes. ε_{it} refers to the error function in the three equations.

The limited variation can be considered as a research limitation, but the logistic regression analysis still provides valuable insights on the effects of the independent variables (i.e., tangible and intangible country-level strategic resources) on three SWF sustainability components. The logistic regressions are conducted with many robustness checks like including year fixed effects and comparing the results across commodity and non-commodity sovereign wealth funds. In addition, to avoid the negative effects of multicollinearity, the independent variables are combined into a single strategic resource index using inverse weighting method (Willan et al., 2012). As another robustness analysis, the three sustainability measures are also combined into a general sustainability measure. In this way, detailed research evidence can be generated on the research topic and the relevant research hypotheses. These quantitative results are presented in the fifth chapter. Overall, the thesis uses both qualitative

and quantitative research methods to construct a conceptual model of SWF sustainability first and then to test the relationships within this new model.

4.5. Conclusion

This chapter provides the methodological contributions of the thesis to the literature on SWF sustainability by deriving a new model of sustainability. The research philosophy, methodology, and strategy of the empirical analysis are presented afterwards. In this context, the chapter also gives the details of data collection and quantitative methods.

The new model established in this chapter for SWF sustainability can be considered as an important conceptual contribution to the relevant literature. While there are many studies examining the financial performance of SWFs, discussions on their sustainability are very limited. The present thesis provides a full-fledged model of SWF sustainability, determines its components, and connects them to the leading country-level strategic resources. All of these conceptual discussions are novel contributions. The following parts of the chapter give the details of the research philosophy (i.e., positivism), the research methodology (i.e., deductivism), and the research strategy (i.e., a case study on a sample of SWFs), the data collection details, and the quantitative methods. The data set collected for the present thesis can be considered as an important contribution to the SWF literature as well. Yearly data on 56 SWFs for the period of 2007-2017 are collected for the three dimensions of SWF sustainability dimensions. This data is helpful to understand the leading strategies employed by SWFs.

Chapter 5: Modelling the Relationship between Country's Strategic Resources and SWF's Sustainability: Results and Analysis.

5.1. Introduction

This chapter presents the results of the empirical analysis. The findings are presented in five parts. The first part provides the descriptive statistics of the relevant variables. In this way, some initial insights are obtained about the given data. Then, the second part provides some bi-variate analysis to understand the relationships between sustainability measures (i.e., investments in alternative assets classes, the employment of external fund managers, and socially and environmentally expenditures) and country strategic resources (i.e., the tangible resources of FDI inflows and the intangible resources of human development, innovation, and reputation). This part conducts cross-correlation analysis, scatter plots, and some t-tests to see the direction and statistical significance of the relationships between the relevant variables. The third part presents the regression analysis to see which country strategic resources matter for various SWF sustainability dimensions. All of the analyses in the first three parts are done for each SWF sustainability measure separately. In this way, one can see the effects of country strategic resources for each SWFs measures of investments in alternative assets classes, the employment of external fund managers, and socially and environmentally expenditures. Namely, the analysis provides detailed findings regarding the impact of country strategic resources on the resource-based sustainability measure of employing external fund managers, on the natural-resource-based sustainability measure of social, developmental, and environmental expenditures, and the portfolio diversification-based sustainability measure of investing in alternative asset classes. Overall, these findings provide enough evidence to test the research hypotheses in the thesis.

In addition to providing quantitative analysis on each of the sustainability measures, this chapter also constructs a single SWF sustainability measure by summing three individual measures. In this way, a multicategory variable of SWF sustainability is obtained. This new variable can take values from 0 to 4 in a discrete manner. In this way, more variation in the dependent variable is created compared to the case of binary dependent variables. Such a higher variation can be useful to identify the effects of country strategic resources more robustly. So, the descriptive statistics, cross-correlations, and scatter-plots of the new dependent variable, as well as the results of the ordered logit and multinomial logit regression models, are presented in the fourth section. As another robustness analysis, the new dependent variable is also

constructed as a variance-weighted average of the three separate SWF sustainability indicators. In this way, the dependent variable becomes a continuous variable between 0 and 1, and the pooled ordinary least squares and panel methods can be used in the regression analysis. Overall, this chapter conducts very detailed empirical analysis with the sample data and is expected to produce valuable findings on the research hypotheses that country strategic resources can matter greatly for the sustainability of SWFs.

5.2. Descriptive Analysis

The main variables used in the analysis are the country strategic resources (i.e., the tangible resources of FDI inflows and the intangible resources of human development, innovation, and reputation), which are the independent variables, and the SWF sustainability measures (i.e., the employment of external fund managers, investments in alternative assets classes, and expenditures on social and environmental projects), which are the dependent variables. So, there is a total of seven variables in the analysis. The dependent variables are binary dummy variables which take the value of 1 if the individual SWF has the relevant sustainability measure, such as employing external managers and investing in alternative asset classes. In contrast, the independent variables are continuous variables. Then, checking their stationarity is important before starting with the regression analysis. For this aim, panel unit root tests are conducted for each independent variable, and it is found that they are stationary. So, the current levels of these independent variables are used in the relevant empirical analysis.

Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
External Fund Managers	616	.482	.5	0	1
Alternative Asset Classes	616	.732	.443	0	1
Social and Envir Expendit	616	.407	.492	0	1
Human Development Index	616	.777	.121	.436	.953
Innovation Index	514	38.707	11.667	6.02	63.5
Reputation Index	290	52.12	12.623	20.3	82.8
Ln(FDI)	588	22.823	2.153	15.516	26.956

TABLE 5: SUMMARY STATISTICS FOR THE FULL SAMPLE (56 SWFS)

As the first descriptive analysis, Table 5 presents the summary statistics of all variables for the full sample of 56 SWFs. It is seen from the table that there are 616 observations in the case of dependent variables, so there is no missing observation in the sample for the dependent variables. Regarding the independent variables, the HDI also has 616 observations with no missing observation. However, the other variables have some missing data. FDI and innovation index have a limited number of observations with 588 and 514 observations, respectively. But the reputation index has only 290 observations due to the reasons, as explained in the previous chapter. While this is not a major problem in the descriptive statistics and bivariate analysis, it can be a major constraint in the case of multifactor regression analysis. When the SWF sustainability components are examined in Table 5, it is seen that the highest share is observed for the investments in the alternative asset classes. As the sustainability measures are binary variables taking a value of 1 for positive observations (i.e., the given SWF has the mentioned property) and a value of 0 for negative observations (i.e., the given SWF does not have the mentioned property), the mean value of 0.732 implies that 73.2% of the SWF-year pairs have invested in alternative asset classes. This high ratio for the incidence of alternative asset class investments is consistent with the findings from the previous sections that SWFs tried to diversify their portfolios, especially after the global financial crisis. So, close to three-quarters of the observations have the sustainability property of the alternative asset classes. This is a quite high ratio compared to the other two sustainability components. Table 5 shows that close to half of the SWF-year pairs (i.e., 48.2%) have employed external fund managers, whereas only 40.7% have social and environmental expenditures and investments. So, the sample seems to be lagging especially on the dimension of social and environmental expenditures. These SWFs are very large organisations with sizeable assets under management. When compared to other large corporations, which have CSR expenditures and reporting with more than 85% incidence rate, 40.7% stays on the very low side.

Table 5 also provides summary statistics for the independent variables in the sample. It is seen that the human development index (HDI), which is measured between 0 and 1, ranges from 0.436 to 0.953. This range can be considered to be quite high; however, it is natural given that a very diverse set of countries (like the advanced countries of the US, Canada, Norway, and New Zealand versus the developing counties of Bolivia, Timor-Leste, Algeria, Botswana, and Mauritania) is included in the sample. The average HDI is estimated as 0.777, while the standard deviation is 0.121. Regarding the summary statistics of the innovation index, the

average is estimated as 38.7, with a standard deviation of 11.67. The range of innovation index is from 6.02 to 63.5, so the most innovative country has more than ten times the relevant score relative to the least country in the sample. Again, the diverse set of countries included analysis the main reason for the high range. Regarding the reputation index, the sample average is 52.1, and the standard deviation is 12.62, where the range is from 20.3 to 82.8. Finally, the natural logarithm of the FDI is 22.82, where the range is from 15.52 to 25.96. In fact, the raw values of the FDI variable have very high levels of dispersion, but taking natural logs compress the dispersion and makes the variable more suitable for empirical analysis.

Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
External Fund Managers	407	.514	.5	0	1
Alternative Asset Classes	407	.703	.458	0	1
Social and Envir Expendit	407	.319	.467	0	1
Human Development Index	407	.771	.123	.468	.953
Innovation Index	327	37.24	11.796	6.02	61.4
Reputation Index	170	50.297	12.29	20.3	82.8
Ln(FDI)	383	22.618	2.254	15.516	26.956

TABLE 6: SUMMARY STATISTICS FOR COMMODITY SWFS (37 SWFS)

Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
External Fund Managers	209	.421	.495	0	1
Alternative Asset Classes	209	.789	.409	0	1
Social and Envir Expendit	209	.579	.495	0	1
Human Development Index	209	.79	.115	.436	.939
Innovation Index	187	41.272	11.006	17.2	63.5
Reputation Index	120	54.702	12.69	35.1	81.6
Ln(FDI)	205	23.206	1.899	17.988	26.397

TABLE 7: SUMMARY STATISTICS FOR NON-COMMODITY SWFS (19 SWFS)

The summary statistics are repeated for the two sub-samples of commodity and non-commodity SWFs in Table 6 and Table 7, respectively. It should be noted the commodity sample has close to two-thirds (37 SWFs) of the sample, while the non-commodity sample is one-third (19 SWFs) of the full sample. By comparing these two samples, it becomes possible to note any differences in the descriptive statistics of commodity versus non-commodity SWFs. For example, it is seen from these two tables that non-commodity sample has a higher share of the binary variable of the alternative asset classes. This share is 78.9% in the non-commodity sample, while it is 70.3% in the commodity sample. A much larger difference in favour of non-commodity SWFs happens in the case of social and environmental expenditures. The share of SWFs that spend on social and environmental projects and causes is 57.9% in the non-commodity sample, while this ratio is only 31.9% in the commodity sample. Interestingly, the sample of SWFs with possible higher negative effects on the environment has a lower incidence of projects targeting the environment and social issues. While such differences and the reasons behind them can be important research questions, they are not in the scope of the present thesis, so they are left for future research. Finally, in the context of dependent variables, the commodity sample has higher utilisation levels of external fund managers with 51.4%, while this ratio is 42.1% in the non-commodity sample.

Tables 6 and 7 also display the differences in the independent variables of country-level strategic resources. In these variables, differences between the commodity and non-commodity samples are relatively smaller. For example, in the case of HDI, the average value is 0.771 in the commodity sample and 0.79 in the non-commodity sample. Similarly, the average ln (FDI) is 22.6 in the commodity sample and 23.2 in the non-commodity sample, thereby displaying very limited difference across two samples. Overall, the commodity and non-commodity samples display large differences in the SWF sustainability measures, whereas the differences in the independent variables are very limited. This differential data properties between commodity and non-commodity SWFs can be another future research topic.

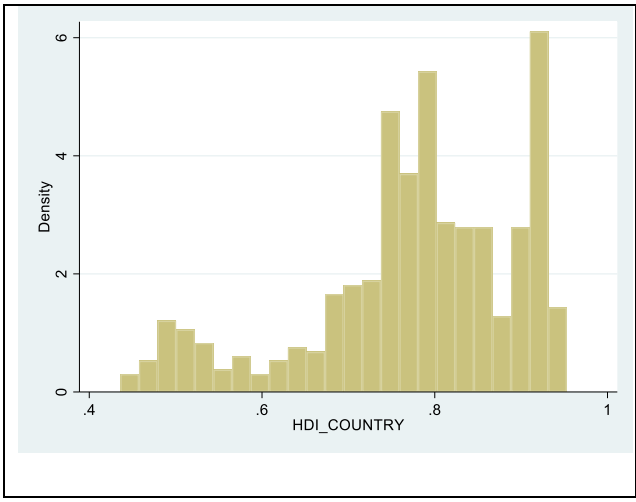


FIGURE 8: HISTOGRAM OF HDI

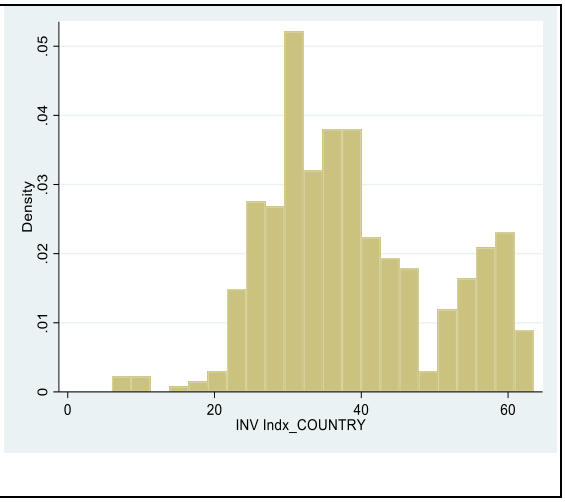


FIGURE 9: HISTOGRAM OF INNOVATION INDEX

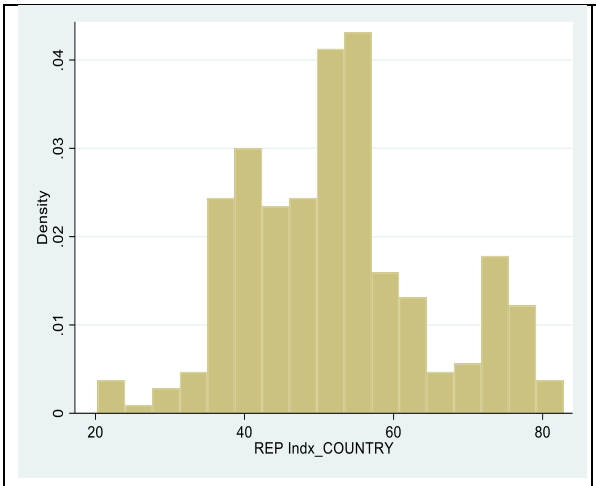


FIGURE 10: HISTOGRAM OF REPUTATION INDEX

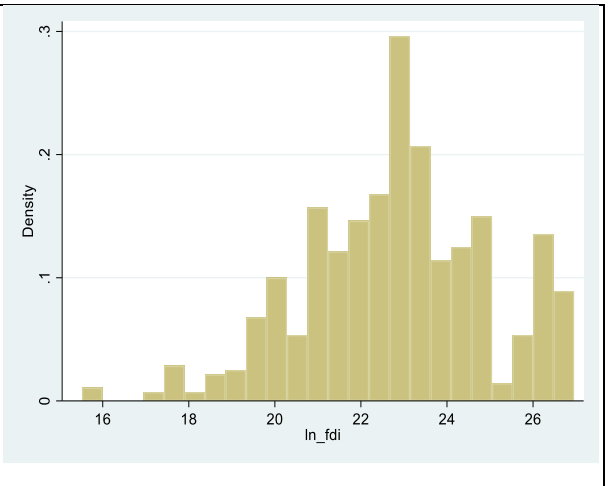


FIGURE 11: HISTOGRAM OF LN(FDI)

As another descriptive analysis, Figures 8 to 11 provide the histograms of the independent variables. It is seen that there is a high variation in these variables, especially the human development index. In HDI, there is a small cluster at the very low levels, while the majority of observations are on the higher end of the distribution. In the case of the innovation index and reputation index, the picture is slightly different. For these variables, there are small clusters at the higher end of the distribution, whereas as the majority of observations are clustered at the medium ranges. A similar picture also emerges in the case of Ln(FDI) variable. Overall, these descriptive analyses, in terms of summary statistics and histograms, provide valuable insights into the sample data.

5.3. Bivariate Analysis

After displaying the descriptive analysis, this subsection moves to the bivariate analysis of the sample data. In other words, relationships between pairs of variables are examined by using various quantitative methods. These methods include pairwise correlations, scatter plots of two variables and the relevant t-tests.

5.3.1. Pairwise Correlations

Table 8 presents the pairwise correlations between seven dependent and independent variables. It should be noted the number of observations can be different for each correlation due to the differing number of observations for each variable. Instead of doing a group correlation analysis, conducting pairwise correlation analysis utilises the sample size at the maximum level. Instead, a group correlation analysis would limit the sample size to the number of smallest observations in the list of variables. In this case, this variable would be Reputation index with only 290 observations, compared to 616 variables in the case of dependent variables.

Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) External Fund Managers	1.000						
(2) Alternative Asset Classes	0.342*	1.000					
(3) Social and Envir Expendit	0.284*	0.427*	1.000				
(4) Human Development Index	0.380*	0.244*	0.069	1.000			
(5) Innovation Index	0.430*	0.345*	0.206*	0.759*	1.000		
(6) Reputation Index	0.298*	0.251*	0.340*	0.689*	0.649*	1.000	
(7) Ln(FDI)	0.346*	0.273*	0.048	0.552*	0.690*	0.177*	1.000

* shows significance at the 0.05 level

TABLE 8: PAIRWISE CORRELATIONS FOR THE FULL SAMPLE (56 SWFS)

Table 8 shows the pairwise correlations for the case of the full sample with 56 SWFs. It is seen that all correlations coefficients among dependent and independent variables are positive, except for the cases of social and environmental expenditures Ln(FDI) pair and HDI, all correlation coefficients are statistically significant at 5% level. This provides supportive empirical evidence for the research hypotheses. Namely, Table 8 shows that HDI is positively associated with the external fund managers (a coefficient size of 0.380) and with the alternative asset classes (a coefficient size of 0.244) at 5% statistical significance level. So, these correlations support the research hypotheses regarding the positive effects of HDI on the SWF sustainability components of external fund managers and the alternative asset classes,

respectively. However, the pairwise correlation coefficient on the relationship between HDI and the social and environmental expenditures is not statistically significant at 5%, so it fails to support the research hypothesis regarding the positive effect of HDI on the social and environmental expenditures. In the case of the research hypotheses regarding the positive effects of the innovation index on the SWF sustainability components of the external fund managers, the alternative asset classes, and the social and environmental expenditures, the correlation evidence is more supportive. Namely, it is seen from Table 8 that the innovation index is positively associated with the external fund managers (a coefficient size of 0.430), with the alternative asset classes (a coefficient size of 0.345), and the social and environmental expenditures (a coefficient of 0.206) at 5% statistical significance level. So, these statistically significant pairwise correlations support the relevant research hypotheses. A similar case emerges in the case of the impact of the reputation index on the SWFs components. Table 8 shows that that the reputation index is positively associated with the external fund managers (a coefficient size of 0.298), with the alternative asset classes (a coefficient size of 0.251), and the social and environmental expenditures (a coefficient of 0.340) at 5% statistical significance level. So, these statistically significant pairwise correlations support the relevant research hypotheses regarding the positive effects of the reputation index on the SWF sustainability components of the external fund managers, the alternative asset classes, and the social and environmental expenditures.

Finally, regarding the effects of the FDI on the SWF sustainability components, Table 8 provides partial support. Namely, Ln(FDI) is positively associated with the external fund managers (a coefficient size of 0.346) and with the alternative asset classes (a coefficient size of 0.273) at 5% statistical significance level. So, these correlations support the research hypotheses regarding the positive effects of FDI on the SWF sustainability components of external fund managers and the alternative asset classes, respectively. However, the pairwise correlation coefficient on the relationship between Ln(FDI) and the social and environmental expenditures is not statistically significant at 5%, so it fails to support the research hypothesis regarding the positive effect of FDI on the social and environmental expenditures. Overall, it is seen that for the SWF sustainability dimension of the employment of external fund managers, all four independent variables have positive and statistically significant correlations, with the relationship with the innovation index being the strongest. In addition, that for the SWF sustainability dimension of investing in alternative asset classes, all four independent variables

have again positive and statistically significant correlations, with the relationship with the innovation index being the strongest. However, for the third SWF sustainability dimension of the social and environmental expenditures, only the innovation index and the reputation index have statistically significant coefficients, whereas the correlation coefficients of the HDI and Ln(FDI) are not statistically significant. So, the conceptual model of SWF sustainability constructed in chapter four is fully supported on the external fund manager and alternative asset dimensions, while the support on the social and environmental expenditures dimensions is more limited.

Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) External Fund Managers	1.000						
(2) Alternative Asset Classes	0.432*	1.000					
(3) Social and Envir Expendit	0.329*	0.330*	1.000				
(4) Human Development Index	0.319*	0.208*	-0.067	1.000			
(5) Innovation Index	0.322*	0.316*	0.063	0.774*	1.000		
(6) Reputation Index	0.300*	0.215*	0.196*	0.665*	0.670*	1.000	
(7) Ln(FDI)	0.278*	0.322*	0.041	0.602*	0.762*	0.341*	1.000

* shows significance at the 0.05 level

TABLE 9: PAIRWISE CORRELATIONS FOR COMMODITY SWFS (37 SWFS)

The pairwise correlation analysis is repeated for the cases of commodity and non-commodity samples in Table 9 and Table 10, respectively. Some important differences emerge between these two samples. In the case of the first SWF sustainability component of the employment of the external fund managers, all four independent variables of the HDI, the innovation index, the reputation index, and Ln(FDI) have positive and statistically significant coefficients for both samples. However, the sizes of the pairwise correlation coefficients are quite different in these samples. For example, the correlation between the innovation index and the external fund managers is 0.322 in the commodity sample, whereas it is 0.701 in the non-commodity sample. Similarly, the correlation between the HDI and the external fund managers is 0.319 in the commodity sample, whereas it is 0.537 in the non-commodity sample. Similar large differences are observed in the cases of the reputation index and Ln(FDI). Hence, these results imply that the non-commodity sampled displays much stronger role of the country-level strategic resources on the SWFs component of the external fund managers.

Pairwise correlations							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) External Fund Managers	1.000						
(2) Alternative Asset Classes	0.179*	1.000					
(3) Social and Envir Expendit	0.295*	0.606*	1.000				
(4) Human Development Index	0.537*	0.311*	0.287*	1.000			
(5) Innovation Index	0.701*	0.381*	0.374*	0.751*	1.000		
(6) Reputation Index	0.319*	0.280*	0.471*	0.761*	0.597*	1.000	
(7) Ln(FDI)	0.559*	0.126	-0.033	0.434*	0.530*	-0.096	1.000
* shows significance at the 0.05 level							

TABLE 10: PAIRWISE CORRELATIONS FOR NON-COMMODITY SWFS (19 SWFS)

When Table 9 and Table 10 are compared regarding the correlation coefficients for the SWFs component of the alternative asset classes, it is seen that all four independent variables have positive and statistically significant correlation coefficients in the commodity sample. In contrast, Ln(FDI) variable does not have a statistically significant correlation in the non-commodity sample. So, the role of Ln(FDI) for this sustainability dimension seems to be limited in the non-commodity sample. When the third SWF sustainability component is compared across two samples, more stark differences are obtained. In the full sample of Table 8, it was seen that HDI and Ln(FDI) did not have statistically significant correlations with the third SWFs measure. When the cases of commodity and non-commodity samples are compared using Table 9 and Table 10, it is found that Ln(FDI) still does not have any statistically significant correlations with social and environmental expenditures. However, HDI has a statistically significant correlation in the case of the non-commodity sample, while it is still statistically insignificant in the commodity sample. As another difference, the innovation index loses its statistical significance in the commodity sample. In addition, the coefficients of the innovation and reputation indices have larger sizes in the non-commodity sample compared to the commodity and full samples.

The results of the correlation analysis are summarised in Table 11 in the contexts of the research hypothesis. There is a total of 6 research hypothesis showing the possible relationships between 3 dependent and 2 independent variables (i.e., the set of intangibles versus tangible resources). If the same analysis is repeated for commodity and non-commodity samples, the total number of relationships will increase to 36. Table 11 shows the statistically significant results among these 36 relationships. It is seen that in the case of the external fund managers,

the results are very robust, with all possible combinations and samples always having statistically significant pairwise correlation coefficients. In addition, the non-commodity sample has stronger correlations than commodity sample for this SWFs measure of employing external fund managers. Regarding the case of the SWFs component of investing in alternative asset classes, the results are generally very robust, with only the correlation of Ln(FDI) being statistically insignificant in the case of the non-commodity sample. In this dimension, the coefficients are not very different across the two samples. Finally, in the case of the third SWFs measure of social and environmental expenditures, the results are quite mixed, and the research evidence is not very strong. It is seen from Table 11 that HDI is always statistically significant, while Ln(FDI) is always statistically insignificant. In the case of HDI, it is only significant in the non-commodity sample, and the reputation index is statistically significant in the case of full and non-commodity samples. Overall, according to the pairwise correlation analysis, the new conceptual model of SWF sustainability performs quite well on the first two sustainability measures of the external fund managers and the alternative asset classes. However, the model is not very strong or robust on the third SWF sustainability component of social and environmental expenditures.

Pairwise Correlations					
		Human Development Index	Innovation Index	Reputation Index	Ln(FDI)
1-External Fund Managers	Full Sample	0.380*	0.430*	0.298*	0.346*
	Commodity Sample	0.319*	0.322*	0.300*	0.278*
	Non-Com. Sample	0.537*	0.701*	0.319*	0.559*
2-Alternative Asset Classes	Full Sample	0.244*	0.345*	0.251*	0.273*
	Commodity Sample	0.208*	0.316*	0.215*	0.322*
	Non-Com. Sample	0.311*	0.381*	0.280*	
3. Social and Environment Expenditures	Full Sample		0.206*	0.340*	
	Commodity Sample		0.196*		
	Non-Com. Sample	0.287*	0.374*	0.471*	

Note: Blank cells indicate statistically insignificant results.

TABLE 11: SUMMARY OF PAIRWISE CORRELATIONS

5.3.2. Scatter Plots

The above pairwise correlation analysis can be supported by examining the scatter plots between dependent and independent variables. These scatter plots would give basically the same information as the correlation coefficients. However, they would provide some graphical representation that would be easier to capture. There are 6 research hypotheses in the present thesis corresponding to a total of 12 relations. So, this sub-section presents 12 sets of scatter plots corresponding to each relationship. In addition, the graphs include the distinction between commodity and non-commodity samples (see APPENDIX).

Figure 12 shows the scatter plots between the external fund manager dummy on the y-axis and the HDI variable on the x-axis. It is seen that the full sample and two sub-samples have all positive relationships between the dummy for the external fund manager and the HDI variable. As the external fund manager is a dummy variable, the relevant observations are clustered either at 0 (i.e., no employment of external fund managers) or at 1 (i.e., employment

of external fund managers). The sub-samples show that in the case of commodity SWFs, both 0 and 1 observations are widely dispersed between different HDI values, while they are mostly over high HDI values for 1-observations in the case of non-commodity SWFs. So, the relationship seems to be stronger in the case of the non-commodity sample.

Figure 13 shows the scatter plots between external fund manager dummy and the innovation index. A similar picture emerges with these graphs, where the relationships seem to be stronger in the case of the non-commodity sample. These two findings confirm the results of Table 11, which shows that the correlation coefficients of HDI and the innovation index are higher in the case of non-commodity SWFs.

Also, Figure 14 shows the scatter plots between the external fund manager dummy and the reputation index. It is seen that there is a positive relationship between these variables, but the relationship does not differ much between two-samples In the case of both commodity and non-commodity SWFs, for the category of 1 for the external fund manager dummy, the values of the innovation index is highly dispersed over the full range.

Figure 15 shows the last scatter plot for the external fund manager dummy, where the x-axis variable is chosen as Ln (FDI). In this case, there is a positive relationship between two variables, while the relationship looks to be stronger in the case of the non-commodity sample. This finding is also confirmed by Table 11, which shows that the correlations coefficient of the external fund manager with Ln(FDI) is much higher in the non-commodity sample. Overall, these four graphs imply that the relationship between the country-level strategic resources and the first SWF sustainability measure of employing external fund managers is quite strong and robust, while there might be some differences across sub-samples.

Figures 16 to 19 shows the scatter plots for the second SWFs measure of investing in alternative asset classes. In Figure 16, a scatter plot is given for the independent variable of HDI, and it is found that the relationship is positive in all samples, while it is slightly stronger in the case of the non-commodity sample.

Figure 17 shows the scatter plot between the alternative asset classes dummy and the innovation index. The graphs indicate that there is a positive association between these two variables. In addition, this relationship seems to be stronger in the case of the non-commodity SWFs. These findings are confirmed by the correlation coefficients in Table 11.

Figure 18 shows the scatter plot between the alternative asset classes dummy and the reputation index. The graphs indicate that there is a positive association between these two variables. However, the relationship is not very strong as the reputation values are highly dispersed across categories of the alternative asset class dummy of 1.

Finally, Figure 19 shows the scatter plot between the alternative asset class dummy and Ln(FDI). In the full sample and the commodity sample, there is a positive relationship between these two variables. However, in the case of the non-commodity sample, the relationship is very weak. These findings are confirmed in Table 11, which shows that the correlation of Ln(FDI) with the alternative asset dummy is statistically significant for the full and commodity samples, whereas it is not statistically significant in the case of the non-commodity samples.

The next four graphs (i.e., Figures 20 to 23) present the scatter plots for the case of the last SWF sustainability component of expenditure on social and environmental responsibility projects and causes. Table 11 showed that the relationship between the country-level strategic resources, and this SWFs component was the weakest in relation to the new conceptual model of SWF sustainability constructed in the fourth chapter. This situation is seen in the case of Figure 20, where the relationship of this SWF sustainability measure and HDI is positive but very weak in the case of the full sample, and it is negative and very weak in the case of the commodity sample. In contrast, this correlation is positive and strong in the case of the non-commodity sample.

Figure 21 shows the scatter plots between the social and environmental expenditures dummy and the innovation index. It is seen that there is no clear relationship in the commodity sample, and the relationship is very weak in the full sample. In contrast, for the nom-commodity sample, the relationship is positive and relatively strong.

Figure 22 shows the scatter plots between the social and environmental expenditures dummy and the reputation index. In contrast to the previous two graphs, there is a positive and relatively strong relationship with the reputation index in the full sample as well as both commodity and non-commodity samples.

Finally, Figure 23 shows the scatter plot between the social and environmental expenditure dummy and Ln(FDI). The graphs indicate that this relationship is positive in the case of the full sample and the commodity sample, whereas it is negative for the non-commodity sample. However, none of these relationships is strong enough, indicating that the

association of Ln(FD) with the social and environmental expenditures is very weak. This point is confirmed in Table 11 as well, which indicates that none of the relevant correlation coefficients is statistically significant. Overall, these scatter plots provide valuable knowledge regarding the relationship between the country-level strategic resources and the SWF sustainability components. The findings indicate that the associations of strategic resources with the first and second SWFs components of the alternative asset classes and the external fund managers are quite strong and robust. However, for the last SWFs component of the social and environmental expenditures, its association with the country-level strategic resources is somewhat mixed and weak. Hence, the new conceptual model performs quite well empirically for the first two SWF sustainability components, whereas as its performance is relatively weak in the case of the last SWF sustainability component.

5.3.3. t-tests

The research hypotheses postulate some relationships between the country-level strategic assets and the three SWF sustainability components. To justify these relationships, the fourth chapter establishes a new conceptual model of SWF sustainability by extending the resources approach (i.e., the resource-based theory and the natural resource-based theory) to the domain of SWFs and including the country-level resources to the list of resources and capabilities that matter for the competitive advantage and sustainability of organisations. Given that the research hypotheses are about bivariate relationships like the impact of the innovation index on the employment of the external fund managers, these relationships can also be examined using the relevant t-tests. So, this section tests the six research hypotheses and corresponding 12 relationships presented in the fourth chapter using two-sample t-tests.

Table 12 presents the results of the two-sample t-tests for the research hypotheses 1a and 1b, regarding the effects of the country-level strategic resources (i.e., the human development index, the innovation index, the reputation index, and Ln(FDI), respectively) on the first SWF sustainability measure of investing in alternative asset classes. The first panel of Table 12 shows the results for the HDI variable. It is seen that in the case of SWFs not investing in alternative asset classes (i.e., the relevant dummy equals 0), the average HDI value is 0.729. However, in the case of SWFs investing in alternative asset classes (i.e., the relevant dummy equals 1), the average HDI value is 0795. So, the SWFs which invest in alternative asset classes have higher HDI scores. When these means are compared using a two-sample t-test, the relevant t-stat is estimated as -6.25, and the relevant p-value becomes 0.000. So, these values

imply that the average HDI values at SWFs with alternative asset class investment are larger in a statistically significant way than the average HDI values at SWFs without any alternative asset class investments. In other words, one can also state that the higher values of the human development index are positively associated with the higher incidence of SWFs investing in alternative asset classes. Therefore, this evidence supports the research hypothesis that HDI has a positive effect on the first SWF sustainability component of investing in alternative asset classes.

Table 12 also provides the two-sample t-test results regarding the relationship between the alternative asset classes dummy and the innovation index. In the case of the SWFs with alternative asset class investments, the average innovation score is 41.084, while in the case of SWFs without alternative asset class investments, this average is 31.895, producing a difference of 9.189. When this difference is tested using a t-test, the relevant t-stat is estimated as -8.3 and the p-value as 0.000. So, the results imply that SWFs with alternative asset class investments have higher innovation scores compared to SWFs without such investment, and this difference is statistically significant. One can also state this finding as follows: the higher values of the innovation index are positively associated with a higher incidence of the SWFs investing in alternative asset classes. Therefore, this evidence supports the research hypothesis regarding the impact of the innovation index on the first SWF sustainability measure of investing in alternative asset classes.

	Alternative Asset Classes Dummy=0	Alternative Asset Classes Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Human Development Index	165	451	.729	.795	-.067	.011	-6.25	0

	Alternative Asset Classes Dummy=0	Alternative Asset Classes Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Innovation Index	133	381	31.895	41.084	-9.189	1.104	-8.3	0

	Alternative Asset Classes	Alternative Asset Classes	Mean1	Mean2	dif	St_Err	t_value	p_value

	Dummy=0	Dummy=1						
Reputation Index	67	223	46.348	53.854	-7.506	.7412	-4.4017	0

	Alternative Asset Classes Dummy=0	Alternative Asset Classes Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Ln (FDI)	157	431	21.849	23.178	-1.329	.194	-6.9	0

TABLE 12: T-TESTS FOR ALTERNATIVE ASSET CLASSES DUMMY FOR THE FULL SAMPLE (56 SWFS)

Table 12 also provides the relevant two-sample t-test results regarding the test of research hypothesis about the effects of the reputation index on the first SWF sustainability component. In the case of the SWFs with alternative asset class investments, the average reputation score is 41.084, while in the case of SWFs without alternative asset class investments, this average is 31.895, producing a difference of 7.506. When this difference is tested using a t-test, the relevant t-stat is estimated as -4.4 and the p-value as 0.000. So, the results imply that SWFs with alternative asset class investments have higher reputation scores compared to SWFs without such investments, and this difference is statistically significant. One can also state this finding as follows: the higher values of the reputation score are positively associated with a higher incidence of the SWFs investing in alternative asset classes. Therefore, this evidence supports the relevant research hypothesis.

Lastly, Table 12 has also two-sample t-test results regarding the relationship between Ln(FDI) and the first SWFs component. The results indicate that, in the case of the SWFs with alternative asset class investments, the Ln(FDI) level is 23.178, while in the case of SWFs without such investment, this average is 21.849, producing a difference of 1.329. When this difference is tested using a t-test, the relevant t-stat is estimated as -6.9 and the p-value as 0.000. So, the results imply that SWFs with alternative asset class investments have higher FDI levels compared to SWFs without alternative asset class investments, and this difference is statistically significant. One can also state this finding as follows: the higher levels of FDI inflows to the home countries are positively associated with a higher incidence of the SWFs investing in alternative asset classes. Therefore, this evidence supports the research hypothesis 1b regarding the effects of FDI on the first SWF sustainability component of investing in alternative asset classes. Overall, these results confirm the findings of the pairwise correlations and the scatter plots and indicate that there is strong and robust evidence regarding the effects

of the country-level strategic resources (i.e., the human development index, the innovation index, the reputation index, and Ln(FDI) on the first SWFs component of investing in alternative asset classes. Therefore, the findings in Table 12 provide strong support for the first component of the new conceptual model of SWF sustainability constructed in this thesis.

Table 13 presents the relevant t-test results from the two-sample t-tests for the case of the SWF sustainability measure of investing in alternative asset classes in the commodity SWFs. The results indicate that for SWFs which invest in alternative asset classes, the average HDI is 0.787, and it is higher than the average HDI for SWFs that do not invest in alternative asset classes. The relevant t-test produces a t-stat of -4.3 and a p-value of 0.000, implying that the difference is statistically significant. So, the research hypothesis regarding the effect of HDI in the incidence of investing in alternative asset classes holds in the case of commodity SWFs. The same is true for the cases of the research hypothesis regarding the effect of the innovation index on the incidence of investing in alternative asset classes, the research hypothesis regarding the effect of the reputation index on the incidence of investing in alternative asset classes, and the research hypothesis regarding the effect of the Ln (FDI) on the incidence of investing in alternative asset classes. Overall, the results of the two-sample t-tests provide strong and robust evidence on the second dimension of the new conceptual model of SWF sustainability in the case of the commodity SWFs.

	Alternative Asset Classes Dummy=0	Alternative Asset Classes Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Human Development Index	121	286	.732	.787	-.056	.013	-4.3	0

	Alternative Asset Classes Dummy=0	Alternative Asset Classes Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Innovation Index	94	233	31.387	39.602	-8.216	1.37	-6	0

	Alternative Asset	Alternative Asset	Mean1	Mean2	dif	St_Err	t_value	p_value

	Classes Dummy=0	Classes Dummy=1						
Reputation Index	45	125	45.91	51.877	-5.967	2.093	-2.85	.005

	Alternative Asset Classes Dummy=0	Alternative Asset Classes Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Ln (FDI)	113	270	21.498	23.087	-1.589	.239	-6.65	0

TABLE 13: T-TESTS FOR ALTERNATIVE ASSET CLASSES DUMMY FOR COMMODITY SAMPLE (37 SWFS)

As the analysis continues with the t-tests within the context of the first SWF sustainability dimension of investing in alternative asset classes, Table 14 presents the relevant results from the two-sample t-tests. The results indicate that for non-commodity SWFs which invest in alternative asset classes, the average HDI is 0.808, and it is higher than the average HDI for SWFs that do not employ any external fund managers. The relevant t-test produces a t-stat of -4.7 and a p-value of 0.000, implying that the difference is statistically significant. So, the research hypothesis regarding the effect of HDI on the incidence of investing in alternative asset classes holds in the case of non-commodity SWFs. The results in Table 14 shows that the same is true for the cases of the research hypothesis regarding the effect of the innovation index on the incidence of investing in alternative asset classes, and the research hypothesis regarding the effect of the reputation index on the incidence of investing in alternative asset classes. However, regarding the research hypothesis about the effect of the Ln (FDI) on the incidence of investing in alternative asset classes, the t-test is statistically significant at only 10%. Overall, the results of the two-sample t-tests provide strong and robust evidence, except for the case of FDI flows, on the first dimension of the new conceptual model of SWF sustainability in the case of the non-commodity SWFs.

	Alternative Asset Classes Dummy=0	Alternative Asset Classes Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Human Development Index	44	165	.721	.808	-.088	.018	-4.7	0

	Alternative Asset Classes Dummy=0	Alternative Asset Classes Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Innovation Index	39	148	33.123	43.419	-10.30	1.837	-5.6	0

	Alternative Asset Classes Dummy=0	Alternative Asset Classes Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Reputation Index	22	98	47.244	56.377	-9.133	2.886	-3.15	.002

	Alternative Asset Classes Dummy=0	Alternative Asset Classes Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Ln (FDI)	44	161	22.749	23.331	-.582	.321	-1.8	.071

TABLE 14: T-TESTS FOR ALTERNATIVE ASSET CLASSES DUMMY FOR COMMODITY SAMPLE (19 SWFS)

After showing the t-tests for the research hypotheses 1a and 1b, Table 15 presents the results of the two-sample t-tests for the research hypotheses 2a and 2b, regarding the effects of the country-level strategic resources (i.e., the human development index, the innovation index, the reputation index, and Ln(FDI), respectively) on the SWF sustainability measure of employing external fund managers. The first panel of Table 15 shows the results for the HDI variable. It is seen that in the case of SWFs not employing external fund managers (i.e., the relevant dummy equals 0), the average HDI value is 0.733. However, in the case of SWFs employing external fund managers (i.e., the relevant dummy equals 1), the average HDI value is 0.825. So, the SWFs with external fund managers have higher HDI scores. When these means are compared using a two-sample t-test, the relevant t-stat is estimated as -10.2, and the relevant p-value becomes 0.000. So, these values imply that the average HDI values at SWFs with the

external fund managers are larger in a statistically significant way than the average HDI values at SWFs without any external fund managers. In other words, one can also state that the higher values of the human development index are positively associated with the higher incidence of SWFs employing external fund managers. Therefore, this evidence supports the research hypothesis that HDI has a positive effect on the second SWF sustainability component of employing external fund managers.

	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Human Development Index	319	297	.733	.825	-.091	.009	-10.2	0
	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Innovation Index	263	251	33.816	43.832	-10.02	.93	-10.75	0
	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Reputation Index	118	172	47.584	55.232	-7.647	1.443	-5.3	0
	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Ln (FDI)	309	279	22.115	23.608	-1.492	.167	-8.95	0

TABLE 15: T-TESTS FOR EXTERNAL FUND MANAGERS DUMMY FOR THE FULL SAMPLE (56 SWFS)

Table 15 also provides the two-sample t-test results regarding the relationship between the external fund manager dummy and the innovation index. In the case of the SWFs with external fund managers, the average innovation score is 43.832, while in the case of SWFs without external fund managers, this average is 33.816, producing a difference of 10.02. When this difference is tested using a t-test, the relevant t-stat is estimated as -10.75 and the p-value

as 0.000. So, the results imply that SWFs with external fund managers have higher innovation scores compared to SWFs without external fund managers, and this difference is statistically significant. One can also state this finding as follows: the higher values of the innovation index are positively associated with a higher incidence of the SWFs employing external fund managers. Therefore, this evidence supports the research hypothesis regarding the impact of the innovation index on the second SWF sustainability measure of the external fund managers.

Regarding the test of research hypothesis about the effects of the reputation index on the second SWF sustainability component, Table 15 provides the relevant two-sample t-test results. In the case of the SWFs with external fund managers, the average reputation score is 55.232, while in the case of SWFs without external fund managers, this average is 47.584, producing a difference of 7.647. When this difference is tested using a t-test, the relevant t-stat is estimated as -5.3 and the p-value as 0.000. So, the results imply that SWFs with external fund managers have higher reputation scores compared to SWFs without external fund managers, and this difference is statistically significant. One can also state this finding as follows: the higher values of the reputation score are positively associated with a higher incidence of the SWFs employing external fund managers. Therefore, this evidence supports the relevant research hypothesis.

Finally, Table 15 has also two-sample t-test results regarding the relationship between Ln(FDI) and the first SWFs component. The results indicate that, in the case of the SWFs with external fund managers, the Ln(FDI) level is 23.608, while in the case of SWFs without external fund managers, this average is 22.125, producing a difference of 1.492. When this difference is tested using a t-test, the relevant t-stat is estimated as -8.95 and the p-value as 0.000. So, the results imply that SWFs with external fund managers have higher FDI levels compared to SWFs without external fund managers, and this difference is statistically significant. One can also state this finding as follows: the higher levels of FDI inflows to the home countries are positively associated with a higher incidence of the SWFs employing external fund managers. Therefore, this evidence supports the research hypothesis regarding the effects of FDI on the second SWF sustainability component of employing external fund managers. Overall, these results confirm the findings of the pairwise correlations and the scatter plots and indicate that there is strong and robust evidence regarding the effects of the country-level strategic resources (i.e., the human development index, the innovation index, the reputation index, and Ln(FDI)) on the second SWFs component of employing external fund

managers. Therefore, the findings in Table 15 provide strong support for the second component of the new conceptual model of SWF sustainability constructed in this thesis.

As in the case of descriptive statistics and the above bi-variate analysis, these t-test analyses are also repeated for two subs-samples of the commodity versus non-commodity SWFs. Table 16 presents the relevant results from the two-sample t-tests. The results indicate that for SWFs which employ external fund managers, the average HDI is 0.808, and it is higher than the average HDI for SWFs that do not employ any external fund managers. The relevant t-test produces a t-stat of -6.8 and a p-value of 0.000, implying that the difference is statistically significant. So, the research hypothesis regarding the effect of HDI in the incidence of employing external fund managers holds in the case of commodity SWFs. The same is true for the cases of the research hypothesis regarding the effect of the innovation index on the incidence of employing external fund managers, the research hypothesis regarding the effect of the reputation index on the incidence of employing external fund managers, and the research hypothesis regarding the effect of the Ln (FDI) on the incidence of employing external fund managers. Overall, the results of the two-sample t-tests provide strong and robust evidence on the second dimension of the new conceptual model of SWF sustainability in the case of the commodity SWFs.

	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Human Development Index	198	209	.731	.808	-.079	.011	-6.8	0

	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Innovation Index	156	171	33.265	40.867	-7.602	1.238	-6.15	0

	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Reputation Index	67	103	45.739	53.263	-7.523	1.845	-4.1	0

	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Ln (FDI)	188	195	21.98	23.233	-1.252	.222	-5.65	0

TABLE 16: T-TESTS FOR EXTERNAL FUND MANAGERS DUMMY FOR COMMODITY SAMPLE (37 SWFS)

In continuation of the t-test analysis within the context of the SWF sustainability dimension of employing external fund managers, Table 17 presents the relevant results from the two-sample t-tests for non-commodity SWFs. The results indicate that for non-commodity SWFs which employ external fund managers, the average HDI is 0.862, and it is higher than the average HDI for SWFs that do not employ any external fund managers. The relevant t-test produces a t-stat of -9.15 and a p-value of 0.000, implying that the difference is statistically significant. So, the research hypothesis regarding the effect of HDI in the incidence of employing external fund managers holds in the case of non-commodity SWFs. The results in Table 17 shows that the same is true for the cases of the research hypothesis regarding the effect of the innovation index on the incidence of employing external fund managers, the research hypothesis regarding the effect of the reputation index on the incidence of employing external fund managers, and the research hypothesis regarding the effect of the Ln (FDI) on

the incidence of employing external fund managers. Overall, the results of the two-sample t-tests provide strong and robust evidence on the second dimension of the new conceptual model of SWF sustainability in the case of the non-commodity SWFs.

	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Human Development Index	121	88	.737	.862	-.125	.013	-9.15	0
	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Innovation Index	107	80	34.618	50.171	-15.55	1.163	-13.35	0
	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Reputation Index	51	69	50.008	58.172	-8.164	2.23	-3.65	.001
	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Ln (FDI)	121	84	22.323	24.476	-2.152	.224	-9.6	0

TABLE 17: T-TESTS FOR EXTERNAL FUND MANAGERS DUMMY FOR NON-COMMODITY SAMPLE (19 SWFS)

Finally, as the last parts of the t-test analyses, Table 18 presents the results of the two-sample t-tests for the research hypotheses 3a and 3b, regarding the effects of the country-level strategic resources (i.e., the human development index, the innovation index, the reputation index, and Ln(FDI), respectively) on the third SWF sustainability measure of social and environmental expenditures. The first panel of Table 18 shows the results for the HDI variable. It is seen that in the case of SWFs not spending on social and environmental projects and causes (i.e., the relevant dummy equals 0), the average HDI value is 0.77. However, in the case of SWFs spending on social and environmental projects and causes (i.e., the relevant dummy equals 1), the average HDI value is 0.787. So, the SWFs with social and environmental

expenditures have slightly higher HDI scores. When these means are compared using a two-sample t-test, the relevant t-stat is estimated as -1.7, and the relevant p-value becomes 0.086. So, these values imply that the average HDI values at SWFs with social and environmental expenditures are larger in a statistically significant way only at 10% levels. So, the evidence regarding the research hypothesis 3a about the effects of HDI on the third SWF sustainability dimension of the social and environmental expenditures is not very strong.

Table 18 also provides the two-sample t-test results regarding the relationship between the social and environmental expenditures dummy and the innovation index. In the case of the SWFs with social and environmental expenditures, the average innovation score is 41.52, while in the case of SWFs without social and environmental expenditures, this average is 36.652, producing a difference of 4.867. When this difference is tested using a t-test, the relevant t-stat is estimated as -4.75 and the p-value as 0.000. So, the results imply that SWFs with social and environmental expenditures have higher innovation scores compared to SWFs without such expenditures, and this difference is statistically significant. One can also state this finding as follows: the higher values of the innovation index are positively associated with a higher incidence of the SWFs spending on social and environmental projects and causes. Therefore, this evidence supports the research hypothesis regarding the impact of the innovation index on the third SWF sustainability measure of social and environmental expenditures.

	Social and Environmental Expenditures Dummy=0	Social and Environmental Expenditures Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Human Development Index	365	251	.77	.787	-.017	.01	-1.7	.086
	Social and Environmental Expenditures Dummy=0	Social and Environmental Expenditures Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Innovation Index	297	217	36.652	41.52	-4.867	1.02	-4.75	0
	Social and Environmental Expenditures Dummy=0	Social and Environmental Expenditures Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value

Reputation Index	158	132	48.202	56.81	-8.609	1.402	-6.15	0
	Social and Environmental Expenditures Dummy=0	Social and Environmental Expenditures Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Ln (FDI)	350	238	22.738	22.95	-.212	.181	-1.15	.241

TABLE 18: T-TESTS FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES DUMMY FOR THE FULL SAMPLE (56 SWFS)

Regarding the test of research hypothesis 3a about the effects of the reputation index on the third SWF sustainability component, Table 18 provides the relevant two-sample t-test results. In the case of the SWFs with social and environmental expenditures, the average reputation score is 56.81, while in the case of SWFs without social and environmental expenditures, this average is 48.202 producing a difference of 8.609. When this difference is tested using a t-test, the relevant t-stat is estimated as -6.15 and the p-value as 0.000. So, the results imply that SWFs with social and environmental expenditures have higher reputation scores compared to SWFs without social and environmental expenditures, and this difference is statistically significant. One can also state this finding as follows: the higher values of the reputation score are positively associated with a higher incidence of SWFs spending on social and environmental projects and causes. Therefore, this evidence supports the research hypothesis 3a.

Lastly, Table 18 has also two-sample t-test results regarding the relationship between Ln(FDI) and the third SWFs component. The results indicate that, in the case of the SWFs with social and environmental expenditures, the Ln(FDI) level is 22.95, while in the case of SWFs without social and environmental expenditures, this average is 22.738, producing a small difference of 0.212. When this difference is tested using a t-test, the relevant t-stat is estimated as -1.15 and the p-value as 0.241. So, these numbers imply that there is no statistically significant difference In the levels of Ln(FDI) for SWFs with and without social and environmental expenditures. Hence, there is no supporting empirical evidence for the research hypothesis 3c. Overall, these results confirm the findings of the pairwise correlations and the scatter plots and indicate that there is mixed evidence regarding the effects of the country-level strategic resources (i.e., the human development index, the innovation index, the reputation index, and Ln(FDI)) on the third SWFs component of social and environmental expenditures.

Therefore, the findings in Table 18 do not provide strong support for the third component of the new conceptual model of SWF sustainability constructed in this thesis.

As in the case of descriptive statistics and the above bi-variate analysis, these t-test analyses are also repeated for two subs-samples of the commodity versus non-commodity SWFs. Table 19 presents the relevant results from the two-sample t-tests. The results indicate that for SWFs with social and environmental expenditures, the average HDI is 0.759, and it is, in fact, smaller than the average HDI for SWFs without social and environmental expenditures. The relevant t-test produces a t-stat of 1.35 and a p-value of 0.175, implying that the difference is not statistically significant. So, there is no evidence for a research hypothesis regarding the effect of HDI on the incidence of spending on social and environmental projects and causes, in the case of commodity SWFs. The same is true for the cases of the research hypothesis regarding the effect of the innovation index on the incidence of spending on social and environmental projects and causes, and the research hypothesis 3b, regarding the effect of Ln(FDI) on the incidence of spending on social and environmental projects and causes. It is only in the case of reputation index that the higher values of reputation score are positively associated with spending on social and environmental projects and causes for commodity SWFs. The result is statistically significant at 5% level. Overall, there is only limited evidence regarding the effects of the country-level strategic assets on the third SWF sustainability component of spending on social and environmental projects and causes in the case of the commodity sample.

	Social and Environmental Expenditures Dummy=0	Social and Environmental Expenditures Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Human Development Index	277	130	.776	.759	.018	.013	1.35	.175
	Social and Environmental Expenditures Dummy=0	Social and Environmental Expenditures Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Innovation Index	218	109	36.715	38.291	-1.575	1.383	-1.15	.256
	Social and Environmental	Social and Environmental	Mean1	Mean2	dif	St_Err	t_value	p_value

	Expenditures Dummy=0	Expenditures Dummy=1						
Reputation Index	109	61	48.499	53.511	-5.013	1.933	-2.6	.011
	Social and Environmental Expenditures Dummy=0	Social and Environmental Expenditures Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Ln (FDI)	262	121	22.555	22.754	-.198	.248	-.8	.424

TABLE 19: T-TESTS FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES DUMMY FOR COMMODITY SAMPLE (37 SWFS)

In continuation of the t-test analysis within the context of the third SWF sustainability dimension of social and environmental expenditures, Table 20 presents the relevant results from the two-sample t-tests for non-commodity SWFs. The results indicate that for non-commodity SWFs with social and environmental expenditures, the average HDI is 0.818, and it is higher than the average HDI for SWFs without social and environmental expenditures. The relevant t-test produces a t-stat of -4.3 and a p-value of 0.000, implying that the difference is statistically significant. So, the research hypothesis regarding the effect of HDI in the incidence of spending on social and environmental projects and causes holds in the case of non-commodity SWFs. The results in Table 20 shows that the same is true for the cases of the research hypothesis regarding the effect of the innovation index on the incidence of spending on social and environmental projects and causes, and the research hypothesis regarding the effect of the reputation index on the incidence of spending on social and environmental projects and causes. So, there is supporting evidence for research hypotheses 3a in the context of the non-commodity SWFs. However, there is no supporting evidence for research hypothesis 3b as the relevant p-value in Table 20 is well above 10% statistical significance level. Overall, the results of the two-sample t-tests provide strong and robust evidence on the third dimension of the new conceptual model of SWF sustainability in the case of the non-commodity SWFs, except for the tangible strategic resource of Ln(FDI).

Overall, the results of the two-sample t-tests provide very valuable insights and research evidence for six research hypotheses detailing the effects of the country-level strategic resources (i.e., the tangible resource of FDI inflows to the home country and the intangible resources of the HDI, the innovation index, and the reputation index) on the three SWF sustainability dimensions of investing on alternative asset classes, employing external fund

managers, and spending on social and environmental projects and causes. The empirical results are supportive for the first two dimensions of the SWF sustainability. In other words, as postulated by the newly constructed model of SWF sustainability and the relevant research hypotheses, the country-level strategic resources have very close positive associations with the first sustainability dimension of investing in alternative asset classes and the second sustainability dimension of employing external fund managers. The evidence on these dimensions is very robust in the sense that the results on the full sample of SWFs, as well as both the commodity and non-commodity samples, are very similar and support the positive association of the country-level strategic resources. However, the evidence on the last dimension of SWF sustainability, i.e., spending on social and environmental projects and causes, is very weak. For example, in the full sample, there are only positive effects of the innovation and reputation indices. When the analysis moves to the commodity sample, there is an only positive effect of the innovation index, and in the non-commodity sample of SWFs, there are positive effects of all intangible resources (i.e., the HDI, the innovation index, and the reputation index). Hence, the tangible resource of FDI is never statistically significant in all samples for the case of social and environmental expenditures. The tangible resources are statistically significant in some combinations and some samples. So, the supportive evidence is relatively weak for the third dimension of the newly constructed model of SWF sustainability in the present thesis. The next section moves the analysis to a new level with the estimations of multivariate regressions.

	Social and Environmental Expenditures Dummy=0	Social and Environmental Expenditures Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Human Development Index	88	121	.751	.818	-.07	.015	-4.3	0

	Social and Environmental Expenditures Dummy=0	Social and Environmental Expenditures Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Innovation Index	79	108	36.48	44.78	-8.3	1.52	-5.5	0

	Social and Environmental	Social and Environmental	Mean1	Mean2	dif	St_Err	t_value	p_value

	Expenditures Dummy=0	Expenditures Dummy=1						
Reputation Index	49	71	47.54	59.645	-12.1	2.088	-5.8	0

	Social and Environmental Expenditures Dummy=0	Social and Environmental Expenditures Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Ln (FDI)	88	117	23.278	23.151	.127	.269	.45	.638

TABLE 20: T-TESTS FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES DUMMY FOR NON-COMMODITY SAMPLE (19 SWFS)

5.4. Multivariate Regression Analysis

This sub-section of the chapter presents the results of the multivariate regression analysis. The previous analyses using bi-variate methods like pairwise correlations and t-tests are useful to see the relationship between one dependent and one independent variable, like the association of HDI with the SWFs measure of the external fund managers. However, it is possible that more than one variable would affect the dependent variable. Namely, the dependent variable of the external fund manager dummy could be related to all four country-level strategic resources at the same time. Then, looking only at the bivariate analysis would be insufficient to arrive at robust findings. In this context, the following three sub-sections present the results of the logistic regression results separately for the three dependent variables of SWF sustainability, namely, investments in alternative asset classes, the employment of external fund managers, and spending on social and environmental projects and causes.

5.4.1. Logistic Regression for Alternative Asset Class Dummy

- *Hypothesis 1a and 1b Analysis*

The new conceptual model of SWF sustainability identifies investing in alternative asset classes (like private equity, commodities, and real estate) and different markets as an important component of sustainability. This point is justified by the portfolio diversification literature and argues that efficient risk management and diversification requires SWFs moving beyond the traditional asset classes (like advanced country government bonds and public equities). The bivariate analysis showed that there is supportive evidence on the relationship between country-level strategic resources and this measure of SWF sustainability. For example, scatter plots identified positive associations between the alternative asset class dummy and the four

strategic resources at the country level (i.e., the human development index, the innovation index, the reputation index, and the FDI inflows to the country). Similarly, the two-sample t-tests showed that for the SWFs which invest in alternative asset classes, the levels of the strategic resource variables are higher than the SWFs which do not invest in alternative asset classes. This evidence is also interpreted as implying that higher levels of the strategic resources would increase the likelihood of SWFs making investments in alternative asset classes. So, the evidence up to now supports the first set of research hypotheses 1a and 1b. This sub-section conducts the same analysis with logistic regressions.

Table 21 shows the results of the individual logistic regressions. It is seen that the first model of the table has an odds ratio of 4.733 for the independent variable of the human development index. The coefficient is statistically significant at the 1% level, implying that an increase of HDI by 1% increases the likelihood of SWFs making investments in alternative asset classes in 4.733 times. So, this funding produces supportive evidence for the research hypothesis 1a. The second regression in Table 21 has an odds ratio of 1.033 for the independent variable of the innovation index. This coefficient is also statistically significant at the 1% level, and it produces supportive evidence for the research hypothesis 1a. However, the odds ratio of the innovation index is not as large as the odds ratio of the HDI. This regression shows that the odds ratio of reputation index is higher than unity, which implies that the higher levels of reputation index are positively associated with the higher likelihoods of SWFs making investments in alternative asset classes. An increase of reputation index by 1% increases the likelihood of SWF making investments in alternative asset classes in 1.025 times. This finding supports the research hypothesis 1a. Finally, the last regression model of Table 21 estimates the odds ratio of Ln (FDI) as 1.054 and find that it is statistically significant at the 1% level as well. So, this final result provides supportive evidence for the research hypothesis 1b. Overall, the first set of research hypotheses are supported by the evidence presented in Table 21 about the first logistics regressions of each strategic resources. Namely, higher levels of a country's tangible and intangible strategic resources would lead to higher odds or likelihood of their SWFs, making investments in the alternative asset classes.

Logistic regression

Alternative Asset Clsses	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	4.733	0.827	8.89	0.000	3.360	6.667	***

Mean dependent var	0.770	SD dependent var	0.421
Number of obs	257.000	Chi-square	79.088
Prob > chi2	0.000	Akaike crit. (AIC)	269.210

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Asset Clsses	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.033	0.003	9.89	0.000	1.026	1.039	***

Mean dependent var	0.770	SD dependent var	0.421
Number of obs	257.000	Chi-square	97.873
Prob > chi2	0.000	Akaike crit. (AIC)	253.951

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Asset Clsses	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.025	0.003	8.93	0.000	1.020	1.031	***

Mean dependent var	0.770	SD dependent var	0.421
Number of obs	257.000	Chi-square	79.680
Prob > chi2	0.000	Akaike crit. (AIC)	267.817

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Asset Clsses	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	1.054	0.006	8.47	0.000	1.041	1.066	***

Mean dependent var	0.770	SD dependent var	0.421
Number of obs	257.000	Chi-square	71.701
Prob > chi2	0.000	Akaike crit. (AIC)	274.485

*** p<0.01, ** p<0.05, * p<0.1

TABLE 21: SIMPLE LOGISTIC REGRESSIONS FOR ALTERNATIVE ASSET CLASSES (FULL SAMPLE)

When the simple logistic regressions are repeated by adding time fixed effects to the estimations, the results still hold in the sense that the odds ratios for each of the four strategic resources are statistically significant and larger than unity. These results are presented in Table 22.

Logistic regression

Alternative Asset Classes	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	25.309	31.270	2.62	0.009	2.247	285.070	***
2009b.year	1.000	.	.	.	.	.	
2011.year	0.198	0.218	-1.47	0.141	0.023	1.714	
2012.year	0.229	0.253	-1.33	0.182	0.026	1.998	
2013.year	0.178	0.197	-1.56	0.118	0.020	1.552	
2014.year	0.285	0.318	-1.13	0.261	0.032	2.541	
2015.year	0.271	0.304	-1.16	0.245	0.030	2.448	
2016.year	0.193	0.212	-1.50	0.134	0.022	1.663	
2017.year	0.268	0.303	-1.17	0.243	0.029	2.444	
Mean dependent var		0.770	SD dependent var			0.421	
Number of obs		257.000	Chi-square			73.816	
Prob > chi2		0.000	Akaike crit. (AIC)			276.719	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Asset Clsses	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.080	0.015	5.39	0.000	1.050	1.111	***
2009b.year	1.000	.	.	.	.	.	
2011.year	0.107	0.079	-3.01	0.003	0.025	0.458	***
2012.year	0.115	0.087	-2.86	0.004	0.026	0.506	***
2013.year	0.085	0.067	-3.15	0.002	0.018	0.394	***
2014.year	0.158	0.117	-2.48	0.013	0.037	0.678	**
2015.year	0.156	0.116	-2.50	0.012	0.037	0.668	**
2016.year	0.123	0.084	-3.07	0.002	0.032	0.468	***
2017.year	0.156	0.115	-2.52	0.012	0.037	0.662	**
Mean dependent var		0.770	SD dependent var			0.421	
Number of obs		257.000	Chi-square			85.172	
Prob > chi2		0.000	Akaike crit. (AIC)			250.755	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Asset Clsses	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.041	0.009	4.50	0.000	1.023	1.059	***
2009b.year	1.000	.	.	.	.	.	
2011.year	0.387	0.241	-1.53	0.127	0.114	1.310	
2012.year	0.461	0.283	-1.26	0.207	0.139	1.534	
2013.year	0.353	0.221	-1.67	0.096	0.104	1.202	*
2014.year	0.574	0.354	-0.90	0.368	0.171	1.924	
2015.year	0.530	0.330	-1.02	0.308	0.156	1.796	
2016.year	0.369	0.217	-1.69	0.091	0.116	1.171	*
2017.year	0.435	0.284	-1.27	0.203	0.121	1.568	
Mean dependent var		0.770	SD dependent var			0.421	
Number of obs		257.000	Chi-square			82.842	
Prob > chi2		0.000	Akaike crit. (AIC)			277.737	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Asset Clsses	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	1.087	0.035	2.58	0.010	1.020	1.158	**
2009b.year	1.000	.	.	.	.	.	
2011.year	0.369	0.327	-1.12	0.261	0.065	2.097	
2012.year	0.440	0.387	-0.93	0.350	0.079	2.463	
2013.year	0.330	0.296	-1.24	0.216	0.057	1.910	
2014.year	0.577	0.504	-0.63	0.529	0.104	3.202	
2015.year	0.546	0.483	-0.69	0.494	0.097	3.085	
2016.year	0.387	0.333	-1.10	0.269	0.072	2.087	
2017.year	0.560	0.493	-0.66	0.510	0.100	3.138	

Mean dependent var	0.770	SD dependent var	0.421
Number of obs	257.000	Chi-square	69.706
Prob > chi2	0.000	Akaike crit. (AIC)	285.072

*** p<0.01, ** p<0.05, * p<0.1

TABLE 22: SIMPLE LOGISTIC REGRESSIONS FOR ALTERNATIVE ASSET CLASSES WITH TIME FIXED EFFECTS (FULL SAMPLE)

The logistic regression analysis for the effects of the country-level strategic resources on the first SWF sustainability dimension of the alternative asset classes is repeated with the new combined index of strategic resources. As the individual strategic resources have high levels of correlations with each other, using them jointly leads to a problem of multicollinearity, thereby making the results of the regressions inefficient. To overcome this problem, the first solution estimated the effects of strategic resources one by one, as presented in Table 22. The solution constructed a combined index of strategic resources by weighting each resource measure with inverse-variance weights. The results of the relevant logistic regression with this new combined measure are presented in Table 23 with and without time fixed effects. The results indicate that in the case of the logistic regressions without time fixed effects, the odds ratio is estimated as 4.2326, and it is statistically significant at the 1% level. This result implies that the larger values of the country strategic assets are associated with higher odds or likelihood of SWFs making investments in alternative asset classes. In the case of the logistic regressions with time fixed effects, the relevant odds ratio is 9.903, and it is again statistically significant at the 1% level. So, the positive effects of the country strategic resources become larger when yearly fixed effects are added to the regressions.

Logistic regression

Alternative Asset Clsses	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resources Index	4.236	0.714	8.57	0.000	3.045	5.894	***
Mean dependent var		0.773	SD dependent var			0.420	
Number of obs		255.000	Chi-square			73.402	
Prob > chi2		0.000	Akaike crit. (AIC)			269.960	

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Logistic regression

Alternative Asset Clsses	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resources Index	9.903	8.080	2.81	0.005	2.001	49.008	***
2009b.year	1.000	.	.	.	.	.	
2011.year	0.377	0.312	-1.18	0.238	0.075	1.908	
2012.year	0.443	0.365	-0.99	0.324	0.088	2.231	
2013.year	0.338	0.281	-1.30	0.193	0.066	1.727	
2014.year	0.537	0.448	-0.75	0.455	0.105	2.751	
2015.year	0.532	0.445	-0.75	0.451	0.103	2.742	
2016.year	0.418	0.341	-1.07	0.285	0.084	2.072	
2017.year	0.526	0.442	-0.77	0.444	0.102	2.727	
Mean dependent var		0.773	SD dependent var			0.420	
Number of obs		255.000	Chi-square			71.405	
Prob > chi2		0.000	Akaike crit. (AIC)			280.928	

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

TABLE 23: SIMPLE LOGISTIC REGRESSION WITH THE STRATEGIC RESOURCE INDEX FOR EXTERNAL ALTERNATIVE ASSET CLASSES (FULL SAMPLE)

As in the previous sub-section, the same analyses are repeated separately for the cases of the commodity and non-commodity samples. Namely, the logistic regressions with each independent variable and the combined strategic resource variable are estimated for both samples of SWFs. In addition, these regressions are estimated by adding yearly fixed effects. To save space, the regressions for commodity sample are not given in the text, while only non-commodity results are presented here.

Table 24 presents the logistic regression results for the sample of the non-commodity SWFs. As the first observation, it is seen that the number of observations is 106 in these logistic regressions. The first regression of Table 24 shows that the odds ratio of the human development index is estimated as 7.008, and it is statistically significant at 1% level. So, this value implies that the larger values of the human development index are positively associated

with higher odds or likelihood of non-commodity SWFs making investments in alternative asset classes. An increase of HDI by 1% increases the likelihood of non-commodity SWFs making investments in alternative asset classes in 7.008 times. This research evidence supports the first research hypothesis of 1a regarding the positive effects of the human development index on the first SWF sustainability dimension of investing in alternative asset classes.

In the case of the second logistic regression model of Table 24, it is found that the odds ratio of the innovation index is estimated as 1.037, and it is statistically significant at 1% level. So, this value implies that the larger values of the innovation index are positively associated with higher odds or likelihood of non-commodity SWFs making investments in alternative asset classes. An increase of innovation index by 1% increases the likelihood of non-commodity SWFs making investments in alternative asset classes in 1.037 times. This research evidence supports the second research hypothesis of 1a regarding the positive effects of the innovation index on the first SWF sustainability dimension of investing in alternative asset classes.

In the case of the third logistic regression model of Table 24, it is found that the odds ratio of the reputation index is estimated as 1.030, and it is statistically significant at 1% level. So, this value implies that the larger values of the reputation index are positively associated with higher odds or likelihood of non-commodity SWFs making investments in alternative asset classes in 1.030 times. This research evidence supports the third research hypothesis of 1a regarding the positive effects of the reputation index on the first SWF sustainability dimension of investing in alternative asset classes. Finally, in the case of the last and fourth logistic regression model of Table 24, it is found that the odds ratio of Ln (FDI) is estimated as 1.063, and it is statistically significant at 1% level. So, this value implies that the larger values of the FDI inflows to home countries are positively associated with higher odds or likelihood of non-commodity SWFs making investments in alternative asset classes. An increase of the FDI inflows to home countries by 1% increases the likelihood of of non-commodity SWFs making investments in alternative asset classes in 1.063 times. This research evidence supports the research hypothesis 1b regarding the positive effects of FDI on the first SWF sustainability dimension. Overall, these simple logistic regressions produce strong empirical evidence regarding the effects of each country-level strategic resource on the first SWFs component of the alternative asset classes in the case of non-commodity SWFs.

Logistic regression

Alternative Funds Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	7.008	2.036	6.70	0.000	3.966	12.384	***
Mean dependent var		0.811	SD dependent var			0.393	
Number of obs		106.000	Chi-square			44.932	
Prob > chi2		0.000	Akaike crit. (AIC)			97.141	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Funds Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.037	0.006	6.82	0.000	1.026	1.048	***
Mean dependent var		0.811	SD dependent var			0.393	
Number of obs		106.000	Chi-square			46.466	
Prob > chi2		0.000	Akaike crit. (AIC)			93.858	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Funds Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Rueputation Index	1.030	0.005	6.36	0.000	1.020	1.039	***
Mean dependent var		0.811	SD dependent var			0.393	
Number of obs		106.000	Chi-square			40.484	
Prob > chi2		0.000	Akaike crit. (AIC)			98.901	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Funds Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	1.063	0.011	5.89	0.000	1.042	1.085	***
Mean dependent var		0.811	SD dependent var			0.393	
Number of obs		106.000	Chi-square			34.686	
Prob > chi2		0.000	Akaike crit. (AIC)			103.948	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 24: SIMPLE LOGISTIC REGRESSIONS FOR EXTERNAL FUND MANAGER DUMMY (NON-COMMODITY SAMPLE)

The individual-level logistic regressions can also be implemented by adding time fixed effects to each regression in the case of the non-commodity sample. The relevant regression results are presented in Table 25. In the first regression model of the table, very interesting and

puzzling results emerge. Firstly, none of the yearly fixed effects is statistically significant. Secondly, the odds ratio is extremely large but statistically insignificant. Thirdly, the intervals for the odds ratio as well as the time fixed effects are extremely wide. All of these are important symptoms of multicollinearity in this logistic regression. So, one should not consider these results as robust and be aware of the multicollinearity issue. This case illustrates that adding time fixed effects can also lead to other problems than higher AIC and lower statistical significance.

Logistic regression

Alternative Funds Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	3270000	42800000	1.14	0.253	0.000	4.710e+17	
2009b.year	1.000	.	.	.	.	.	
2011.year	0.000	0.000	-1.05	0.294	0.000	8758.086	
2012.year	0.000	0.000	-1.05	0.293	0.000	9371.980	
2013.year	0.000	0.000	-1.06	0.290	0.000	9229.895	
2014.year	0.000	0.000	-1.01	0.313	0.000	19166.823	
2015.year	0.000	0.000	-1.01	0.314	0.000	20204.447	
2016.year	0.000	0.000	-1.06	0.288	0.000	11460.949	
2017.year	0.000	0.000	-1.01	0.314	0.000	22306.080	
Mean dependent var		0.811	SD dependent var			0.393	
Number of obs		106.000	Chi-square			21.965	
Prob > chi2		0.005	Akaike crit. (AIC)			93.213	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Funds Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.117	0.037	3.39	0.001	1.048	1.191	***
2009b.year	1.000	.	.	.	.	.	
2011.year	0.032	0.047	-2.33	0.020	0.002	0.577	**
2012.year	0.027	0.042	-2.34	0.019	0.001	0.554	**
2013.year	0.024	0.037	-2.38	0.018	0.001	0.520	**
2014.year	0.038	0.063	-2.00	0.045	0.002	0.932	**
2015.year	0.038	0.062	-2.00	0.045	0.002	0.929	**
2016.year	0.025	0.036	-2.53	0.011	0.001	0.436	**
2017.year	0.039	0.061	-2.09	0.037	0.002	0.820	**
Mean dependent var		0.811	SD dependent var			0.393	
Number of obs		106.000	Chi-square			28.819	
Prob > chi2		0.000	Akaike crit. (AIC)			95.757	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Funds Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.061	0.018	3.45	0.001	1.026	1.097	***
2009b.year	1.000	.	.	.	.	.	
2011.year	0.180	0.202	-1.53	0.126	0.020	1.615	
2012.year	0.183	0.203	-1.53	0.125	0.021	1.605	
2013.year	0.174	0.190	-1.60	0.110	0.020	1.486	
2014.year	0.266	0.314	-1.12	0.262	0.026	2.686	
2015.year	0.264	0.309	-1.14	0.255	0.027	2.620	

2016.year	0.125	0.138	-1.88	0.060	0.014	1.095	*
2017.year	0.181	0.226	-1.37	0.170	0.016	2.078	
Mean dependent var		0.811	SD dependent var			0.393	
Number of obs		106.000	Chi-square			39.673	
Prob > chi2		0.000	Akaike crit. (AIC)			108.680	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Alternative Funds Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	1.103	0.058	1.87	0.062	0.995	1.222	*
2009b.year	1.000	.	.	.	.	.	
2011.year	0.358	0.504	-0.73	0.466	0.023	5.660	
2012.year	0.355	0.501	-0.73	0.463	0.022	5.654	
2013.year	0.314	0.449	-0.81	0.418	0.019	5.182	
2014.year	0.531	0.774	-0.43	0.664	0.031	9.229	
2015.year	0.522	0.764	-0.44	0.657	0.030	9.213	
2016.year	0.297	0.408	-0.88	0.377	0.020	4.399	
2017.year	0.533	0.777	-0.43	0.666	0.031	9.273	
Mean dependent var		0.811	SD dependent var			0.393	
Number of obs		106.000	Chi-square			32.737	
Prob > chi2		0.000	Akaike crit. (AIC)			116.187	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 25: SIMPLE LOGISTIC REGRESSIONS FOR EXTERNAL FUND MANAGER DUMMY WITH TIME FIXED EFFECTS (NON-COMMODITY SAMPLE)

The above multicollinearity problem is not present in the case of the other three regressions in Table 26. In the case of the second logistic regression with the independent variable of the innovation index, all yearly effects are statistically significant, and the odds ratio for the innovation index is estimated as 1.17. This ratio is also statistically significant at 1% level, and it implies that the higher levels of the innovation score are positively associated with higher odds or incidence of non-commodity SWFs making investments in alternative asset classes. An increase of innovation index by 1% increases the likelihood of non-commodity SWFs making investments in alternative asset classes.in 1.17 times.

In the case of the third logistic regression with the independent variable of the reputation index, all yearly effects are statistically significant, and the odds ratio for the reputation index is estimated as 1.041. This ratio is also statistically significant at 1% level, and it implies that the higher levels of the reputation score are positively associated with higher odds or incidence of SWFs employing external fund managers. The results imply that the larger values of the reputation index are positively associated with higher odds or likelihood of non-commodity SWFs employing external fund managers.

Table 26 presents the summaries of odds ratios for the second SWF sustainability component. It is seen that in the case of the logistic regressions without time fixed effects (i.e., the upper panel of Table 39), the effect of the human development index is largest in the non-commodity sample, which has an odds-ratio of 7.008, followed by an odds ratio of 3.744 in the commodity sample. When the cases of other strategic resources are compared across samples, not such large differences emerge. For example, it is seen from the table that the odds ratio for the innovation index is 1.037 in the non-commodity sample, and this ratio is 1.030 in the commodity sample. As another important feature, Table 26 shows that the human development index has the largest impact factor among the four strategic resources, where its odds ratios are around 4-7, while the other measures have odds ratios very close to unity. When the odds ratios are estimated for the combined index, it is found that the impact factor is again large with the odds ratios being around 4-6. In addition, the effect is stronger in the case of the non-commodity sample.

The lower panel of Table 26 presents the odds ratios for the logistic regressions of the SWFs measure of alternative asset classes with time fixed effects. It is seen that in the case of the human development index is very large (i.e., 25 in the case of the full sample and 6 in the case commodity sample); however, other odds ratios are close to unity. So, the HDI exerts the strongest impact on the likelihood of SWFs making investments in alternative asset classes. In the case of the combined strategic resource index, the odds ratios are also relatively high. Similar to the case of the second SWF sustainability measure of the external fund managers, there are also some missing odds ratios in Table 26 due to the issues of multicollinearity and insignificant results. Overall, these results presented in Table 26 provides strong support for the research hypotheses 1a and 1b regarding the positive effects of country-level strategic resources on the first sustainability dimension of SWF sustainability, i.e., making investments in alternative asset classes.

		Human Development Index	Innovation Index	Reputation Index	Ln (HDI)	Strategic Resources Index
Logistic Regressions without Time Fixed Effects	Full Sample	4.733	1.033	1.025	1.054	4.236
	Commodity Sample	3.744	1.03	1.023	1.047	3.504
	Non-Commodity Sample	7.008	1.037	1.03	1.063	5.645
Logistic Regressions with Time Fixed Effects	Full Sample	25.309	1.08	1.041	1.087	9.903
	Commodity Sample	5.944	1.064	1.029	1.076	4.856
	Non-Commodity Sample	Multic.	1.117	1.061	1.013	Insig.

TABLE 26: ODDS RATIOS FOR THE DEPENDENT VARIABLE OF ALTERNATIVE ASSET CLASSES

5.4.2. Logistic Regression for External Fund Managers Dummy

- *Hypothesis 2a and 2b Analysis*

Since the dependent variables in the present thesis are the three SWF sustainability indicators (i.e., dummy variables), the standard linear regression approaches are not appropriate, as explained in the previous chapter. Instead, one can use logit or probit models, and the current model proceeds with the logistics regression models. Table 27 presents the results of the logistic regression model for the full sample of SWFs. When the odds ratios are examined, it is found that these ratios are higher than 1 for the innovation and reputation indices, while they are less than 1 for the human development index and Ln(FDI). When the relevant odds ratios are higher than 1, they imply that the higher values of the independent variable would lead to a higher odd of SWFs employing external fund managers. So, the levels of the odds ratios imply that higher scores of innovation and reputation indices would increase the odds of SWFs using external fund managers. However, only the coefficient for the innovation index is statistically significant. Similarly, the odds ratios for the human development index and Ln(FDI) are smaller than unity, implying that higher values of these variables decrease the odds of SWFs employing external fund managers. These findings are in contrast to the implications of the new conceptual model of the SWF sustainability in the fourth chapter and the research evidence of the above bivariate analyses. However, the coefficients of

these two variables are not statistically significant as well. Overall, the logistic regression in Table 27 finds a statistically significant result only for the innovation index. Its odds ratio is higher than unity, which implies that an increase of innovation index by 1% increases the likelihood of employing external manager in 1.13 times.

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Devel. Ind	0.007	0.022	-1.64	0.102	0.000	2.665	
Innovation Ind	1.133	0.032	4.49	0.000	1.073	1.197	***
Reputation Ind	1.005	0.019	0.28	0.784	0.969	1.043	
Ln (FDI)	0.966	0.127	-0.27	0.791	0.747	1.249	
Constant	0.638	2.213	-0.13	0.897	0.001	574.563	

Mean dependent var	0.584	SD dependent var	0.494
Pseudo r-squared	0.169	Number of obs	257
Chi-square	47.171	Prob > chi2	0.000
Akaike crit. (AIC)	299.958	Bayesian crit. (BIC)	317.704

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

TABLE 27: LOGISTIC REGRESSION FOR EXTERNAL FUND MANAGERS DUMMY FOR FULL SAMPLE (56 SWFS)

One can suspect that quite different results in Table 26 compared to the bivariate analysis in the previous section can come from the different samples used in the respective analysis. In the case of the bivariate analysis, the sample size would be equal to the lower number of observations among the two variables. However, in the case of the multiple regression model, the sample size would be equal to the lowest number of observations among all the variables. So, multiple analysis can decrease the sample size significantly. This point is seen in Table 27, where the sample size is 257. To see whether the change in the sample is the main factor behind the insignificant results for some SWF sustainability components, one can conduct the bivariate analysis with the new smaller sample. For example, Table 28 presents the pairwise correlations for this sample. It is seen that the first SWFs measure of SWF sustainability, i.e., employing external fund managers, has positive correlations with all country-level strategic resource variables, and these correlations coefficients are statistically significant at 5% level. So, the insignificant regression coefficients in Table 27 are not observed in the pairwise correlations in Table 28. Thus, the change in the sample does not seem to be the cause of different results in the logistic regressions (see APPENDIX for tables 28 to 58)

The possible role of the change in samples can be examined by repeating one of the t-tests with the new smaller sample. The results in Table 27 shows that the human development index is found to decrease the odds of SWFs employing external fund managers. However, the results of the relevant t-test in Table 12 implies the opposite. As the quantitative analysis in Table 12 and Table 21 have different samples, repeating the t-test analysis with the smaller sample would allow seeing whether the differences in the samples are the main factors behind opposing results. In this context, Table 29 conducts a two-sample t-test for the mean differences in the human development index for SWFs with and without external fund managers.

In Table 29, it is seen that the total sample size is 257, which is the same as the total number of observations in Table 27. The table indicates that the average human development score is 0.856 for the SWFs with external fund managers, and it is 0.802 for SWFs without external fund managers. So, funds employing external fund managers perform better on this SWF sustainability measure with a margin of 0.053. Table 29 shows that the t-stat is estimated as -4.9, and the corresponding p-value is 0.000. These values imply that the mean level of HDI at SWFs with external fund managers is larger in a statistically significant way than the mean level of HDI at SWFs without external fund managers. Interpreted in the other way, the results indicate that higher levels of the human development index would be positively associated with the incidence of SWFs employing external fund managers. So, the negative association between HDI and external fund managers in the logistic regression of Table 27 is not confirmed by the t-test results in Table 23 using the same sample. Therefore, the puzzling results in Table 27 are not due to the changes in the given samples.

As another step to see the possible reason behind the insignificant but negative associations of some country-level strategic resource independent variables in Table 27, the same logistic analysis can be repeated in terms of bivariate regressions. In other words, the logistic regressions can be estimated only with one independent variable each time. To make results comparable with Table 27, in each simple regression, the same sample of 257 observations are used. Table 30 presents the results of these simple logistic regressions. It is seen that the corresponding odds ratios for the human development index, the innovation index, the reputation index, and Ln(FDI) are 1.612, 1.012, 1.009, and 1.016, respectively. In addition, all of these coefficients are statistically significant at 1% level. Since the relevant odds ratios are greater than unity, these results imply that the higher values of each country-level strategic

resource would increase the odds of SWFs employing external fund managers. So, these results are fully consistent with the previous bivariate analysis and provide supporting evidence for the research hypotheses 2a and 2b. Hence, they also confirm the new conceptual model of SWF sustainability constructed in the fourth chapter.

Then, understanding why the simple logistic regressions in Table 30 provide supportive evidence, while the multiple logistic regression in Table 28 produces puzzling results becomes the next question. To understand this problem, examining the pairwise correlations in Table 28 becomes valuable. The table shows that the correlations between the country-level strategic resources variables are very high. For example, the correlation between the human development index and the innovation index is 0.774, and the correlation between the innovation index and Ln(FDI) is 0.762. All relevant correlations among these independent variables are higher than 0.60, except for the correlation between the reputation index and Ln(FDI) with a correlation coefficient of 0.341. In addition, all of these pairwise correlation coefficients are statistically significant at 5% level. Based on these very high levels of correlations between independent variables, it can be argued that the logistic regressions in Table 28 suffer from multicollinearity. One trivial way to overcome the multicollinearity problem would be to omit one or more of the highly correlated independent variables. Since in the case of the multiple logistic regression model in Table 28, all independent variables have very high correlations with each other, this solution mounts to running simple logistic regressions as in the case of Table 24.

As another solution, one can combine the relevant independent variables into a single measure of country-level strategic resource index. Such an index is constructed using the inverse-variance weighting approach. This index is called the strategic resources index, and it combines the four independent variables into a single measure of country-level strategic resources. Table 31 shows the pairwise correlations of this new strategic resource variable with its four components. It is seen that the strategic resource index has a very high correlation with its components. Namely, its correlation with the human development index is 0.963, and its correlation with the innovation index is 0.680. The table also shows the pairwise correlations of the new strategic resources index with each of the SWF sustainability measures. It is found that the correlation of the second SWFs component of employing external fund managers is 0.356, and the correlation of the first SWFs component of investing in alternative asset classes

is 0.251. Both coefficients are statistically significant at 5% level. However, the correlation of the third SWFs component of spending on social and environmental projects and causes is not statistically significant. In fact, these results are generally consistent with the findings of the bivariate analysis in the previous section which showed that the relevant empirical evidence supported the first two dimensions of SWF sustainability model, but the support for the third SWF sustainability component of spending on social and environmental projects and causes was limited.

After identifying the source of the puzzling results as multicollinearity, the thesis discusses two solutions to avoid this problem. Namely, the first solution is to run logistic regressions with each independent variable separately, and the second solution is to run logistic regressions with the new strategic resource index. Table 31 already presented the results of the first solution. Table 32 presents the results of the second solution. It is seen that the relevant odds ratio is 1.581, and it is statistically significant at the 1% level. This finding implies that higher levels of the strategic resource index at the country level are positively associated with the higher likelihood of SWFs to employ external fund managers. An increase of strategic resources index by 1% increases the likelihood of SWFs employing external fund managers in 1.581 times. So, the analysis supports the research hypotheses of 2a and 2b in a joint fashion.

The above discussions show that the high correlations of different strategic resource variables are a limitation to conduct multiple regression analysis due to the associated multicollinearity problem. Another restriction in the quantitative analysis arises due to the nature of dependent variables. As the sample is composed of different cross-sectional units (i.e., sovereign wealth funds) over a balanced period of years (i.e., from 2007 to 2017), it would be possible to use some panel methods in the analysis. Namely, one can run panel logistic regressions and utilise the panel dimension of the data to arrive at more efficient results.

However, this panel data estimation is not possible due to the invariability of SWF sustainability measures over the years for each SWF. Namely, the collected data indicates that each measure of SWF sustainability (i.e., employing external fund managers, investing in alternative asset classes, and spending on social and environmental projects and causes) takes the same value (either 0 or 1) for the whole period of 2007-2017 in the case of each SWF. Then, this invariability of measures over time restricts the ability to conduct panel methods in

the regression estimations. One benefit of the panel data methods would be to include fixed effects for each SWF so that SWF-specific factors would be controlled in the analysis, while such panel data methods cannot be used due to data restrictions. However, one can still add time fixed effects into the analysis so that such effects are controlled in the analysis. Table 33 presents the results of the simple regression with year effects. The results indicate that year fixed effects are statistically significant, so including them could be a plausible strategy. It is seen from Table 33 that the odds ratio for the human development index is 4.164, which is bigger than unity. In addition, the coefficient is statistically significant at the 1% level. This finding implies that higher values of the human development index would be positively associated with higher odds of SWFs employing external fund managers in 4.164 times. Another important difference from Table 33 increases from 1.612 to 4.164, implying that with the time fixed effects, the impact of HDI becomes stronger.

A similar finding is obtained in the case of the innovation index. Table 33 shows the odds ratio for the innovation index is 1.062, which is larger than 1.02 computed in Table 30. So, adding time fixed effects also increase the impact of the innovation index on the incidence of SWFs employing external fund managers. In the case of the reputation index, the odds ratio increases to 1.041 and in the case of Ln (FDI) it increases to 1.024. So, Table 33 shows that all four country-level strategic resource variables have positive effects on the likelihood of SWFs employing external fund managers. Therefore, the relevant evidence supports the research hypotheses 2a and 2b.

The addition of time fixed effects to the logistic regression can be done in the case of the combined independent variable of the strategic resource index. Table 34 shows the relevant logistic regressions with time effects. It is seen that year effects, and the odds ratio is statistically significant, and the odds ratio increases from 1.581 to 7.706. So, Table 34 produces stronger results for the effects of the country-level strategic resources on the odds of SWFs employing external fund managers.

Overall, this section shows that there can be major multicollinearity problems in conducting multivariate regressions with the current data as the four variables on the country-level strategic assets have very high correlations with each other. This problem is overcome by estimating the relevant logistic regressions individually for each independent variable as the

first approach and estimating the logistic regression with a combined measure of strategic resource index as the second approach. Both methods produce supportive evidence on the positive effects of the country strategic resources on the odds or likelihood of SWFs employing external fund managers. So, the relevant findings support the second set of research hypotheses 2a and 2b.

Similar to the descriptive analysis and the bivariate methods, the above quantitative results are repeated for the case of commodity and non-commodity samples to see whether any discernible differences exist between these two samples. Table 35 shows the simple logistic regressions for the individual cases of the four country-level strategic resources variables of the human development index, the innovation index, the reputation index, and the FDI inflows to the country. As discussed above, all these regressions use the same smaller sample so that the results become comparable across different models. Table 35 shows that there are 151 observations in the first logistic regression for the independent variable of the human development index. The odds ratio is estimated as 1.724, which is statistically significant at 1% level. So, this finding implies that higher levels of the HDI are positively associated with the higher likelihood of commodity sovereign wealth funds making investments in alternative asset classes in 1.724 times. Therefore, this evidence also supports the research hypothesis 2a regarding the positive effects of HDI on the second SWF sustainability in the case of the commodity sample. As another point, the odds ratio of 1.724 in the commodity sample is larger than the odds ratio of 1.612 in the full sample.

Similar to the full-sample findings, the odds ratio for the human development index is larger than the odds ratios for other single logistic regression estimations. For example, it is seen from Table 35 that the odds ratio for the innovation index is 1.013, it is 1.011 for the reputation index, and it is 1.019 for Ln (FDI). These odds ratios are only slightly higher than the estimates in the full sample. In addition, all of these estimates are statistically significant at 1% level. They imply that higher values of the reputation index, the innovation index and Ln (FDI) are positively associated with the higher probability of commodity SWFs employing external fund managers. However, as the odds ratios are very close to unity, these effects are not very strong, or not as strong as in the case of the odds ratio for the human development index. Overall, the results of Table 35 confirm the research hypothesis 2a and 2b in the case of the commodity sample.

The above logistic regressions are repeated with the addition of time fixed effects as well. Table 36 presents the results of the new logistic regressions for the commodity sample. The numbers of observations are the same as Table 35, while only new time fixed effects are added to the logistic regressions. It is seen from the table that the time fixed effects are not statistically significant in the case of the logistic regression for the independent variable of the human development index. In this case, examining the Akaike Information Criteria (AIC) (Akaike, 1973) can be helpful in testing how well the model fits the data set. According to AIC, the best- fit model is the one that explains the greatest amount of variation using the fewest independent variables (Burnham and Anderson, 2004). In the case of Table 35 without time fixed effects, the AIC value is estimated as 203.637 for the logistic regression with the HDI, while this value is 214.835 in Table 30 with time fixed effects. So, this criterion implies that the logistic model without time fixed effects is superior goodness-of-fit to the model with the time fixed effects. This finding is important to show that the addition of the time fixed effects does not always improve the model performance.

In fact, in the case of the logistic regression with the HDI, the extended model has statistically insignificant coefficients for year effects, and the AIC level is higher. Therefore, there is no benefit of including time fixed effects in this case. Therefore, presenting the models with and without the time fixed effects is useful to be able to compare the relevant results.

Table 36 shows that the odds ratio for the human development index is estimated as 5.3, and this coefficient is statistically significant at 5% level. So, it implies that the higher levels of the HDI score would lead to higher odds or positively associated with the higher likelihood of SWFs employing external fund managers in 5.3 times. In addition, the odds ratio of 5.3 is much larger than the coefficient of 4.164 in the full sample with time effects, and the value of 1.724 in the commodity sample without time fixed effects. So, the addition of time fixed effect and switch to the commodity sample improve the odds ratio for the human development index significantly. In the case of the second logistic regression with the independent variable of the innovation index, all yearly effects are statistically significant, and the odds ratio for the innovation index is estimated as 1.048. This ratio is also statistically significant at 1% level, and it implies that the higher levels of the innovation score are positively associated with higher odds or incidence of SWFs employing external fund managers in 1.013 times. This coefficient is larger than the relevant odds rate of 1.013 in the case of no time fixed effects in the commodity sample, while it is smaller than the odds ratio

of 1.062 in the case of the full sample with time fixed effects. So, the level of odds ratio increases when adding time fixed effects, but it declines when moving from full to commodity sample. Still, it implies that the larger values of the innovation index are positively associated with higher odds or likelihood of commodity SWFs employing external fund managers.

In the case of the third logistic regression with the independent variable of the reputation index, all yearly effects are statistically significant, and the odds ratio for the reputation index is estimated as 1.041. This ratio is also statistically significant at 1% level, and it implies that the higher levels of the reputation score are positively associated with higher odds or incidence of SWFs employing external fund managers in 1.041 times. This coefficient is larger than the relevant odds rate of 1.011 in the case of no time fixed effects in the commodity sample, while it is the same as the odds ratio of 1.041 in the case of the full sample with time fixed effects. So, the level of odds ratio increases when adding time fixed effects, but it does not change when moving from full to commodity sample. Still, the results imply that the larger values of the reputation index are positively associated with higher odds or likelihood of commodity SWFs employing external fund managers.

Finally, in the case of the fourth logistic regression with the independent variable of Ln (FDI), none of the time fixed effects is statistically significant, and the odds ratio for the Ln (FDI) is estimated as 1.056. This ratio is statistically significant only at 10% level, and it implies that the larger amounts of FDI inflows to the home countries are positively associated with higher odds or incidence of commodity SWFs employing external fund managers in 1.056 times. However, the research evidence is not very strong due to the odds ratio not being statistically significant at 5% level. This coefficient is larger than the relevant odds rate of 1.019 in the case of no time fixed effects in the commodity sample and larger than the odds ratio of 1.024 in the case of the full sample with time fixed effects. So, the level of odds ratio increases when adding time fixed effects and when moving from full to commodity sample. Overall, the results of Table 36 indicate that the research hypotheses of 2a and 2b are supported in the case of the commodity SWFs.

In addition to examining the individual level logistic regressions in the case of the commodity SWFs for the second SWF sustainability measure of employing external fund managers, the same analyses can be repeated with the new combined strategic resource variable. Table 37 presents the relevant logistic regression results without and with the relevant

time fixed effects. In the first regression of Table 37 without time fixed effects, the odds ratio is estimated at 1.678, and it is statistically significant at the 1% level. The coefficient is larger than unity, implying that the larger values of the combined strategic resources index are positively associated with higher odds or likelihood of commodity SWFs employing external fund managers in 1.678 times. This coefficient is also larger than the odds ratio of 1.581 in the case of the full sample without time fixed effects. In the case of the second regression of Table 37, none of the yearly fixed effects is statistically significant, while the odds ratio is estimated as 5.895 and it is only statistically significant at 10% level. So, when time fixed effects are added to the logistic regression, the size of the odds ratio increases significantly, but its statistical significance declines. This case of the second regression model in Table 37 displays again that adding time fixed effects do not always increase the efficiency of the regressions as shown by the insignificant coefficients of all yearly fixed effects, the lower statistical significance of the odds ratio, and the higher values of AIC measure. Overall, these results in Table 31 indicate that larger values of the strategic resources index are positively associated with the higher odds or incidence of commodity SWFs employing external fund managers. So, the results support the first set of the research hypotheses 2a and 2b jointly.

The above analysis regarding the individual and combined effects of the country-level strategic resources on the second SWF sustainability dimension of employing external fund managers in the case of the commodity sample can be repeated for the case of the non-commodity sample as well. Table 38 shows the results of the individual-level logistic regression for each one of the four strategic resources. The first observation about these results is that the non-commodity sample size is 106.

When the results of Table 38 for the non-commodity sample are examined, very different results are obtained compared to the case of the commodity sample. For example, in the case of the first regression model in Table 38, the odds ratio for the human development index is not statistically significant at the 10% level. Similarly, the fourth variable of Ln (FDI) is not statistically significant at the 10% level as well. So, there is no supporting evidence for the research hypotheses of 1a and 1b in the case of the non-commodity sample. In contrast, the odds ratio for the innovation index is estimated at 1.011, and it is statistically significant at the 1% level. Similarly, the odds ratio for the reputation index is estimated at 1.007, and it is

statistically significant only at the 10% level. So, these results indicate that larger values of either the reputation index or the innovation index are positively associated with higher odds or likelihood of the non-commodity SWFs employing external fund managers. However, as the odds ratios are very close to unity, these effects are not very large. In addition, these two odds ratios are not very different from the full sample or commodity sample results.

The above analysis is also repeated by adding time fixed effects to the non-commodity sample. Table 39 shows the relevant results. The sample size is again 106 observations. There is a very interesting result regarding the first regression model of Table 39. It is seen that the odds ratio of the human development index is statistically significant at the 1% level, whereas the time fixed effects are not statistically significant. However, the size of the odds ratio is extremely large, and the relevant confidence interval is extremely wide. These are symptoms of multicollinearity, and so these results should not be taken as robust results, and one should be cautious about similar situations in other cases as well.

In the case of the second logistic regression with the independent variable of the innovation index in Table 39, all yearly effects are statistically significant, and the odds ratio for the innovation index is estimated as 1.0152. This ratio is also statistically significant at 1% level, and it implies that the higher levels of the innovation score are positively associated with higher odds or incidence of non-commodity SWFs employing external fund managers in 1.0152 times. This coefficient is larger than the relevant odds rate of 1.011 in the case of no time fixed effects in the non-commodity sample and larger than the odds ratio of 1.062 in the case of the full sample with time fixed effects or the odds ratio of 1.048 in the case of the commodity sample with yearly fixed effects. So, the level of odds ratio increases when adding time fixed effects and when moving from full or commodity samples to the non-commodity sample. Hence, this result implies that the larger values of the innovation index are positively associated with higher odds or likelihood of non-commodity SWFs employing external fund managers.

In the case of the third logistic regression with the independent variable of the reputation index, all yearly effects are statistically significant, and the odds ratio for the reputation index is estimated as 1.039. This ratio is also statistically significant at 5% level, and it implies that the higher levels of the reputation score are positively associated with higher odds or incidence of non-commodity SWFs employing external fund managers in 1.039 times.

This coefficient is larger than the relevant odds rate of 1.007 in the case of no time fixed effects in the non-commodity sample, while it is smaller than the odds ratio of 1.041 in the case of the full or commodity samples with time fixed effects. So, the level of odds ratio increases when adding time fixed effects, but it decreases when moving from full to non-commodity sample. Still, its odds ratio is higher than unity, which implies that the larger values of the reputation index are positively associated with higher odds or likelihood of non-commodity SWFs employing external fund managers. Lastly, in the case of the fourth regression model with the independent variable of Ln (FDI), the odds ratio is not statistically significant.

Finally, the logistic regressions are repeated for the case of the non-commodity SWFs with the combined measure of the strategic resources index. Table 40 presents the results of the relevant logistic regressions without and with the yearly fixed effects. It is found that the odds ratio for the strategic resource index is statistically insignificant in the case of time fixed effects. In contrast, in the case of the logistic regression without time fixed effects, the relevant odds ratio is estimated as 1.465, and it is statistically significant at the 10% level. So, it implies that larger values of the strategic resource index at the country level are positively associated with higher odds or likelihood of non-commodity SWFs employing external fund managers in 1.465 times. However, the size of the odds ratio is smaller in the case of the non-commodity sample compared to the full and commodity samples without time fixed effects.

Overall, the results of the above-detailed regression analyses support the second set of the research hypotheses regarding the positive effects of the country-level strategic resources on the second dimension of the SWF sustainability, which is the employment of external fund managers. The analyses were repeated with different samples (i.e., commodity and non-commodity SWFs), with and without time fixed effects, and with individual versus combined strategic resource variables. So, a total of 30 odds ratios are obtained in the case of the second sustainability measure. These odds ratios are presented in Table 41. It is seen that some results are insignificant or not reported due to strong multicollinearity. The results show that in the full and commodity samples, the research hypotheses of 2a and 2b are supported. However, in the case of the non-commodity sample, the results are weaker.

5.4.3. Logistic Regression for Social and Environmental Expenditures Dummy

- *Hypothesis 3a and 3b Analysis*

The new conceptual model of SWF sustainability identifies spending on social and environmental projects and causes as another important component of sustainability. This point is justified by the natural resource-based theory of the firm, which argues that investing in clean technologies and social responsibility projects would increase the competitive advantage of businesses and make the business operations consistent with the natural and social constraints. The bivariate analysis showed that there is some supportive evidence on the relationship between country-level strategic resources and this measure of SWF sustainability. For example, scatter plots identified positive associations between the social and environmental expenditure dummy and some of the four strategic resources at the country level (i.e., the human development index, the innovation index, the reputation index, and the FDI inflows to the country). Similarly, the two-sample t-tests showed that for the SWFs which spend on social and environmental projects and causes, the levels of the strategic resource variables are higher than the SWFs which do not make such spending. This evidence is also interpreted as implying that higher levels of strategic resources would increase the likelihood of SWFs spending on social and environmental projects and causes. So, the evidence up to now supports the second set of research hypotheses 3a and 3b only to some extent. This sub-section conducts the same analysis with logistic regressions.

Table 42 shows the results of the individual logistic regressions. In large contrast to the previous logistic regressions, all odds ratios for each strategic resource is less than unity, and only the odds ratio for Ln (FDI) is statistically significant at the 10% level. So, these logistic regressions imply that there are no positive or negative effects of the human development index, the innovation index, and the reputation index on the odds or likelihood of SWFs spending on social and environmental projects and causes. So, there is no support for the case of research hypotheses 3a.

In the case of the last simple logistic regression in Table 42, the odds ratio for Ln (FDI) is estimated as 0.991, and it is statistically significant only at the 10% level. As the odds ratio is less than unity, it implies that higher values of FDI inflows to the home country are associated with lower odds or likelihood of their SWFs spending on social and environmental projects and causes. However, given that the relevant odds ratio is very close to unity, this negative

effect of FDI is very limited economically. So, this result also implies that there is no supportive evidence in the case of research hypotheses 3b.

Table 43 repeats the same analysis by adding yearly fixed effects to the logistic regressions. The results improve on various dimensions. For example, it is seen that the odds ratio for the human development index is 1.108, so it becomes largest than unity, implying a positive association between the HDI and the third dimensions of SWF sustainability. However, the coefficient is still statistically insignificant. In the case of the innovation index, the odds ratio is estimated as 1.015, and it is statistically significant at the 10% level. Similarly, in the case of the reputation index, the odds ratio is estimated at 1.020, and it is statistically significant at the 5% level. So, these findings imply that the larger values of the innovation and reputation indices are positively associated with higher odds or likelihood of SWFs making social and environmental expenditures. Hence, they support the research hypotheses 3a. For the last strategic resource variable of Ln (FDI), the odds ratio is slightly lower than unity, but the coefficient is not statistically significant. So, there is no supportive evidence for the research hypothesis 3b.

Table 44 estimates the logistic regressions of the social and environmental expenditures using the combined measure of the strategic resource index. Interestingly, the odds ratios for the logistic regressions both with and without yearly fixed effects are statistically insignificant. So, there is no research evidence on the joint significance of the country-level strategic resources for the third SWFs measure of social and environmental expenditures.

As the results for the third SWF sustainability measure are somewhat mixed, providing detailed analysis is useful to understand the underlying factors. In this context, Table 45 repeats the estimations of simple logistic regressions for the sample of commodity SWFs. The results are very interesting in the sense that all four odds ratios are statistically significant at the 1% level. However, all of them are also lower than unity. For example, the odds ratio for HDI is 0.492, while the odds ratios for the other three measures are all above 0.975. So, in the case of the human development index, there seems to be a negative association with the third SWF sustainability measure. In the other strategic resources, the intensity of this negative relationship is very low due to the odds ratios being very close to unity. However, these findings indicate that there is no supportive empirical evidence for the research hypotheses 3a and 3b.

To see whether the above results are robust to the inclusion of yearly fixed effects, Table 46 repeats the same analysis with time fixed effects. Interestingly, the first three strategic resources (i.e., the human development index, the innovation index, and the reputation index) lose their statistical significance. In the case of Ln (FDI), the coefficient is statistically significant only at the 10% level, and the odds ratio is 0.944. So, the results vary greatly when time fixed effects are added into the logistic regressions, but they still do not provide evidence for research hypotheses 3a and 3b.

Table 47 repeats the logistic regression for the combined independent variable of the strategic resource index for the case of the commodity sample. It is seen that the odds ratio is less than unity and statistically significant in the logistic regression model without time fixed effects. However, when yearly fixed effects are added to the logistic regression model in the lower panel of Table 47, the coefficient loses its statistical significance. So, the empirical evidence is again mixed.

Overall, the above regression analyses show that the evidence on the positive effects of the country strategic resources on the third SWFs dimension of social and environmental expenditures is quite mixed and weak for the commodity SWFs. However, the results change significantly when the non-commodity sample is examined. Table 48 presents the relevant results. It is seen that all odds ratios are statistically significant, and they are larger than unity. For example, in the case of the human development index, the odds ratio is estimated at 1.070, and it is statistically significant at the 1% level. So, these results imply that the larger values of the country strategic resources are positively associated with higher odds or likelihood of non-commodity SWFs spending on social and environmental projects and causes in 1.070 times. Therefore, they provide supportive evidence for the research hypotheses 3a and 3b in the context of the non-commodity SWFs.

Checking whether the above results regarding the positive effects of the country strategic resources on the third SWF sustainability dimension are robust to the inclusion of yearly fixed effects, Table 49 repeats the same analysis with the time fixed effects. In this case, all odds ratios are still above unity, thereby confirming the positive effects of the country strategic resources. However, the HDI and Ln(FDI) lose their statistical significance. So, the evidence is still supportive, but it becomes weaker.

Finally, Table 50 repeats the logistic regressions in the case of the non-commodity sample by using the independent variable of the combined strategic resources index. In the logistic regression without time fixed effects, the odds ratio is estimated as 1.513, and it is statistically significant at the 10% level. So, this result provides supportive evidence on the positive effects of the country-level strategic resources for the third SWFs dimension jointly. However, when the time fixed effects are added, the coefficient loses its statistical significance. Comparing AIC values implies that the logistic regression model without the time fixed effects is better. Therefore, Table 50 provided support for the joint significance and positive effects of the country strategic resources on the third SWF sustainability component in the context of the non-commodity sample.

To get a general perspective on the above-detailed results for different samples, the inclusion of time fixed effects, and the use of combined strategic resource index, Table 51 gives the summary of odds ratios for all 30 logistic regressions. It is seen that there are many insignificant results in this case. Additionally, in the case of the non-commodity sample, there is strong evidence on the positive effects of the country strategic resources for the third SWF sustainability dimension. However, in the case of the commodity sample, there is some evidence on the possible negative effects of these country strategic resources. Overall, the evidence for the third SWFs dimension is quite mixed and weak. This was the case in the bivariate analyses as well. So, the conceptual model of SWF sustainability performs quite well on the first two dimensions empirically, but the research evidence for the third dimensions is relatively weak.

5.5. Empirical Analysis for Combined SWF Sustainability Measure

The previous sub-section combined four independent variables into a single measure of strategic resources index. In this way, the logistic regressions avoided the multicollinearity problem and were able to examine the joint effects of the four variables. A similar index generation can also be conducted in the case of the dependent variables. The above analysis uses three different measures of SWF sustainability as separate regressions. In addition, the binary nature of the dependent variables is a concern due to the low levels of variation. Therefore, combining them into a single sustainability index by directly summing three relevant dummies becomes a feasible approach in this context. It can be argued that one can use some weighting method like the inverse-variance weighting as in the case of the strategic

resource index. However, such as a weighting method is not feasible due to the invariance of each sustainability measure. Due to this invariance over time for each SWF, there is no possibility of estimating within-SWF variance.

Because of the nature of the dummy dependent variables, the new sustainability index could take values from 0 to 3. In addition, it becomes an ordinal variable in the sense that higher values of the sustainability index imply higher sustainability score for SWFs.

Table 52 shows the summary statistics of the new variable for the case of the full, commodity and non-commodity samples. It is seen that the average index is 1.622 in the full sample, while the average for non-commodity sample is higher, with a score of 1.789 compared a score of 1.536 in the commodity sample. Table 53 shows the pairwise correlations with this new sustainability variable. It is seen that the combined sustainability measure has positive associations with the four independent variables. When sub-samples are compared, it is seen that non-commodity SWFs have higher correlation coefficients. Overall, this combined measure displays the close positive association between country-level strategic resources and SWF sustainability.

As another bivariate analysis, Figure 23 shows the scatter plots between the new sustainability index and one of the independent variables, i.e., the human development index. It is seen the largest sustainability category is 2, followed by 3 and 1, with these categories having similar shares in the full sample. The category with the smallest sample is 0, as it implies that the SWFs do not satisfy any of the three sustainability indicators. Figure 23 shows that there is a clear positive association between the human development index and the sustainability index. This positive relationship holds for the full, commodity, and non-commodity samples.

The following parts repeat the logistics regressions with the new sustainability index. Table 54 shows the ordered logistic regression results for the sample with four independent variables added to the estimation. At this point, it should be noted that the regression coefficients are presented in the following tables, not the odds ratios. So, the interpretations of coefficients are made compared to zero, not unitary value.

The results of Table 54 shows that the innovation index affects the sustainability index positively while FDI inflows have a negative effect. These are the only statistical regression coefficients. When time fixed effects are added to the ordered logistic regressions, in the lower panel of Table 54, the results stay the same. So, the research evidence from these regressions seems to be mixed and weak. However, as in the case of the logistic regressions in the previous sub-section, the inclusion of all independent variables at the same time is problematic due to the multicollinearity problem. So, the first solution to this problem is to conduct logistic regressions with only one independent variable. Table 53 shows these simple ordered logistic results for the full sample case. It is found that all four independent variables have positive and statistically significant effects on the combined sustainability measures. Therefore, the evidence supports the research hypotheses groups of 1, 2, and 3. In terms of magnitude, the human development index has the largest regression coefficient, which is consistent with the simple logistic regression results.

As a robustness check, Table 55 is estimated using yearly fixed effects as well. The results are robust to this specification as all the coefficients are positive and statistically significant. So, the full sample has supportive evidence regarding the positive effects of each strategic resource on the sustainability of SWFs. In addition to the effects of the individual independent variables, checking the effect of the combined independent variable of the strategic resource index becomes another approach to see the relationship between countries' strategic resources and their SWF's sustainability. Table 56 presents the related ordered logistic regression results with and without time fixed effects. In both regressions, the coefficient of the combined strategic resource index is positive and statistically significant at the 1% level. So, these regressions provide strong support for a positive relationship between countries' strategic resources and their SWFs' sustainability.

As a further empirical analysis, the following two tables show the ordered logistic results with time fixed effects in the case of commodity and nom-commodity SWFs. The results show that in the case of the commodity sample, the human development index and Ln (FDI) lose their statistical significance, while the innovation and reputation indices have positive and statistically significant coefficients. In the case of the non-commodity sample, all relevant coefficients are statistically significant and positive. So, in the case of the combined sustainability index, there is strong research evidence supporting the positive effects of the country strategic resources on the sustainability of SWFs.

Overall, these results are consistent with the results from the bivariate analysis as well as the results from the regression analysis of individual SWF sustainability measures. One benefit of creating a combined sustainability index is to have a higher variation in the dependent variables. In this way, more robust and efficient quantitative findings can be obtained. However, as various measures are combined to a single index, the researcher would also lose the ability to check the effects on individual SWFs dimensions. So, there are both benefits and challenges of creating index variables by combining various sub-components. Notwithstanding such issues, the relevant evidence in this chapter provides strong support for the new conceptual model of SWF sustainability constructed in this thesis.

5.6 Concluding Remarks

This chapter presents the results of the empirical analysis using SWF-level data covering the period of 2007-2017. The results are presented in three main sections. Firstly, the descriptive analysis presented the summary statistics of the available data. Then, the bivariate analysis part examined the relationship between the four country-level strategic resources and three SWF sustainability dimensions one by one. This is implemented by pairwise correlations, scatter plots, and t-tests. The results of these sections indicate that there are very close relationships between the four country-level strategic resources and the first two SWFs dimensions of investing in alternative asset classes and employing external fund managers. However, the relationship between the four strategic resources and the last SWF sustainability dimension of spending on social and environmental projects is found to be relatively weak. In fact, the logistic regression analyses confirm this finding. They indicate that higher levels of HDI, reputation index, innovation index, and FDI inflows would lead to higher likelihoods of SWFs investing in alternative asset classes and employing external fund managers. However, the odds of SWFs making expenditures on ESG causes and the levels of country-level strategic resources are not related in statistically significant ways. Overall, the empirical analysis provides strong supportive evidence of the first two dimensions of SWF sustainability, while the evidence is mixed for the last dimension. This point can be examined further in future research.

This thesis aims to examine the issue of sovereign wealth fund sustainability and its relationship to its home countries' strategic resources. Both of these topics are not studied in detail in the relevant literature. In the case of SWF sustainability, there are some studies examining the financial performance and strategic investment decisions (like home bias in

investments) of SWFs, but no study focuses on the topic of SWF sustainability as a general aspect, not only a financial performance dimension. Therefore, the current study makes an important contribution to the literature by discussing the details of SWF sustainability in depth, identifying some components of it, using theoretical models to construct a novel conceptual model of SWF sustainability, and testing its major dimensions empirically. So, the thesis makes both conceptual and empirical contributions to the relevant literature about the first research topic. Regarding the second research dimension of country-level strategic resources, the thesis makes a unique conceptual contribution by extending the resource-based theory to include such resources in the SWFs domain. Therefore, it can be argued that some leading contributions of the thesis are on the conceptual dimensions. These conceptual arguments are made after a very detailed review of the relevant theories and empirical evidence. Then, the thesis provides the first test of the new conceptual model using SWF-level data covering the period of 2007-2017. In this way, the arguments of the conceptual model are supported by the empirical findings.

A New Model of SWF Sustainability

Regarding the topic of SWF sustainability, the literature, as reviewed in chapters two, three, and four, is very scarce. There are some studies that focus on financial performance measures and the strategic decisions of the SWFs, but those studies do not consider the sustainability dimension. There are also studies that examine the topic of sustainable or responsible investments by SWFs, but they do not provide any conceptual framework to map general sustainability issues. So, in this context of very limited research, the current thesis makes detailed reviews of the relevant theories, along with the related evidence, and constructs a new conceptual model of SWF sustainability. This model can be acknowledged as an important contribution to the literature on SWFs and sustainability. Toward the purpose of establishing a sustainability model, the thesis first defines the leading components of sustainability in the context of SWFs. These components do not need to be on the financial performance of the companies, but they are expected to be more related to the long-term competitive advantage and survival of the funds. Three such factors are identified from the detailed reviews of the relevant studies. These are investing in alternative asset classes, employing external fund managers, and spending on social and environmental projects and causes.

On the first SWF sustainability dimension of investing in alternative asset classes, the portfolio and diversification literature are identified. The portfolio theory notes that investing portfolios in different assets with a limited correlation over the business cycle or economic conditions would be very valuable to decrease risk exposure while holding the return rate constant. For example, it is found that the traditional asset classes of government bonds and public securities in various countries have become much riskier as the correlations among traditional assets increased significantly in the last decades due to the intensification of globalisation and the rise of global financial flows. So, the traditional asset classes presented lower risk diversification opportunities in the last decades. Then, the relevant literature suggested diversifying towards less traditional or more alternative asset classes. These alternative assets are very diverse, including real estate, commodities, precious metals, and private equity. In this way, corporations can diversify away from traditional asset classes. There also studies showing the benefits of such diversification strategies. The studies on the SWFs investment strategies noticed that many SWFs had a very limited diversification in the early 2000s. They put the majority of their funds into a few advanced country government bonds and public equities. However, as such limited diversification strategies performed very poorly during the global financial crisis, SWFs started to diversify after the crisis. Based on these theoretical discussions as well as the relevant empirical evidence, the thesis identified "investing in alternative asset classes" as an important sustainability dimension for SWFs.

Once SWFs decide to diversify into different asset classes and markets, they need to extend the scope of their managerial and technical capabilities significantly. For example, real estates in different regions and global cities are attractive alternative assets for many SWFs. However, it would be very difficult for SWFs to develop expertise and domestic knowledge in many markets. It would lead to managerial inefficiencies and diseconomies of scope after a certain level. As another non-economic problem, the investments of SWFs in alternative asset classes in other countries could attract some domestic policy reactions and negative public perceptions. So, to address such managerial and non-economic concerns, SWFs can sign contracts with external fund managers (like managers who focus on the real estate markets of their domestic economies) from those countries or managers who focus on specific asset classes. Therefore, SWFs can utilise the expertise and skills of external fund managers in different assets and markets. In addition, their involvement can decrease the political pressures and negative public perceptions. Therefore, SWFs can benefit both economically and non-

economically from the employment of external fund managers. Hence, this thesis identifies "the employment of external fund managers" as another important component of SWF sustainability.

While choosing the employment of external fund managers as a component of SWF sustainability makes sense, it is also necessary to justify this choice through relevant theories. At this point, the thesis uses the resource-based theory as the main tool. This theory argues that the resources and capabilities of organisations are the main factors determining the competitive advantage and survival. There is a large theoretical and empirical literature examining the different resources and capabilities. One related segment of this literature shows the benefits of external directors on board for the performance of corporations. The relevant studies note that external directors can bring unique and valuable skills, expertise, experience, and networks that can be very valuable for their companies. Such topics are not examined in the context of the SWFs. This thesis utilises the resource-based theory to argue that the employment of external fund managers can bring valuable and unique resources and capabilities to their SWFs, as discussed above. Therefore, the employment of external fund managers become a major component of SWF sustainability.

Lastly, the thesis notes that SWFs function as fiduciary agents of their societies. Hence, they have responsibilities to both current and future generations. So, they cannot behave like some hedge funds or mutual funds that usually focus on the short-run returns. In this context, the long-term investment focus stands out as an important characteristic of SWFs. Having a long-term investment perspective also implies that SWF should take social and environmental constraints into account. Namely, given the interests of future generations, SWFs would care about the social and environmental conditions that these generations would face in future. So, social challenges like income inequality and grand environmental challenges like climate change become important factors of consideration for SWFs. Therefore, the thesis argues that "spending on social and environmental projects and causes" is another important SWF sustainability component.

Again, the choice of the "spending on social and environmental projects and causes" as an SWF sustainability dimension makes sense; however, one would need to justify it using relevant theories and empirical evidence. The thesis uses another resources approach, i.e., the natural resource-based theory, to justify this SWFs component. This theory argues that social

and environmental constraints are not taken into account in the standard resource-based theory. Then, the relevant studies devise a new theory and add various strategic resources on the social and environmental dimensions. These resources include pollution prevention, product stewardship, clean technologies, and strategies aiming at the base of the pyramid. This theory argues that usual business practices should go beyond greening activities and generate revolutionary and path-breaking technologies and processes to address the grand challenges that humanity faces. This thesis argued that the natural resource-based theory justifies the spending of SWFs on the social and environmental projects and causes by SWFs.

After establishing the importance of the above three factors as SWF sustainability components, the thesis also examines what determinants at the country level would be important for SWF sustainability. At this point, the resource-based theory is utilised again. As discussed above this theory argues that the resources and capabilities of corporation matter for their competitive advantage and survival. One can extend this claim and argue that such resources and capabilities are also important for the sustainability of organisations. However, at this point, the resource-based theory does not make any reference to the strategic resources at the country-level that can matter greatly for their competitive advantage and sustainability. Hence, the thesis identifies three intangible strategic resources (i.e., the human development index, the innovation index, and the reputation index) and one tangible strategic resource (i.e., FDI inflows to the home country) as important factors that would matter for SWF sustainability. Therefore, the thesis establishes a novel conceptual model of SWF sustainability by incorporating countries' strategic resources into the model. This new model implies that four country-level strategic resources affect the three sustainability dimensions of SWFs (i.e., the employment of external fund managers, investing in alternative classes, and spending on social and environmental projects and causes) positively. In this way, 6 research hypotheses are obtained regarding the relationship between strategic resources and sustainability components. Based on these discussions, it can be argued that the thesis makes important conceptual contributions to the dimensions of SWF sustainability, country-level strategic resources, and a novel conceptual model connecting these two topics.

Empirical Support for the New SWF Sustainability Model

After establishing a detailed model of SWF sustainability, the thesis tests the relevant research hypotheses using firm-level data for 56 SWFs covering the period of 2007-2017. Then, detailed quantitative analyses are conducted on this data in terms of descriptive statistics, pairwise correlations, scatter plots, and logistic regressions. Table 57 below summarises the extensive results on the dimensions of pairwise correlations and odds ratios of logistic regressions. In this way, the main findings of the thesis can be assessed and compared easily.

The pairwise correlations show only the results that are significant at the 5% level. If some correlations are insignificant, they are indicated as Insig. in Table 57. These results show that for the first SWF sustainability component of investing in alternative asset classes and the second SWFs component of employing external fund managers, the relationships between these country-level strategic resources and SWF sustainability are quite strong. These results imply that the larger values of the human development index, the reputation index, the innovation index, and FDI lead to higher probabilities or likelihood of SWFs employing external fund managers and investing in alternative asset classes. However, in the case of the third SWF sustainability component of spending on social and environmental projects and causes, the pairwise correlations with the human development index and Ln (FDI) are not statistically significant. Only the reputation index and the innovation index have positive correlations with the third SWFs component. Overall, based on the pairwise correlation results, it can be argued that there is strong support for the first two components of SWF sustainability, while the research evidence is relatively weak for the third dimension of SWF sustainability.

The research findings from the odds ratios in Table 57 also provide supportive evidence on the first two dimensions of the SWF sustainability. In other words, the odds ratios for each of the four country-level strategic resources and the combined strategic resource index are larger than unity and statistically significant. This finding implies that the larger values of individual strategic resources or the combined strategic resource index lead to higher odds or likelihood of SWFs making investments in alternative asset classes and employing external fund managers. However, in the case of the third SWF sustainability dimension of spending on social and environmental projects and causes, there is no statistically significant odds ratio in the case of logistic regression without time fixed effects. When the logistic regressions are repeated with time fixed effects, the human development index and Ln (FDI) still do not have

statistically significant odds ratios. In contrast, the reputation index and the innovation index have odds ratios that are statistically significant and larger than unity. So, these results are closely aligned with the pairwise correlation findings. Overall, based on all the empirical results it can be safely argued that there is strong empirical evidence for the new conceptual model of SWF sustainability on its first two dimensions of investing in alternative asset markets and employing external fund managers. However, empirical evidence on the third dimension of SWF sustainability is relatively weak.

Chapter 6: Conclusion

This chapter presents a summary of the main finding together with the important implications for academic and policy dimensions. Then, sub-section 6.3. addresses number of limitations and constrains regarding the present investigation. The following sub-section 6.4. identifies the potentially rewarding future research directions based on the main finding from this thesis. Finally, the last sub-section outlines the final conclusion.

6.1. Overview

This thesis examines the topic of sovereign wealth fund (SWF) sustainability and its relationship with a country's strategic resources. When the relevant literature on SWFs is reviewed, it is found these topics are examined scarcely. There are studies that focus on the financial performance of SWFs, but the sustainability of SWFs did not attract enough attention in the academic and business circles. This thesis fills this conceptual gap by developing measures of SWF sustainability and country-level strategic resources and then connecting them in a novel conceptual model of SWF sustainability. Towards this aim, three sustainability measures are identified. These measures are the employment of external fund managers, investments in alternative asset classes, and spending on social and environmental projects and causes. When these measures are reviewed through different theories, it is found that the resource-based theory can justify the employment of external fund managers, the natural resource-based theory justifies the spending on social and environmental projects and causes, and the portfolio diversification theory can be used to justify the investments in alternative asset classes. The resource-based theory is also used in establishing the new conceptual model of SWF sustainability. This theory argues that the resources and capabilities that companies possess matter for their competitive advantage and sustainability. However, this theory does not take country-level factors into account. In this context, the thesis extends the resource-based theory to the SWFs domain and incorporate the country-level strategic resources into the new model. So, this model of SWF sustainability postulates that countries' strategic resources would positively affect their SWFs' sustainability.

To test the relevant research hypotheses of the SWF sustainability model, the thesis uses firm-level data from 56 SWFs, covering the period of 2007-2017. There are four independent variables (i.e., the human development index, the innovation index, the reputation index, and FDI inflows) representing the country-level strategic resources and three dependent

variables (i.e., the dummy for alternative asset classes, the dummy for employing external fund managers, and the dummy for social and environmental expenditures). The relationships between these dependent and independent variables are examined quantitatively using descriptive statistics, pairwise correlations, scatter plots, t-tests, and finally logistic and ordered logistic regressions. The results from different quantitative methods usually support each other. Overall, these quantitative results show that there is strong empirical support for the first two dimensions of SWF sustainability, which are employing external fund managers and investing in alternative asset classes. However, empirical evidence for the third SWFs' dimension is relatively weak.

These results also have important implications for global financial markets. The global financial crisis of 2008 and 2009 showed that the investment strategies and management structures of financial institutions were very flawed. The corporate governance in these institutions (like the dominance of shareholder perspective and a focus on short-term returns at the expense of long-term sustainability) resulted in excessive financial innovation, high levels of risk-taking, and inefficient housing and credit booms. The costs of these financial market inefficiencies were born by many countries as higher unemployment rates, higher public debt levels, and slower economic growth rates. So, these experiences showed that there is a need to align the objectives of financial institutions and the interests of societies. After the crisis, there have been regulatory and macroeconomic policy efforts to contain such risks in the financial sector. As another important development, the COVID-19 pandemic in early 2020 showed that countries could be subject to large shocks on non-financial dimensions as well. This development implies that having some buffers against large negative shocks can become very helpful in times of distress periods. This thesis implies that SWFs can be considered to play such stabilising and welfare-improving roles in the global financial markets. Firstly, thanks to their long-term investment perspectives, SWFs could avoid many of the financial market inefficiencies. Secondly, their funds can be used to smooth the negative effects of the large negative shocks like COVID-19 pandemic. To show such positive effects of SWFs in global financial markets, the present thesis examines the components of SWF sustainability and their relations to countries' strategic resources. In this way, a framework for SWF sustainability is established, and the relevant empirical evidence is produced. These results provide a comprehensive understanding of how SWFs can contribute to the stability of global financial markets and the welfare of their home countries.

6.2. Academic and Policy Implications

The thesis produces important implications for academic and policy dimensions. On the academic dimension, the lack of research on SWF sustainability and its determinants looks inefficient, given the rising prominence of the sovereign wealth funds in the global capital markets. The last two decades witnessed significant volatilities and instabilities in financial markets. In this context, SWFs can become stabilising agents in the global economy and financial markets with their long-term investment focus and sustainable strategies. Therefore, examining the sustainability of the SWFs sector is an important research question with valuable practical implications. So, the academic literature should investigate the components of SWF sustainability and its determinants in more detailed theoretical models and empirical strategies. The novel conceptual model of SWF sustainability constructed in this thesis can function as a starting point for the theoretical studies on the topic. Similarly, the quantitative methods used in the thesis can be examples of research methods to follow in relevant empirical analyses. Therefore, the thesis, along with its conceptual and empirical findings present important implications for the academic literature.

The results are also very important for relevant policies. The findings show that the sustainability of SWFs can be improved by focusing on certain components. These components are investing in alternative asset classes, employing external fund managers, and increase social and environmental responsibility expenditures. The first two components are closely connected. As the diversification opportunities of traditional asset classes shrink, SWFs need to move beyond traditional asset classes and invest in alternative assets classes like real estate, commodities, and private equity. So, one policy recommendation coming from the current thesis is to diversify SWFs' portfolios towards alternative asset classes. However, some challenges can emerge in this process, as investing in different assets and markets requires specific skills and expertise. It would be difficult to manage such diverse portfolios with only internal resources and capabilities. So, one relevant policy implication of the current thesis is to employ external fund managers. Lastly, given the fiduciary duties of SWFs towards their societies and their responsibilities for future generations, SWFs should also be active on social and environmental projects and causes. SWFs' role in achieving Agenda 2030 is already being debated, and there is some literature on this. This thesis highlights how much more could be done and should be part of their future strategic plans.

6.3. Limitation of the data

This research has so far highlighted some challenges which the researcher encountered while conducting the research for this thesis. These limitations, however, imply interesting future research direction. First, the evidence on the investment strategies of SWFs is scarce because of the limited disclosure and transparency in the sector. The lack of comprehensive data is an important obstacle to document and analyse investment activities of SWFs. However, this study overcomes this data limitation in certain dimensions by manually collecting SWF-specific data from five different sources over two years. In this way, the thesis makes an important data contribution to the relevant literature as well in relation to SWFs investment strategies.

The limited variation of the dependent (Dummy) variables of SWFs over time can be considered as another research limitation. The interest in the SWFs performance has guided this research to suggest alternative views of sustainability measures dealing with much qualitative nature of non-financial performance measures. Being constrained by the availability of data, dummy variables options emerge as a valid alternative, which can provide some initial insight into the relationship between a country's strategic resources and SWF sustainability. Logistic regression analysis can provide valuable insights on the effects of the independent variables (i.e., tangible and intangible country-level strategic resources) on three SWF sustainability components. The logistic regressions are conducted with many robustness checks like including year fixed effects and comparing the results across commodity and non-commodity sovereign wealth funds. Furthermore, to avoid the negative effects of multicollinearity, the independent variables are combined into a single strategic resource index using inverse weighting method (Willan et al., 2012). As another robustness analysis, the three sustainability measures are also combined into a general sustainability measure. In this way, detailed research evidence can be generated on the research topic and the relevant research hypotheses.

6.4 Direction of Future Research

This thesis provides some initial conceptual models and empirical findings on the topic of SWF sustainability and its determinants. It shows that there are various dimensions of SWF sustainability, and various country-level strategic resources can affect these SWFs dimensions in significant ways. The novel conceptual model of SWF sustainability constructed in this

thesis is quite valuable to structure the topic. However, it can be revised and improved further by looking at other dimensions of SWF sustainability. One such area is the effects of SWF-specific variables on sustainability measures. It is possible that size, age, the level of portfolio diversification, and the board characteristics of SWFs would produce effects on their sustainability. So, such characteristics can be added to the analysis in future research. In this way, more robust results would be obtained, and different dimensions of SWF sustainability would be uncovered. In addition to adding SWF-specific variables into the analysis, one can also try to revise and improve specific sustainability measures. The empirical results indicated that while the first two SWFs components of investing in alternative asset classes and employing external fund managers were strongly supported by the relevant empirical evidence, the research evidence for the third SWFs component of the social and environmental expenditures was not very strong. So, one can examine the reasons behind the weak relationship between expenditures on social and environmental activities and sustainability through theoretical and empirical studies. Lastly, the binary nature of the dependent variables is an important concern for obtaining more robust results. While the lack of adequate data on SWFs is widely acknowledged in the literature and business circles, finding more detailed dependent variables and conducting different econometric techniques such as panel data regression methods in future research would be very valuable to get more robust results.

6.4. Concluding Remarks

Overall, this thesis examines an important research question on SWFs with valuable policy implications. The literature on SWF sustainability and its determinants is very scarce. So, this thesis makes both conceptual and empirical contributions to the relevant literature. The thesis constructs a novel conceptual model of SWF sustainability and identifies three leading components as investing in alternative asset classes, employing external fund managers, and spending on social and environmental projects and causes. These components and the conceptual model are mostly justified by utilising resources approach (i.e., the resource-based theory and the natural resource-based theory). In addition, as an important conceptual contribution, country-level strategic resources are incorporated into the resource-based theory so that it can be used in the new model of SWF sustainability. Then, the relevant research hypotheses are tested using different quantitative methods, including descriptive statistics, histograms, pairwise correlations, scatter plots, t-tests, and logistic and ordered logistic regressions. The relevant empirical findings support the new conceptual model. Overall, these

results are very important for the SWF sustainability question. However, it should also be acknowledged that these conceptual and empirical efforts constitute the initial steps of a much longer research endeavour. Given the scarcity of studies on this topic, future research can extend the current thesis in different dimensions.

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APPENDIX

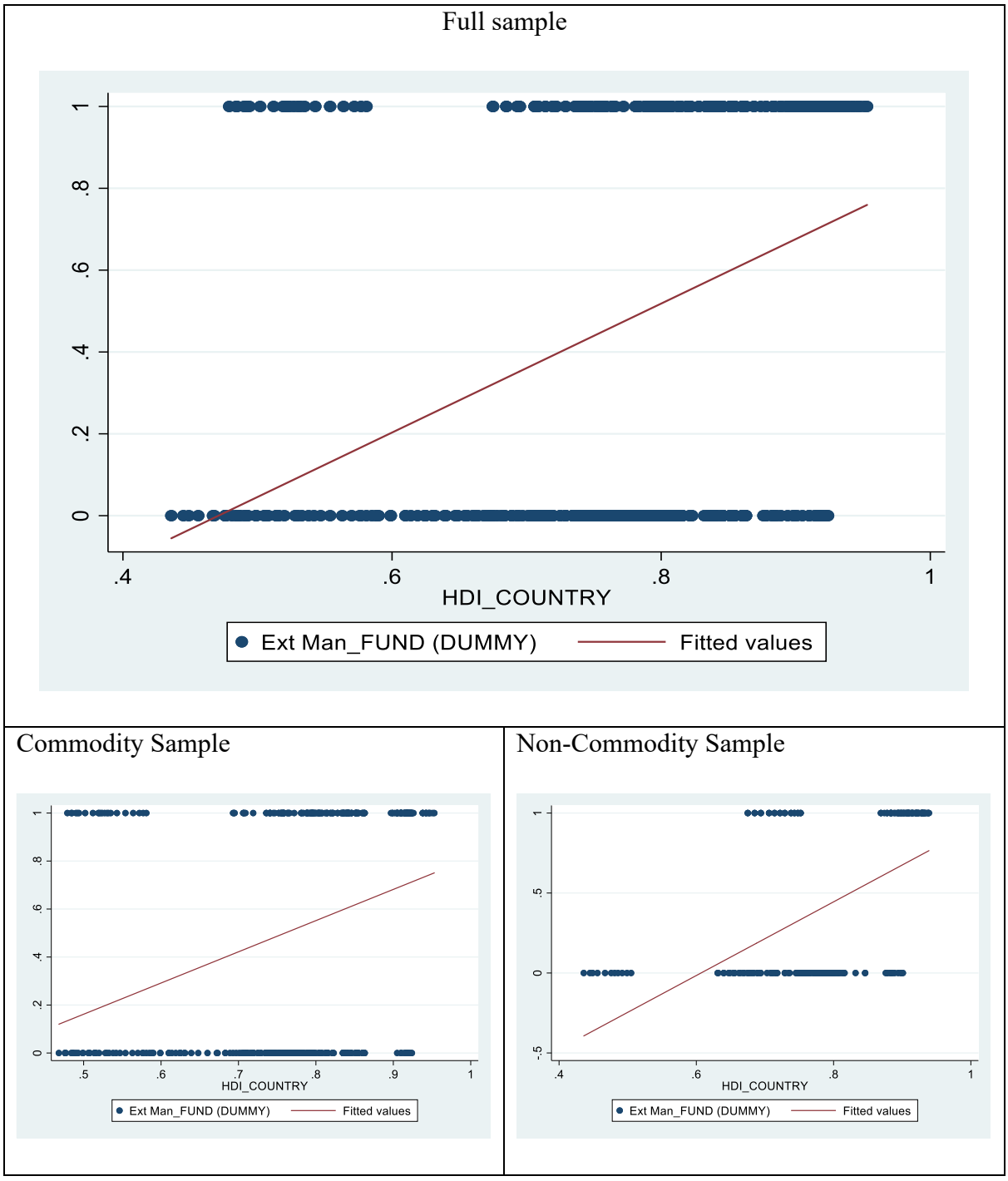
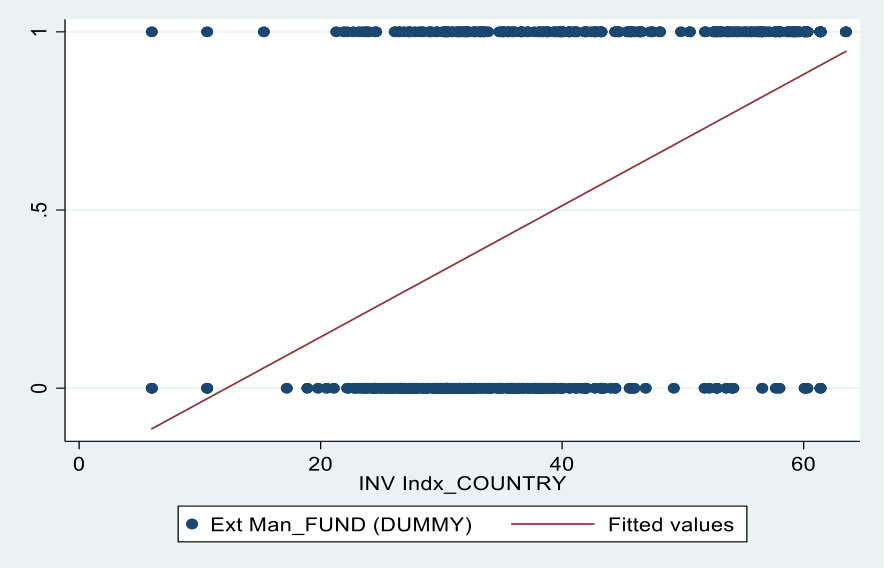
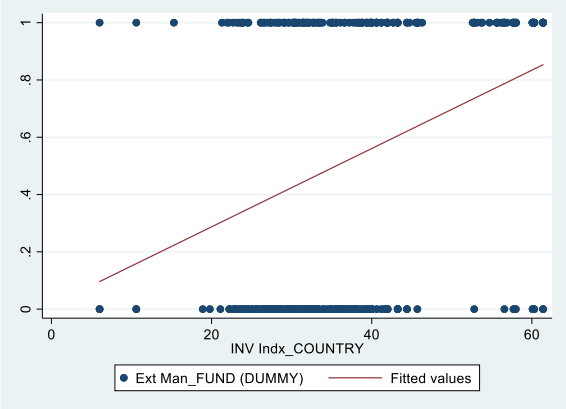


FIGURE 12: SCATTER PLOT BETWEEN EXTERNAL MANAGER DUMMY AND HDI

Full sample



Commodity Sample



Non-Commodity Sample

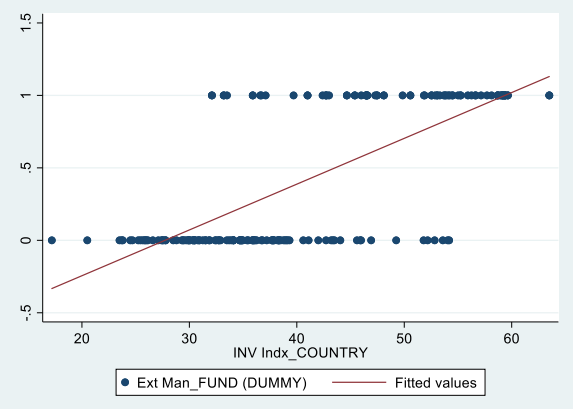


FIGURE 13: SCATTER PLOT BETWEEN EXTERNAL MANAGER DUMMY AND INNOVATION INDEX

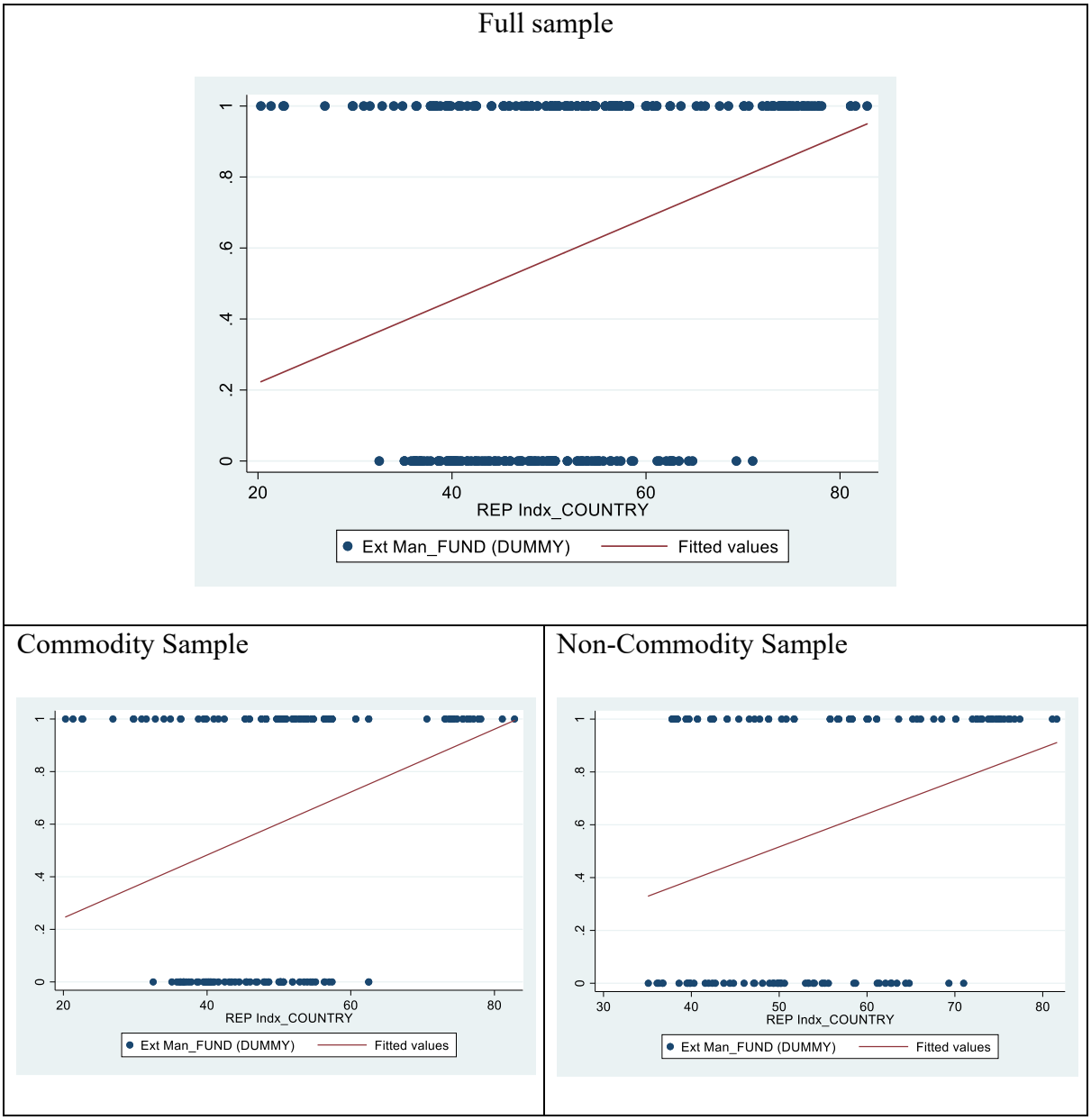


FIGURE 14: SCATTER PLOT BETWEEN EXTERNAL MANAGER DUMMY AND REPUTATION INDEX

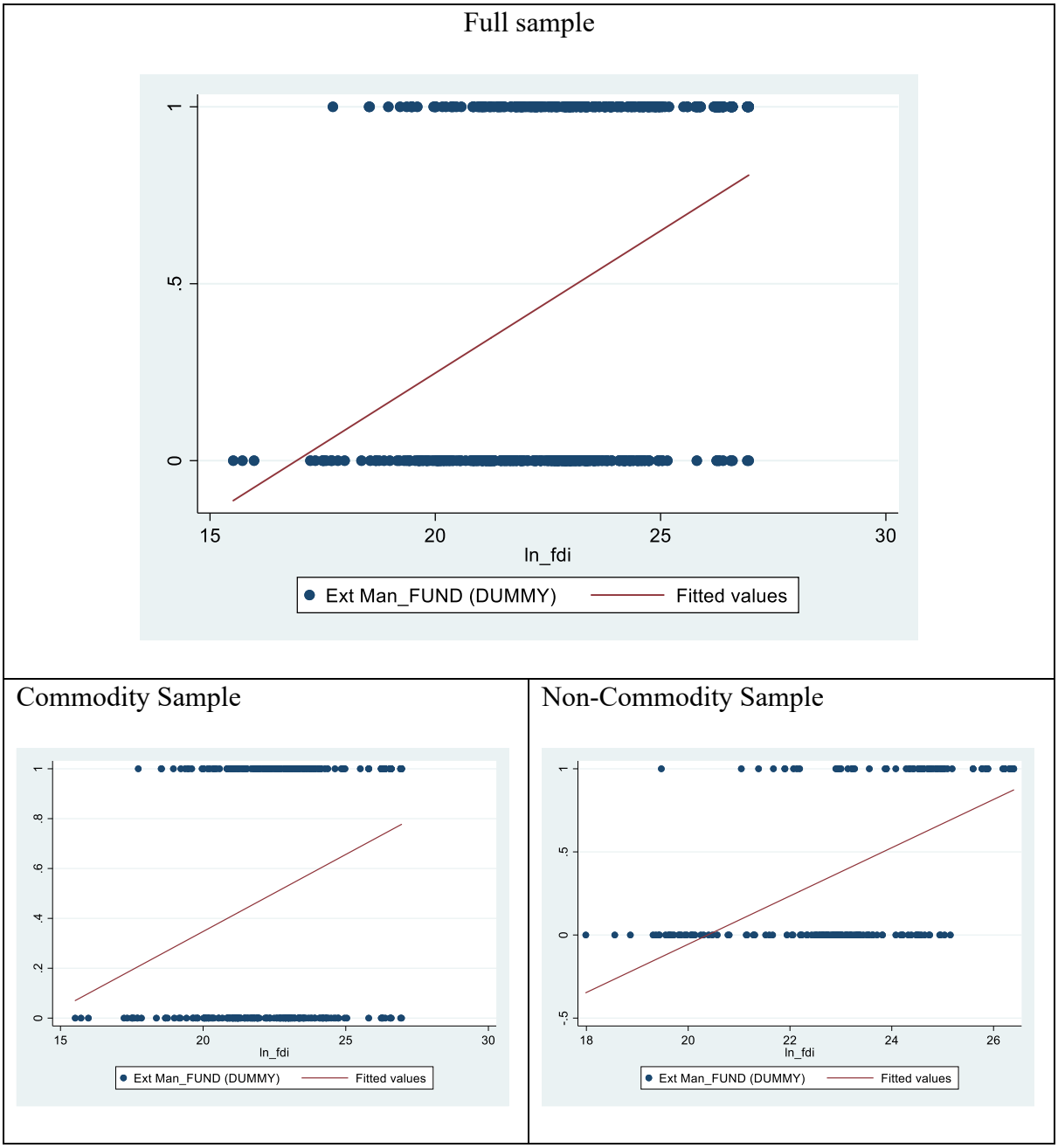
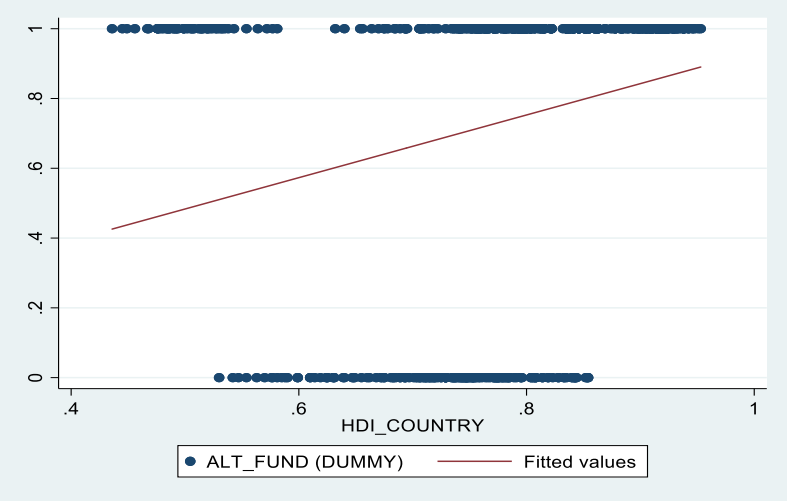
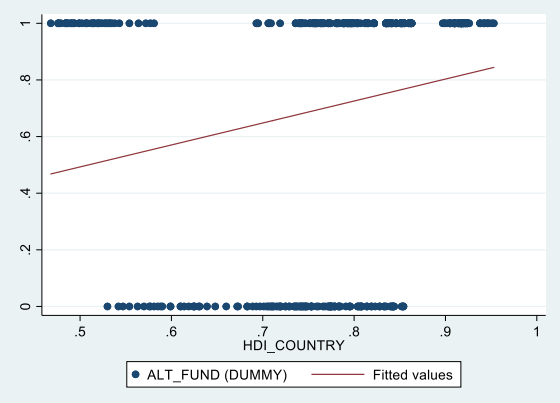


FIGURE 15: SCATTER PLOT BETWEEN EXTERNAL MANAGER DUMMY AND LN(FDI)

Full sample



Commodity Sample



Non-Commodity Sample

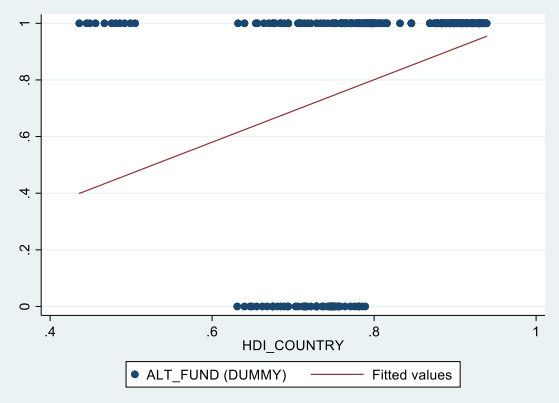


FIGURE 16: SCATTER PLOT BETWEEN ALTERNATIVE ASSETS DUMMY AND HDI

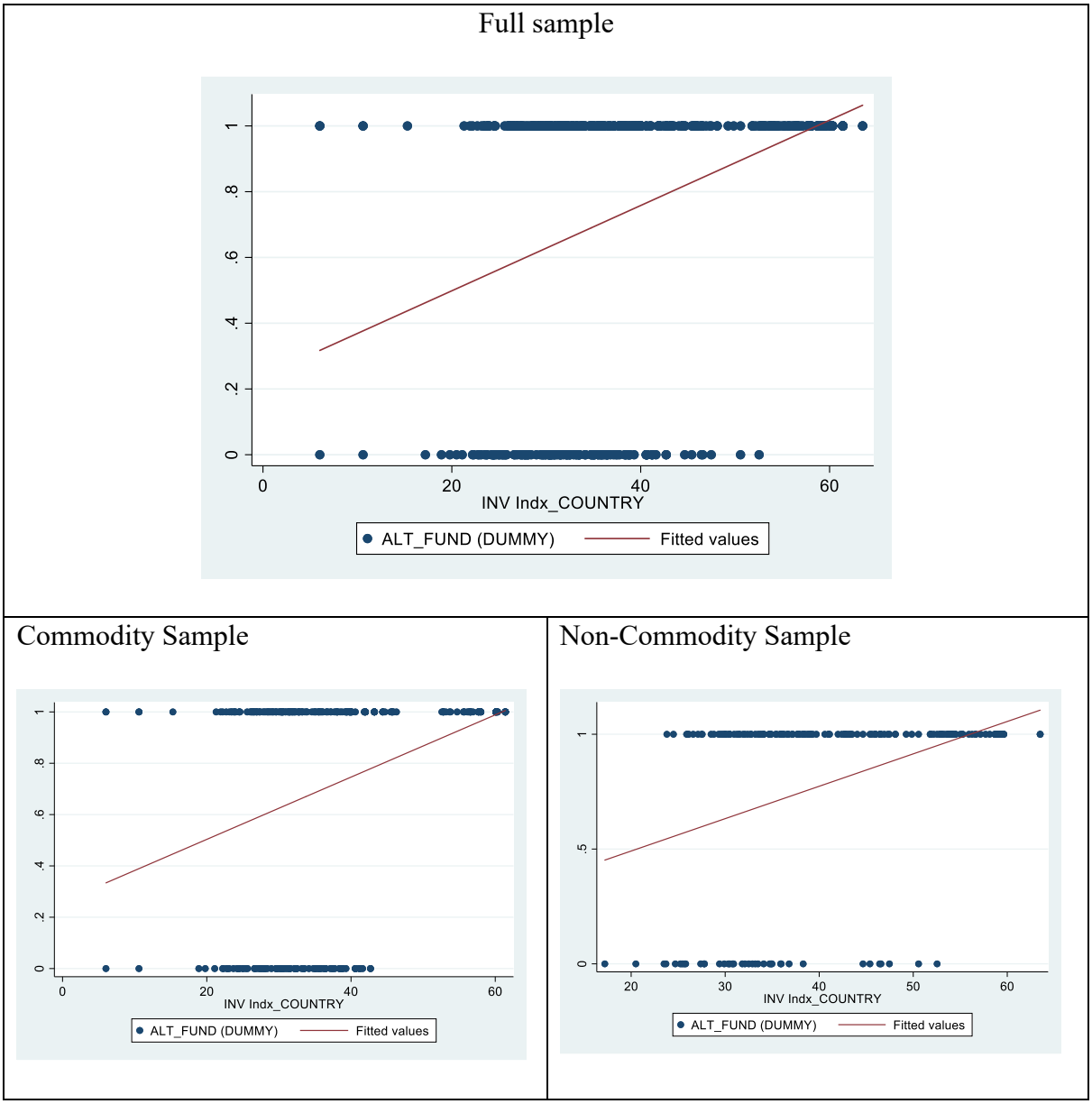


FIGURE 17: SCATTER PLOT BETWEEN ALTERNATIVE ASSETS DUMMY AND INNOVATION INDEX

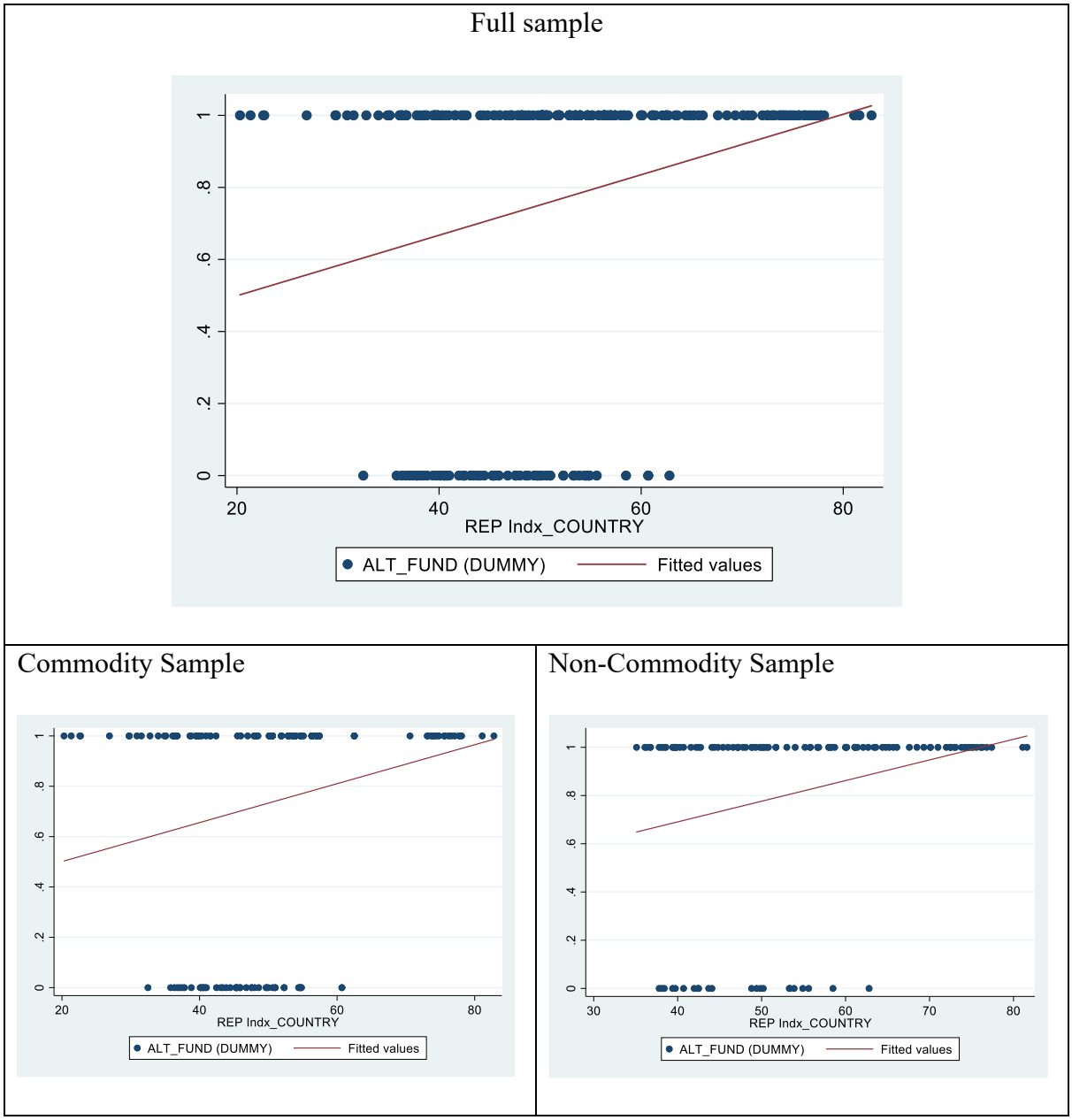


FIGURE 18: SCATTER PLOT BETWEEN ALTERNATIVE ASSETS DUMMY AND REPUTATION INDEX

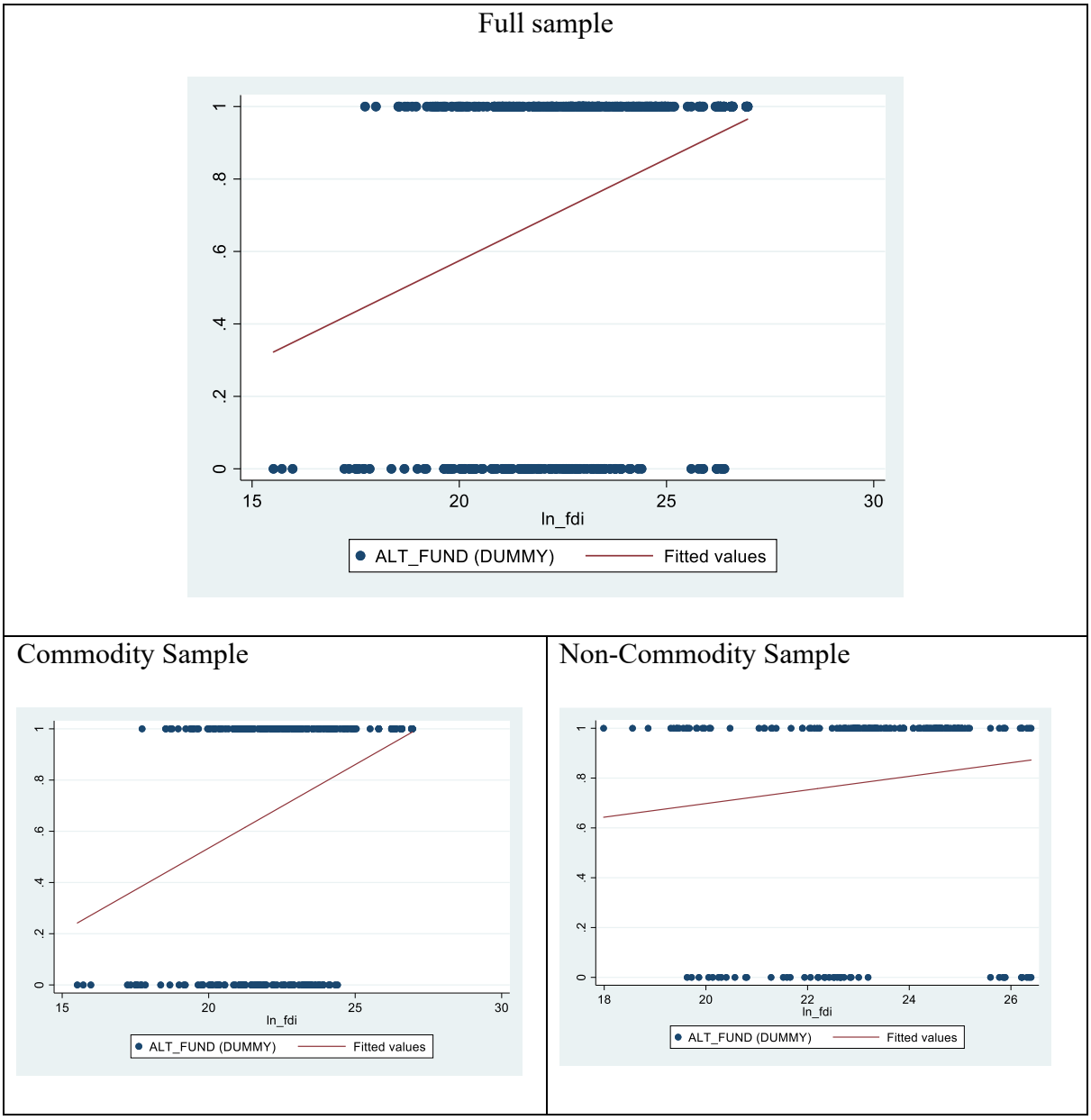
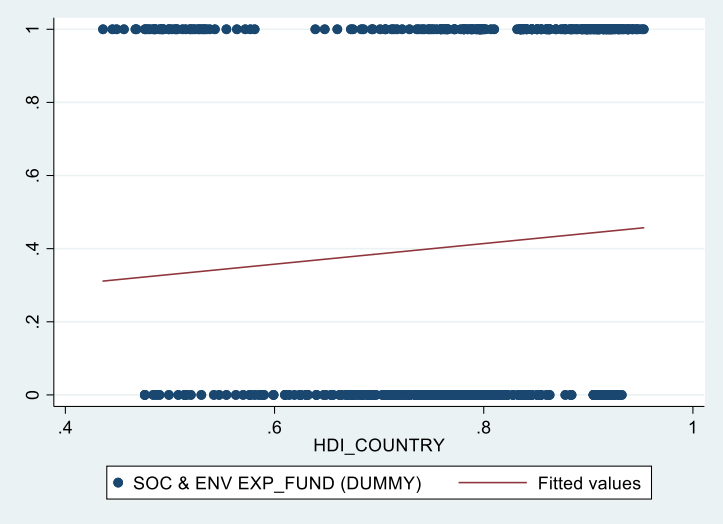
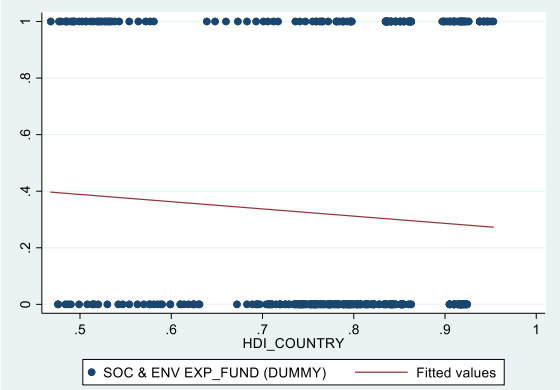


FIGURE 19: SCATTER PLOT BETWEEN ALTERNATIVE ASSETS DUMMY AND LN(FDI)

Full sample



Commodity Sample



Non-Commodity Sample

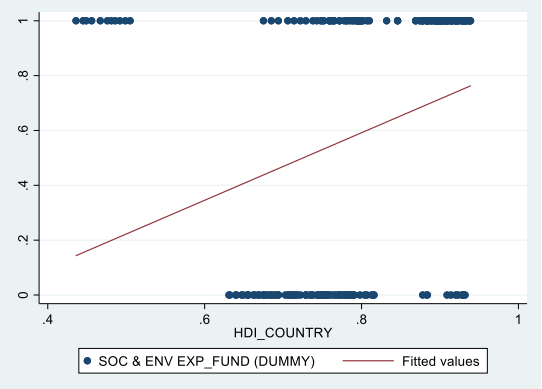
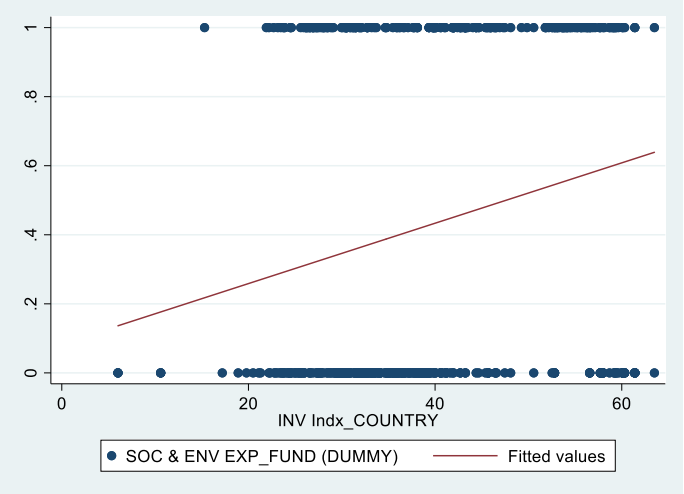
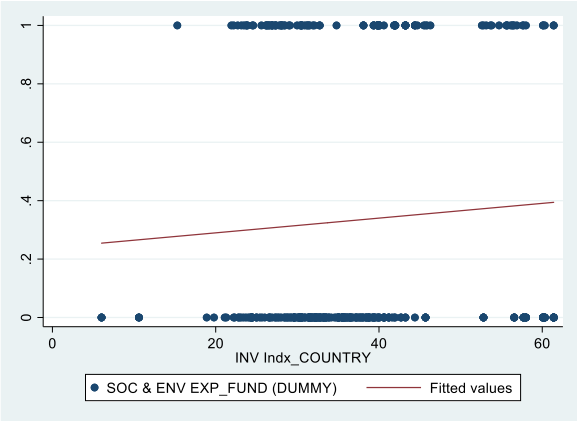


FIGURE 20: SCATTER PLOT BETWEEN SOCIAL AND ENVIRONMENTAL EXPENDITURE DUMMY AND HDI

Full sample



Commodity Sample



Non-Commodity Sample

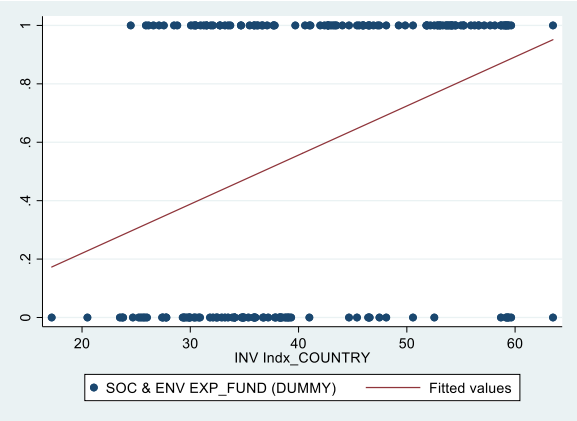


FIGURE 21: SCATTER PLOT BETWEEN SOCIAL AND ENVIRONMENTAL EXPENDITURE DUMMY AND INNOVATION INDEX

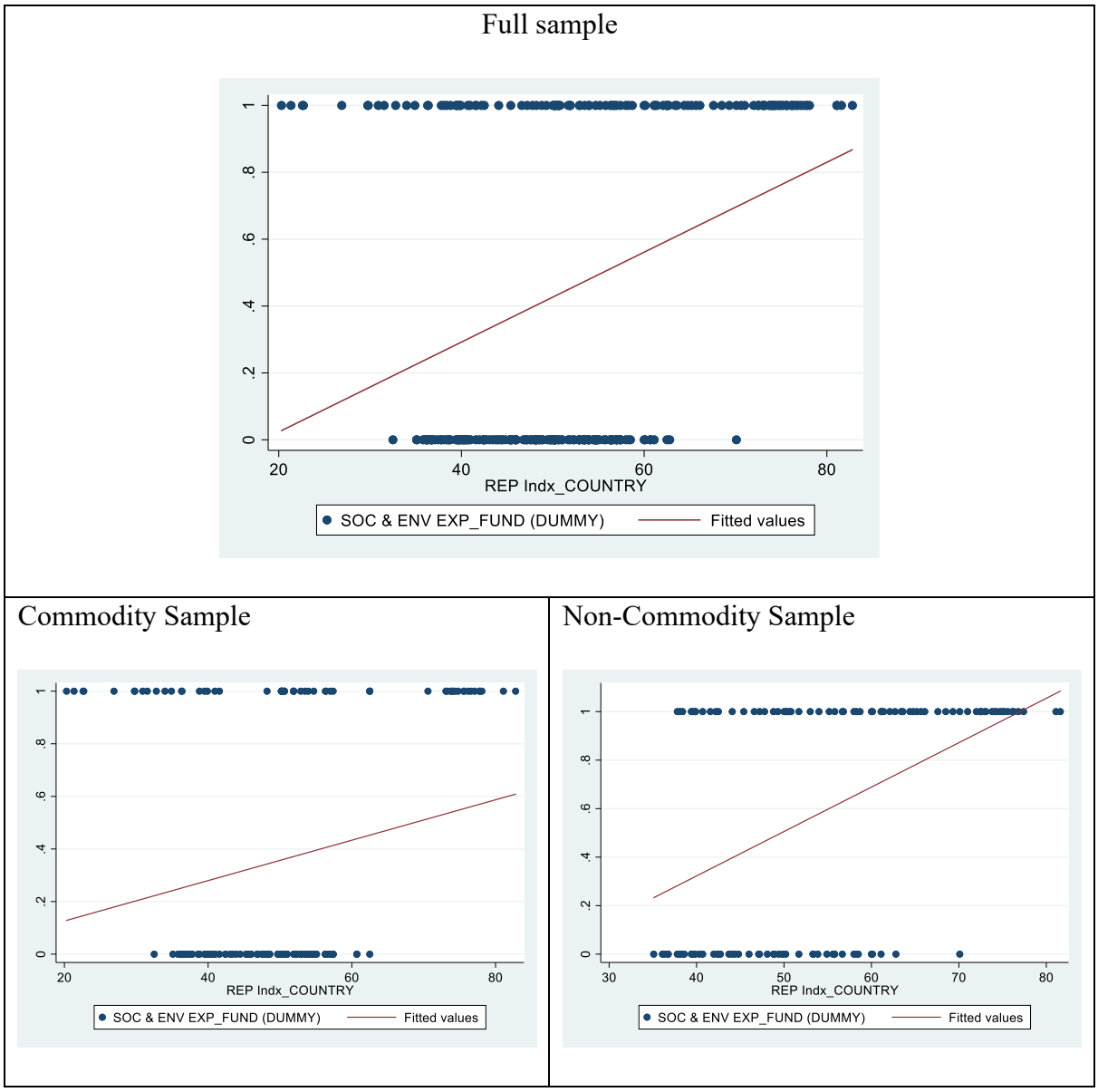


FIGURE 22: SCATTER PLOT BETWEEN SOCIAL AND ENVIRONMENTAL EXPENDITURE DUMMY AND REPUTATION INDEX

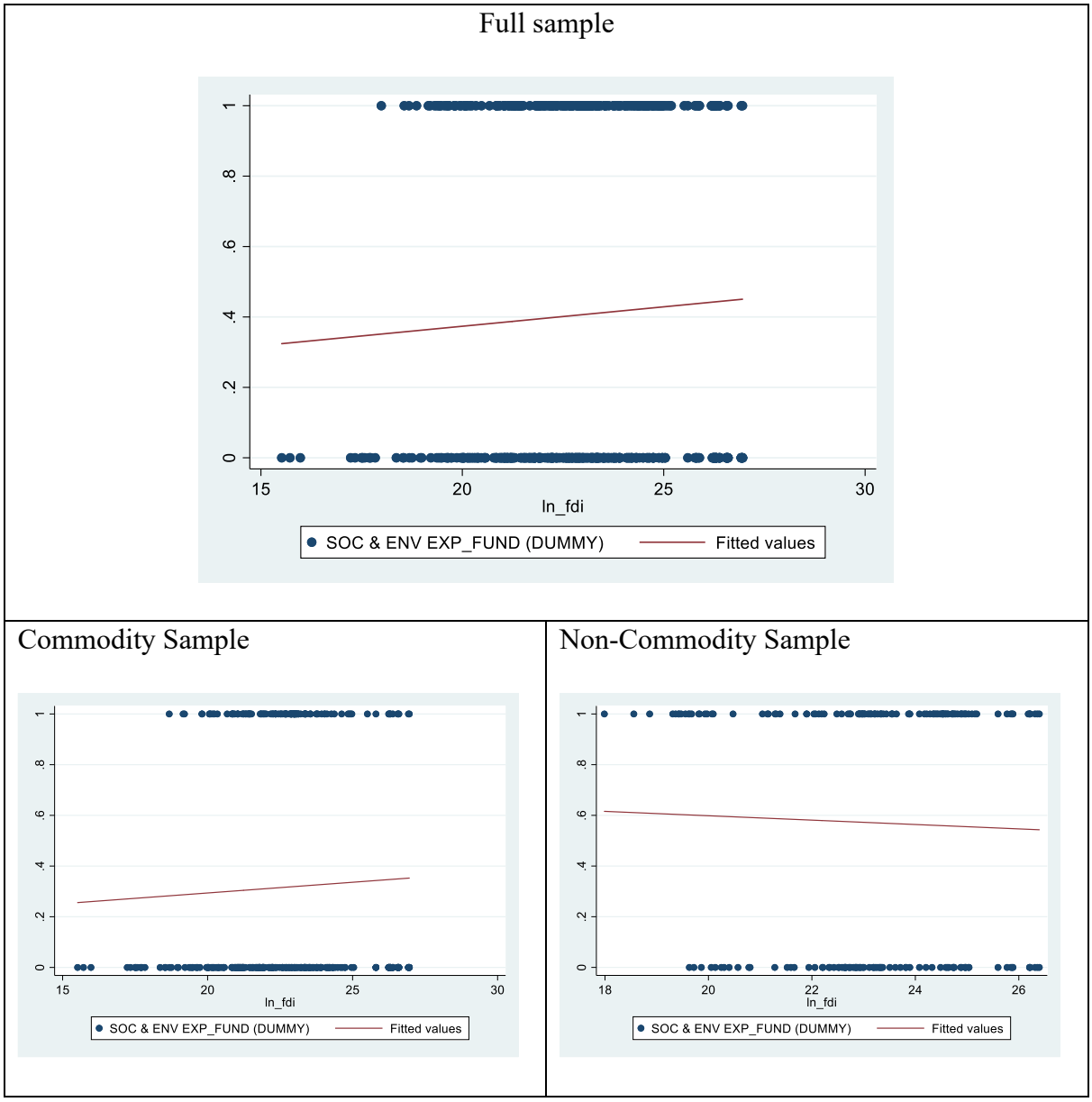


FIGURE 23: SCATTER PLOT BETWEEN SOCIAL AND ENVIRONMENTAL EXPENDITURE DUMMY AND LN(FDI)

Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) External Fund Managers	1.000						
(2) Alternative Asset Classes	0.432*	1.000					
(3) Social and Envir Expendit	0.329*	0.330*	1.000				
(4) Human Development Index	0.319*	0.208*	-0.067	1.000			
(5) Innovation Index	0.322*	0.316*	0.063	0.774*	1.000		
(6) Reputation Index	0.300*	0.215*	0.196*	0.665*	0.670*	1.000	
(7) Ln(FDI)	0.278*	0.322*	0.041	0.602*	0.762*	0.341*	1.000

* shows significance at the 0.05 level

TABLE 28: PAIRWISE CORRELATIONS FOR THE LOGISTIC REGRESSION SAMPLE

Two-sample t-test with equal variances

	External Fund Manager Dummy=0	External Fund Manager Dummy=1	Mean1	Mean2	dif	St_Err	t_value	p_value
Human Development Index	107	150	.802	.856	-.053	.011	-4.9	0

TABLE 29: T-TEST FOR THE LOGISTIC REGRESSION SAMPLE

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	1.612	0.242	3.18	0.001	1.201	2.163	***

Mean dependent var	0.584	SD dependent var	0.494
Number of obs	257.000	Chi-square	10.111
Prob > chi2	0.001	Akaike crit. (AIC)	348.200

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.012	0.003	4.52	0.000	1.007	1.018	***

Mean dependent var	0.584	SD dependent var	0.494
Number of obs	257.000	Chi-square	20.418
Prob > chi2	0.000	Akaike crit. (AIC)	339.061

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.009	0.002	3.75	0.000	1.004	1.013	***

Mean dependent var	0.584	SD dependent var	0.494
Number of obs	257.000	Chi-square	14.071
Prob > chi2	0.000	Akaike crit. (AIC)	344.717

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	1.016	0.005	3.00	0.003	1.005	1.026	***

Mean dependent var	0.584	SD dependent var	0.494
Number of obs	257.000	Chi-square	9.000
Prob > chi2	0.003	Akaike crit. (AIC)	349.220

*** p<0.01, ** p<0.05, * p<0.1

TABLE 30: SIMPLE LOGISTIC REGRESSIONS FOR EXTERNAL FUND MANAGER DUMMY (FULL SAMPLE OF 56 SWFS)

Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)
(1) Strategic Resource Index	1.000				
(2) Human Development Index	0.693*	1.000			
(3) Innovation Index	0.680*	0.791*	1.000		
(4) Reputation Index	0.448*	0.679*	0.647*	1.000	
(5) Ln (FDI)	0.521*	0.397*	0.677*	0.175*	1.000

* shows significance at the 0.05 level

Pairwise correlations

Variables	(1)	(2)	(3)	(4)
(1) External Fund Manager	1.000			
(2) Alternative Asset Classes	0.196*	1.000		
(3) Social and Eviron. Expend	0.385*	0.495*	1.000	
(4) Strategic Resource Index	0.356*	0.251*	0.071	1.000

* shows significance at the 0.05 level

TABLE 31: PAIRWISE CORRELATIONS FOR STRATEGIC RESOURCE INDEX (FULL SAMPLE OF 56 SWFS)

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Reource Index	1.581	0.226	3.20	0.001	1.194	2.093	***
Mean dependent var		0.584	SD dependent var			0.494	
Number of obs		255.000	Chi-square			10.229	
Prob > chi2		0.001	Akaike crit. (AIC)			345.277	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 32: SIMPLE LOGISTIC REGRESSION WITH THE STRATEGIC RESOURCE INDEX FOR EXTERNAL FUND MANAGER DUMMY (FULL SAMPLE OF 56 SWFS)

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	4.164	1.731	3.43	0.001	1.844	9.405	***
2007b.year	1.000	.	.	.	.	.	
2008.year	0.315	0.129	-2.82	0.005	0.141	0.703	***
2009.year	0.313	0.129	-2.82	0.005	0.140	0.701	***
2010.year	0.311	0.128	-2.83	0.005	0.138	0.699	***
2011.year	0.309	0.128	-2.83	0.005	0.137	0.696	***
2012.year	0.306	0.128	-2.84	0.004	0.135	0.693	***
2013.year	0.304	0.127	-2.85	0.004	0.134	0.691	***
2014.year	0.303	0.127	-2.85	0.004	0.133	0.688	***
2015.year	0.301	0.127	-2.85	0.004	0.132	0.686	***
2016.year	0.300	0.126	-2.86	0.004	0.131	0.685	***
2017.year	0.299	0.126	-2.86	0.004	0.131	0.684	***
Mean dependent var		0.482	SD dependent var			0.500	
Number of obs		616.000	Chi-square			12.516	
Prob > chi2		0.326	Akaike crit. (AIC)			856.987	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.062	0.010	6.17	0.000	1.042	1.083	***
2007b.year	1.000	.	.	.	.	.	
2008.year	0.104	0.046	-5.15	0.000	0.044	0.246	***
2009.year	0.107	0.046	-5.25	0.000	0.047	0.247	***
2011.year	0.084	0.040	-5.19	0.000	0.033	0.215	***
2012.year	0.082	0.040	-5.09	0.000	0.031	0.214	***
2013.year	0.082	0.040	-5.09	0.000	0.031	0.215	***
2014.year	0.081	0.040	-5.07	0.000	0.031	0.215	***
2015.year	0.084	0.042	-4.97	0.000	0.032	0.223	***
2016.year	0.085	0.042	-5.02	0.000	0.032	0.222	***
2017.year	0.082	0.041	-5.01	0.000	0.031	0.218	***
Mean dependent var		0.488	SD dependent var			0.500	
Number of obs		514.000	Chi-square			38.647	

Prob > chi2	0.000	Akaike crit. (AIC)	656.802

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.041	0.010	4.25	0.000	1.022	1.060	***
2009b.year	1.000	.	.	.	.	.	
2010.year	0.244	0.157	-2.19	0.028	0.069	0.862	**
2011.year	0.207	0.127	-2.58	0.010	0.062	0.686	**
2012.year	0.197	0.118	-2.72	0.006	0.061	0.634	***
2013.year	0.197	0.123	-2.61	0.009	0.058	0.668	***
2014.year	0.187	0.111	-2.83	0.005	0.058	0.598	***
2015.year	0.166	0.099	-3.01	0.003	0.051	0.535	***
2016.year	0.155	0.091	-3.17	0.002	0.049	0.492	***
2017.year	0.135	0.086	-3.13	0.002	0.038	0.473	***

Mean dependent var	0.593	SD dependent var	0.492
Number of obs	290.000	Chi-square	28.721
Prob > chi2	0.001	Akaike crit. (AIC)	384.040

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	1.024	0.013	1.95	0.052	1.000	1.050	*
2007b.year	1.000	.	.	.	.	.	
2008.year	0.516	0.201	-1.70	0.090	0.240	1.109	*
2009.year	0.560	0.218	-1.49	0.137	0.261	1.202	
2010.year	0.518	0.201	-1.69	0.090	0.242	1.109	*
2011.year	0.495	0.194	-1.79	0.073	0.230	1.068	*
2012.year	0.532	0.209	-1.60	0.109	0.246	1.150	
2013.year	0.491	0.195	-1.79	0.073	0.225	1.070	*
2014.year	0.539	0.208	-1.60	0.110	0.252	1.149	
2015.year	0.534	0.210	-1.59	0.112	0.247	1.156	
2016.year	0.511	0.203	-1.69	0.091	0.235	1.113	*
2017.year	0.514	0.203	-1.68	0.093	0.236	1.116	*

Mean dependent var	0.474	SD dependent var	0.500
Number of obs	588.000	Chi-square	5.373
Prob > chi2	0.912	Akaike crit. (AIC)	831.200

*** p<0.01, ** p<0.05, * p<0.1

TABLE 33: SIMPLE LOGISTIC REGRESSIONS FOR EXTERNAL FUND MANAGER DUMMY WITH TIME FIXED EFFECTS (FULL SAMPLE OF 56 SWFS)

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resorce Index	7.706	6.392	2.46	0.014	1.516	39.159	**
2009b.year	1.000	.	.	.	.	.	
2011.year	0.254	0.207	-1.68	0.092	0.052	1.252	*
2012.year	0.241	0.194	-1.77	0.077	0.050	1.165	*
2013.year	0.223	0.183	-1.83	0.068	0.045	1.115	*
2014.year	0.221	0.179	-1.87	0.062	0.045	1.076	*
2015.year	0.220	0.178	-1.87	0.061	0.045	1.074	*
2016.year	0.196	0.156	-2.04	0.041	0.041	0.939	**
2017.year	0.218	0.177	-1.88	0.061	0.044	1.072	*

Mean dependent var	0.584	SD dependent var	0.494
Number of obs	255.000	Chi-square	11.813
Prob > chi2	0.160	Akaike crit. (AIC)	350.501

*** p<0.01, ** p<0.05, * p<0.1

TABLE 34: SIMPLE LOGISTIC REGRESSION WITH THE STRATEGIC RESOURCE INDEX FOR EXTERNAL FUND MANAGER DUMMY AND WITH TIME FIXED EFFECTS (FULL SAMPLE OF 56 SWFS)

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	1.724	0.340	2.76	0.006	1.171	2.538	***

Mean dependent var	0.603	SD dependent var	0.491
Number of obs	151.000	Chi-square	7.619
Prob > chi2	0.006	Akaike crit. (AIC)	203.637

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.013	0.004	3.54	0.000	1.006	1.021	***

Mean dependent var	0.603	SD dependent var	0.491
Number of obs	151.000	Chi-square	12.541
Prob > chi2	0.000	Akaike crit. (AIC)	199.160

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.011	0.003	3.36	0.001	1.004	1.017	***

Mean dependent var	0.603	SD dependent var	0.491
Number of obs	151.000	Chi-square	11.282
Prob > chi2	0.001	Akaike crit. (AIC)	200.492

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	1.019	0.007	2.67	0.008	1.005	1.033	***
Mean dependent var		0.603	SD dependent var			0.491	
Number of obs		151.000	Chi-square			7.114	
Prob > chi2		0.008	Akaike crit. (AIC)			204.079	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 35: SIMPLE LOGISTIC REGRESSIONS FOR EXTERNAL FUND MANAGER DUMMY (COMMODITY SAMPLE)

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	5.300	4.499	1.96	0.049	1.004	27.982	**
2009b.year	1.000	.	.	.	.	.	
2011.year	0.423	0.372	-0.98	0.328	0.076	2.366	
2012.year	0.375	0.318	-1.16	0.248	0.071	1.977	
2013.year	0.380	0.336	-1.09	0.274	0.067	2.149	
2014.year	0.388	0.323	-1.14	0.256	0.076	1.984	
2015.year	0.357	0.300	-1.23	0.220	0.069	1.853	
2016.year	0.300	0.249	-1.45	0.148	0.059	1.531	
2017.year	0.356	0.299	-1.23	0.219	0.068	1.851	
Mean dependent var		0.603	SD dependent var			0.491	
Number of obs		151.000	Chi-square			9.388	
Prob > chi2		0.311	Akaike crit. (AIC)			214.835	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.048	0.014	3.47	0.001	1.021	1.076	***
2009b.year	1.000	.	.	.	.	.	
2011.year	0.232	0.179	-1.90	0.058	0.051	1.050	*
2012.year	0.192	0.147	-2.16	0.031	0.043	0.858	**
2013.year	0.190	0.155	-2.03	0.042	0.038	0.944	**
2014.year	0.210	0.153	-2.14	0.033	0.050	0.879	**
2015.year	0.199	0.146	-2.20	0.028	0.047	0.836	**
2016.year	0.179	0.126	-2.44	0.015	0.045	0.711	**
2017.year	0.197	0.144	-2.22	0.026	0.047	0.827	**
Mean dependent var		0.603	SD dependent var			0.491	
Number of obs		151.000	Chi-square			17.647	
Prob > chi2		0.024	Akaike crit. (AIC)			203.537	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.041	0.014	3.13	0.002	1.015	1.068	***
2009b.year	1.000	.	.	.	.	.	
2011.year	0.243	0.203	-1.69	0.091	0.047	1.253	*
2012.year	0.213	0.171	-1.93	0.054	0.044	1.029	*
2013.year	0.213	0.181	-1.82	0.069	0.040	1.127	*
2014.year	0.214	0.168	-1.97	0.049	0.046	0.995	**
2015.year	0.186	0.149	-2.09	0.036	0.038	0.898	**
2016.year	0.165	0.129	-2.31	0.021	0.036	0.760	**
2017.year	0.157	0.133	-2.18	0.029	0.030	0.828	**
Mean dependent var		0.603	SD dependent var			0.491	
Number of obs		151.000	Chi-square			17.054	
Prob > chi2		0.030	Akaike crit. (AIC)			206.225	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	1.056	0.034	1.72	0.085	0.992	1.125	*
2009b.year	1.000	.	.	.	.	.	
2011.year	0.437	0.409	-0.88	0.377	0.070	2.736	
2012.year	0.399	0.358	-1.02	0.306	0.069	2.315	
2013.year	0.393	0.370	-0.99	0.321	0.062	2.489	
2014.year	0.426	0.370	-0.98	0.326	0.078	2.334	
2015.year	0.390	0.343	-1.07	0.284	0.070	2.182	
2016.year	0.323	0.283	-1.29	0.197	0.058	1.797	
2017.year	0.398	0.345	-1.06	0.288	0.073	2.180	
Mean dependent var		0.603	SD dependent var			0.491	
Number of obs		151.000	Chi-square			8.144	
Prob > chi2		0.420	Akaike crit. (AIC)			215.825	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 36: SIMPLE LOGISTIC REGRESSIONS FOR EXTERNAL FUND MANAGER DUMMY WITH TIME FIXED EFFECTS (COMMODITY SAMPLE

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resource Index	1.678	0.323	2.69	0.007	1.151	2.446	***
Mean dependent var		0.600	SD dependent var			0.492	
Number of obs		150.000	Chi-square			7.242	
Prob > chi2		0.007	Akaike crit. (AIC)			202.626	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resource Index	5.895	5.523	1.89	0.058	0.940	36.979	*
2009b.year	1.000	.	.	.	.	.	

2011.year	0.369	0.353	-1.04	0.297	0.056	2.407
2012.year	0.329	0.305	-1.20	0.231	0.053	2.029
2013.year	0.330	0.318	-1.15	0.250	0.050	2.183
2014.year	0.315	0.289	-1.26	0.209	0.052	1.908
2015.year	0.313	0.289	-1.26	0.208	0.051	1.907
2016.year	0.261	0.239	-1.47	0.143	0.043	1.574
2017.year	0.310	0.287	-1.26	0.206	0.050	1.906

Mean dependent var	0.600	SD dependent var	0.492
Number of obs	150.000	Chi-square	8.727
Prob > chi2	0.366	Akaike crit. (AIC)	213.415

*** p<0.01, ** p<0.05, * p<0.1

TABLE 37: SIMPLE LOGISTIC REGRESSION WITH THE STRATEGIC RESOURCE INDEX FOR EXTERNAL FUND MANAGER DUMMY (COMMODITY SAMPLE)

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	1.465	0.342	1.64	0.102	0.928	2.314	

Mean dependent var	0.557	SD dependent var	0.499
Number of obs	106.000	Chi-square	2.682
Prob > chi2	0.102	Akaike crit. (AIC)	146.285

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.011	0.004	2.79	0.005	1.003	1.019	***

Mean dependent var	0.557	SD dependent var	0.499
Number of obs	106.000	Chi-square	7.794
Prob > chi2	0.005	Akaike crit. (AIC)	141.789

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.007	0.003	1.88	0.060	1.000	1.013	*

Mean dependent var	0.557	SD dependent var	0.499
Number of obs	106.000	Chi-square	3.537
Prob > chi2	0.060	Akaike crit. (AIC)	145.507

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig

Ln (FDI)	1.012	0.008	1.47	0.141	0.996	1.028	
Mean dependent var		0.557	SD dependent var			0.499	
Number of obs		106.000	Chi-square			2.167	
Prob > chi2		0.141	Akaike crit. (AIC)			146.774	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 38: SIMPLE LOGISTIC REGRESSIONS FOR EXTERNAL FUND MANAGER DUMMY (NON-COMMODITY SAMPLE)

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	348000	967000	4.59	0.000	1491.994	81000000	***
2009b.year	1.000	.	.	.	.	.	
2011.year	0.514	0.575	-0.59	0.552	0.057	4.601	
2012.year	0.481	0.537	-0.66	0.512	0.054	4.286	
2013.year	0.412	0.466	-0.78	0.433	0.045	3.783	
2014.year	0.336	0.378	-0.97	0.332	0.037	3.046	
2015.year	0.325	0.365	-1.00	0.317	0.036	2.938	
2016.year	0.289	0.310	-1.16	0.248	0.035	2.369	
2017.year	0.309	0.345	-1.05	0.293	0.034	2.764	
Constant	0.000	0.000	-3.90	0.000	0.000	0.009	***
Mean dependent var		0.557	SD dependent var			0.499	
Pseudo r-squared		0.176	Number of obs			106.000	
Chi-square		21.365	Prob > chi2			0.006	
Akaike crit. (AIC)		137.925	Bayesian crit. (BIC)			161.896	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.152	0.058	2.80	0.005	1.043	1.272	***
2009b.year	1.000	.	.	.	.	.	
2011.year	0.002	0.005	-2.60	0.009	0.000	0.220	***
2012.year	0.002	0.004	-2.62	0.009	0.000	0.200	***
2013.year	0.002	0.004	-2.67	0.008	0.000	0.179	***
2014.year	0.001	0.003	-2.67	0.007	0.000	0.172	***
2015.year	0.001	0.003	-2.67	0.008	0.000	0.170	***
2016.year	0.001	0.003	-2.71	0.007	0.000	0.159	***
2017.year	0.001	0.003	-2.67	0.008	0.000	0.171	***
Mean dependent var		0.557	SD dependent var			0.499	
Number of obs		106.000	Chi-square			8.815	
Prob > chi2		0.358	Akaike crit. (AIC)			115.451	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.039	0.016	2.49	0.013	1.008	1.070	**
2009b.year	1.000	.	.	.	.	.	
2011.year	0.179	0.175	-1.76	0.079	0.026	1.219	*

2012.year	0.180	0.176	-1.75	0.080	0.026	1.225	*
2013.year	0.162	0.160	-1.84	0.065	0.023	1.124	*
2014.year	0.148	0.150	-1.89	0.059	0.020	1.077	*
2015.year	0.149	0.150	-1.90	0.058	0.021	1.066	*
2016.year	0.119	0.119	-2.14	0.033	0.017	0.839	**
2017.year	0.116	0.126	-1.98	0.048	0.014	0.980	**
Mean dependent var		0.557	SD dependent var			0.499	
Number of obs		106.000	Chi-square			7.350	
Prob > chi2		0.499	Akaike crit. (AIC)			151.258	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	1.072	0.047	1.57	0.117	0.983	1.168	
2009b.year	1.000	.	.	.	.	.	
2011.year	0.256	0.303	-1.15	0.250	0.025	2.605	
2012.year	0.255	0.302	-1.15	0.249	0.025	2.603	
2013.year	0.218	0.262	-1.27	0.205	0.021	2.300	
2014.year	0.222	0.265	-1.26	0.207	0.021	2.300	
2015.year	0.219	0.263	-1.26	0.206	0.021	2.304	
2016.year	0.194	0.224	-1.42	0.156	0.020	1.868	
2017.year	0.223	0.266	-1.26	0.208	0.022	2.305	
Mean dependent var		0.557	SD dependent var			0.499	
Number of obs		106.000	Chi-square			3.414	
Prob > chi2		0.906	Akaike crit. (AIC)			156.701	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 39: SIMPLE LOGISTIC REGRESSIONS FOR EXTERNAL FUND MANAGER DUMMY WITH TIME FIXED EFFECTS (NON-COMMODITY SAMPLE)

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resource Index	1.465	0.316	1.77	0.077	0.960	2.236	*
Mean dependent var		0.562	SD dependent var			0.499	
Number of obs		105.000	Chi-square			3.136	
Prob > chi2		0.077	Akaike crit. (AIC)			144.435	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

External Fund Manager	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resource Index	13.735	25.740	1.40	0.162	0.349	540.799	
2009b.year	1.000	.	.	.	.	.	
2011.year	0.129	0.226	-1.17	0.241	0.004	3.957	
2012.year	0.128	0.224	-1.17	0.241	0.004	3.975	
2013.year	0.110	0.195	-1.25	0.212	0.003	3.507	
2014.year	0.106	0.191	-1.25	0.211	0.003	3.567	
2015.year	0.105	0.189	-1.25	0.211	0.003	3.579	
2016.year	0.106	0.187	-1.27	0.204	0.003	3.388	
2017.year	0.104	0.188	-1.25	0.211	0.003	3.590	

Mean dependent var	0.562	SD dependent var	0.499
Number of obs	105.000	Chi-square	2.958
Prob > chi2	0.937	Akaike crit. (AIC)	151.558

*** p<0.01, ** p<0.05, * p<0.1

TABLE 40: SIMPLE LOGISTIC REGRESSION WITH THE STRATEGIC RESOURCE INDEX FOR EXTERNAL FUND MANAGER DUMMY (NON-COMMODITY SAMPLE)

		Human Development Index	Innovation Index	Reputation Index	Ln (HDI)	Strategic Resources Index
Logistic Regressions without Time Fixed Effects	Full Sample	1.612	1.012	1.009	1.016	1.581
	Commodity Sample	1.724	1.013	1.011	1.019	1.678
	Non-Commodity Sample	Insig.	1.011	1.007	Insig.	1.465
Logistic Regressions with Time Fixed Effects	Full Sample	4.164	1.062	1.041	1.024	7.706
	Commodity Sample	5.3	1.048	1.041	1.056	5.895
	Non-Commodity Sample	Multicol.	1.152	1.039	Insig.	Insig.

TABLE 41: ODDS RATIOS FOR THE DEPENDENT VARIABLE OF EXTERNAL FUND MANAGERS

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	0.824	0.124	-1.28	0.199	0.614	1.107	
Mean dependent var		0.451	SD dependent var			0.499	
Number of obs		257.000	Chi-square			1.652	
Prob > chi2		0.199	Akaike crit. (AIC)			356.602	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	0.998	0.003	-0.70	0.485	0.993	1.003	
Mean dependent var		0.451	SD dependent var			0.499	
Number of obs		257.000	Chi-square			0.487	

Prob > chi2	0.485	Akaike crit. (AIC)		357.784

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	0.999	0.002	-0.35	0.725	0.995	1.004	

Mean dependent var	0.451	SD dependent var	0.499
Number of obs	257.000	Chi-square	0.124
Prob > chi2	0.725	Akaike crit. (AIC)	358.152

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	0.991	0.005	-1.67	0.095	0.981	1.002	*

Mean dependent var	0.451	SD dependent var	0.499
Number of obs	257.000	Chi-square	2.789
Prob > chi2	0.095	Akaike crit. (AIC)	355.471

*** p<0.01, ** p<0.05, * p<0.1

TABLE 42: SIMPLE LOGISTIC REGRESSIONS FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES (FULL SAMPLE)

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	1.108	0.544	0.21	0.835	0.423	2.903	
2009b.year	1.000	.	.	.	.	.	
2011.year	0.703	0.383	-0.65	0.518	0.241	2.047	
2012.year	0.817	0.435	-0.38	0.703	0.288	2.318	
2013.year	0.595	0.332	-0.93	0.353	0.199	1.779	
2014.year	0.821	0.435	-0.37	0.710	0.291	2.318	
2015.year	0.867	0.463	-0.27	0.788	0.304	2.467	
2016.year	0.743	0.389	-0.57	0.570	0.267	2.071	
2017.year	0.772	0.413	-0.48	0.629	0.271	2.205	

Mean dependent var	0.451	SD dependent var	0.499
Number of obs	257.000	Chi-square	2.770
Prob > chi2	0.948	Akaike crit. (AIC)	369.466

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.015	0.009	1.75	0.081	0.998	1.032	*
2009b.year	1.000	.	.	.	.	.	

2011.year	0.395	0.205	-1.79	0.074	0.143	1.095	*
2012.year	0.450	0.232	-1.55	0.122	0.164	1.237	
2013.year	0.326	0.179	-2.05	0.041	0.112	0.953	**
2014.year	0.459	0.233	-1.53	0.125	0.170	1.242	
2015.year	0.485	0.248	-1.41	0.158	0.178	1.323	
2016.year	0.425	0.208	-1.75	0.081	0.163	1.111	*
2017.year	0.432	0.220	-1.65	0.099	0.159	1.172	*

Mean dependent var	0.451	SD dependent var	0.499
Number of obs	257.000	Chi-square	5.923
Prob > chi2	0.656	Akaike crit. (AIC)	366.046

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.020	0.008	2.50	0.012	1.004	1.036	**
2009b.year	1.000	.	.	.	.	.	
2011.year	0.277	0.153	-2.33	0.020	0.094	0.816	**
2012.year	0.323	0.173	-2.11	0.035	0.114	0.922	**
2013.year	0.235	0.133	-2.55	0.011	0.077	0.715	**
2014.year	0.321	0.171	-2.13	0.033	0.113	0.914	**
2015.year	0.332	0.180	-2.03	0.043	0.114	0.963	**
2016.year	0.286	0.152	-2.35	0.019	0.100	0.813	**
2017.year	0.267	0.153	-2.31	0.021	0.087	0.819	**

Mean dependent var	0.451	SD dependent var	0.499
Number of obs	257.000	Chi-square	8.535
Prob > chi2	0.383	Akaike crit. (AIC)	361.414

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	0.982	0.018	-1.00	0.319	0.948	1.018	
2009b.year	1.000	.	.	.	.	.	
2011.year	1.182	0.677	0.29	0.770	0.385	3.632	
2012.year	1.372	0.762	0.57	0.569	0.462	4.075	
2013.year	1.004	0.589	0.01	0.995	0.318	3.173	
2014.year	1.373	0.748	0.58	0.560	0.472	3.996	
2015.year	1.456	0.802	0.68	0.495	0.495	4.283	
2016.year	1.245	0.674	0.40	0.686	0.430	3.598	
2017.year	1.291	0.707	0.47	0.641	0.442	3.774	

Mean dependent var	0.451	SD dependent var	0.499
Number of obs	257.000	Chi-square	3.726
Prob > chi2	0.881	Akaike crit. (AIC)	368.468

*** p<0.01, ** p<0.05, * p<0.1

TABLE 43: SIMPLE LOGISTIC REGRESSIONS FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES (FULL SAMPLE)

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resource Index	0.828	0.118	-1.33	0.185	0.626	1.095	
Mean dependent var		0.455	SD dependent var			0.499	
Number of obs		255.000	Chi-square			1.761	
Prob > chi2		0.185	Akaike crit. (AIC)			353.726	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resource Index	0.871	0.408	-0.29	0.769	0.348	2.182	
2009b.year	1.000	.	.	.	.	.	
2011.year	0.862	0.473	-0.27	0.787	0.294	2.528	
2012.year	1.002	0.535	0.00	0.997	0.352	2.856	
2013.year	0.730	0.411	-0.56	0.576	0.242	2.202	
2014.year	1.066	0.569	0.12	0.905	0.375	3.034	
2015.year	1.067	0.571	0.12	0.904	0.374	3.044	
2016.year	0.959	0.506	-0.08	0.937	0.341	2.699	
2017.year	0.952	0.511	-0.09	0.926	0.332	2.727	
Mean dependent var		0.455	SD dependent var			0.499	
Number of obs		255.000	Chi-square			2.538	
Prob > chi2		0.960	Akaike crit. (AIC)			366.912	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 44: SIMPLE LOGISTIC REGRESSION WITH THE STRATEGIC RESOURCE INDEX FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES (FULL SAMPLE)

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	0.492	0.101	-3.47	0.001	0.330	0.734	***
Mean dependent var		0.358	SD dependent var			0.481	
Number of obs		151.000	Chi-square			12.050	
Prob > chi2		0.001	Akaike crit. (AIC)			198.523	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	0.987	0.004	-3.28	0.001	0.980	0.995	***
Mean dependent var		0.358	SD dependent var			0.481	
Number of obs		151.000	Chi-square			10.758	
Prob > chi2		0.001	Akaike crit. (AIC)			199.682	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	0.990	0.003	-2.76	0.006	0.984	0.997	***
Mean dependent var		0.358	SD dependent var			0.481	
Number of obs		151.000	Chi-square			7.606	
Prob > chi2		0.006	Akaike crit. (AIC)			202.499	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	0.975	0.007	-3.64	0.000	0.961	0.988	***
Mean dependent var		0.358	SD dependent var			0.481	
Number of obs		151.000	Chi-square			13.271	
Prob > chi2		0.000	Akaike crit. (AIC)			197.572	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 45: SIMPLE LOGISTIC REGRESSIONS FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES (COMMODITY SAMPLE)

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	0.313	0.243	-1.50	0.134	0.068	1.433	
2009b.year	1.000	.	.	.	.	.	
2011.year	1.180	0.980	0.20	0.842	0.232	6.011	
2012.year	1.751	1.379	0.71	0.477	0.374	8.201	
2013.year	0.944	0.817	-0.07	0.947	0.173	5.152	
2014.year	1.691	1.306	0.68	0.496	0.372	7.684	
2015.year	1.832	1.428	0.78	0.437	0.398	8.443	
2016.year	1.499	1.170	0.52	0.604	0.325	6.924	
2017.year	1.517	1.190	0.53	0.596	0.326	7.062	
Mean dependent var		0.358	SD dependent var			0.481	
Number of obs		151.000	Chi-square			12.987	
Prob > chi2		0.112	Akaike crit. (AIC)			210.835	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	0.989	0.011	-1.08	0.282	0.968	1.009	
2009b.year	1.000	.	.	.	.	.	
2011.year	0.741	0.517	-0.43	0.667	0.189	2.909	
2012.year	1.107	0.724	0.15	0.877	0.307	3.989	
2013.year	0.605	0.453	-0.67	0.502	0.140	2.626	
2014.year	1.055	0.662	0.09	0.932	0.309	3.606	
2015.year	1.130	0.711	0.19	0.846	0.329	3.880	
2016.year	0.912	0.567	-0.15	0.883	0.270	3.085	
2017.year	0.935	0.593	-0.11	0.915	0.270	3.238	
Mean dependent var		0.358	SD dependent var			0.481	

Number of obs	151.000	Chi-square	11.613
Prob > chi2	0.169	Akaike crit. (AIC)	212.484

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.001	0.010	0.13	0.897	0.981	1.022	
2009b.year	1.000	.	.	.	.	.	
2011.year	0.426	0.309	-1.18	0.240	0.103	1.767	
2012.year	0.625	0.420	-0.70	0.484	0.168	2.330	
2013.year	0.341	0.264	-1.39	0.164	0.075	1.554	
2014.year	0.602	0.397	-0.77	0.442	0.166	2.192	
2015.year	0.647	0.438	-0.64	0.520	0.172	2.438	
2016.year	0.536	0.359	-0.93	0.352	0.144	1.994	
2017.year	0.531	0.375	-0.90	0.371	0.133	2.121	

Mean dependent var	0.358	SD dependent var	0.481
Number of obs	151.000	Chi-square	10.884
Prob > chi2	0.208	Akaike crit. (AIC)	213.661

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	0.944	0.031	-1.74	0.082	0.885	1.007	*
2009b.year	1.000	.	.	.	.	.	
2011.year	1.849	1.801	0.63	0.528	0.274	12.476	
2012.year	2.674	2.465	1.07	0.286	0.439	16.282	
2013.year	1.481	1.481	0.39	0.694	0.209	10.508	
2014.year	2.501	2.233	1.03	0.304	0.435	14.389	
2015.year	2.733	2.467	1.11	0.265	0.466	16.029	
2016.year	2.260	2.055	0.90	0.370	0.381	13.428	
2017.year	2.210	1.984	0.88	0.377	0.381	12.840	

Mean dependent var	0.358	SD dependent var	0.481
Number of obs	151.000	Chi-square	14.268
Prob > chi2	0.075	Akaike crit. (AIC)	208.999

*** p<0.01, ** p<0.05, * p<0.1

TABLE 46: SIMPLE LOGISTIC REGRESSIONS FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES WITH TIME FIXED EFFECTS (COMMODITY SAMPLE)

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resource Index	0.511	0.101	-3.39	0.001	0.346	0.753	***

Mean dependent var	0.360	SD dependent var	0.482
Number of obs	150.000	Chi-square	11.489
Prob > chi2	0.001	Akaike crit. (AIC)	197.802

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resource Index	0.326	0.251	-1.46	0.145	0.072	1.471	
2009b.year	1.000	.	.	.	.	.	
2011.year	1.178	0.995	0.19	0.846	0.225	6.164	
2012.year	1.739	1.389	0.69	0.489	0.363	8.324	
2013.year	0.945	0.830	-0.07	0.949	0.169	5.283	
2014.year	1.813	1.430	0.75	0.451	0.386	8.508	
2015.year	1.819	1.439	0.76	0.449	0.386	8.575	
2016.year	1.495	1.188	0.51	0.613	0.315	7.096	
2017.year	1.511	1.207	0.52	0.605	0.316	7.232	
Mean dependent var		0.360	SD dependent var			0.482	
Number of obs		150.000	Chi-square			12.535	
Prob > chi2		0.129	Akaike crit. (AIC)			210.033	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 47: SIMPLE LOGISTIC REGRESSION WITH THE STRATEGIC RESOURCE INDEX FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES (COMMODITY SAMPLE)

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	1.700	0.399	2.26	0.024	1.073	2.694	**
Mean dependent var		0.585	SD dependent var			0.495	
Number of obs		106.000	Chi-square			5.104	
Prob > chi2		0.024	Akaike crit. (AIC)			143.872	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.012	0.004	2.79	0.005	1.003	1.020	***
Mean dependent var		0.585	SD dependent var			0.495	
Number of obs		106.000	Chi-square			7.757	
Prob > chi2		0.005	Akaike crit. (AIC)			141.357	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.010	0.003	2.83	0.005	1.003	1.017	***
Mean dependent var		0.585	SD dependent var			0.495	
Number of obs		106.000	Chi-square			7.992	
Prob > chi2		0.005	Akaike crit. (AIC)			141.398	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	1.015	0.008	1.77	0.077	0.998	1.031	*
Mean dependent var		0.585	SD dependent var			0.495	
Number of obs		106.000	Chi-square			3.127	
Prob > chi2		0.077	Akaike crit. (AIC)			145.746	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 48: SIMPLE LOGISTIC REGRESSIONS FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES (NON-COMMODITY SAMPLE)

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	6.517	7.832	1.56	0.119	0.618	68.708	
2009b.year	1.000	.	.	.	.	.	
2011.year	0.288	0.322	-1.11	0.266	0.032	2.578	
2012.year	0.285	0.321	-1.12	0.264	0.032	2.581	
2013.year	0.250	0.282	-1.23	0.219	0.027	2.281	
2014.year	0.333	0.386	-0.95	0.342	0.034	3.224	
2015.year	0.331	0.385	-0.95	0.341	0.034	3.225	
2016.year	0.269	0.302	-1.17	0.242	0.030	2.421	
2017.year	0.329	0.383	-0.95	0.340	0.034	3.227	
Mean dependent var		0.585	SD dependent var			0.495	
Number of obs		106.000	Chi-square			5.662	
Prob > chi2		0.685	Akaike crit. (AIC)			154.846	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	1.060	0.025	2.48	0.013	1.012	1.110	**
2009b.year	1.000	.	.	.	.	.	
2011.year	0.094	0.109	-2.04	0.041	0.010	0.912	**
2012.year	0.085	0.101	-2.07	0.039	0.008	0.878	**
2013.year	0.076	0.091	-2.15	0.032	0.007	0.797	**
2014.year	0.103	0.128	-1.83	0.067	0.009	1.169	*
2015.year	0.100	0.126	-1.83	0.067	0.009	1.175	*
2016.year	0.089	0.105	-2.05	0.040	0.009	0.897	**
2017.year	0.101	0.127	-1.83	0.067	0.009	1.176	*
Mean dependent var		0.585	SD dependent var			0.495	
Number of obs		106.000	Chi-square			8.716	
Prob > chi2		0.367	Akaike crit. (AIC)			144.917	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	1.045	0.018	2.50	0.012	1.010	1.081	**
2009b.year	1.000	.	.	.	.	.	
2011.year	0.133	0.142	-1.90	0.058	0.016	1.072	*
2012.year	0.134	0.142	-1.89	0.058	0.017	1.072	*
2013.year	0.120	0.129	-1.98	0.047	0.015	0.976	**
2014.year	0.153	0.169	-1.70	0.090	0.017	1.340	*
2015.year	0.154	0.169	-1.70	0.089	0.018	1.332	*
2016.year	0.113	0.125	-1.97	0.048	0.013	0.986	**
2017.year	0.115	0.137	-1.82	0.069	0.011	1.187	*
Mean dependent var		0.585	SD dependent var			0.495	
Number of obs		106.000	Chi-square			9.669	
Prob > chi2		0.289	Akaike crit. (AIC)			146.801	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	1.020	0.027	0.73	0.466	0.968	1.075	
2009b.year	1.000	.	.	.	.	.	
2011.year	0.836	0.701	-0.21	0.831	0.162	4.328	
2012.year	0.835	0.702	-0.21	0.830	0.161	4.334	
2013.year	0.727	0.622	-0.37	0.709	0.136	3.892	
2014.year	1.002	0.861	0.00	0.999	0.186	5.403	
2015.year	0.998	0.863	-0.00	0.998	0.183	5.435	
2016.year	0.809	0.657	-0.26	0.794	0.164	3.979	
2017.year	1.003	0.861	0.00	0.998	0.186	5.395	
Mean dependent var		0.585	SD dependent var			0.495	
Number of obs		106.000	Chi-square			3.433	
Prob > chi2		0.904	Akaike crit. (AIC)			159.389	

*** p<0.01, ** p<0.05, * p<0.1

TABLE 49: SIMPLE LOGISTIC REGRESSIONS FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES WITH TIME FIXED EFFECTS (NON-COMMODITY SAMPLE)

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig
Strategic Resource Index	1.513	0.332	1.89	0.059	0.984	2.326	*
Mean dependent var		0.590	SD dependent var			0.494	
Number of obs		105.000	Chi-square			3.567	
Prob > chi2		0.059	Akaike crit. (AIC)			143.891	

*** p<0.01, ** p<0.05, * p<0.1

Logistic regression

Social and Environ. Expenditures	Odds Ratio	Robust St.Err.	z-value	p-value	[95% Conf	Interval]	Sig

Strategic Resource Index	1.720	1.209	0.77	0.441	0.434	6.821
2009b.year	1.000	.	.	.	.	.
2011.year	0.823	0.681	-0.24	0.814	0.162	4.171
2012.year	0.820	0.682	-0.24	0.812	0.161	4.181
2013.year	0.716	0.604	-0.40	0.692	0.137	3.739
2014.year	0.975	0.837	-0.03	0.976	0.181	5.249
2015.year	0.972	0.838	-0.03	0.974	0.180	5.262
2016.year	0.917	0.760	-0.10	0.917	0.181	4.656
2017.year	0.971	0.838	-0.03	0.973	0.179	5.266
Mean dependent var		0.590	SD dependent var			0.494
Number of obs		105.000	Chi-square			3.812
Prob > chi2		0.874	Akaike crit. (AIC)			157.578

**** p<0.01, ** p<0.05, * p<0.1*

TABLE 50: SIMPLE LOGISTIC REGRESSION WITH THE STRATEGIC RESOURCE INDEX FOR SOCIAL AND ENVIRONMENTAL EXPENDITURES (NON-COMMODITY SAMPLE)

		Human Development Index	Innovation Index	Reputation Index	Ln (HDI)	Strategic Resources Index
Logistic Regressions without Time Fixed Effects	Full Sample	Insig.	Insig.	Insig.	Insig.	Insig.
	Commodity Sample	0.492	0.987	0.99	0.975	0.511
	Non-Commodity Sample	1.7	1.012	1.01	1.015	1.513
Logistic Regressions with Time Fixed Effects	Full Sample	Insig.	1.015	1.02	Insig.	Insig.
	Commodity Sample	Insig.	Insig.	Insig.	0.944	Insig.
	Non-Commodity Sample	Insig.	1.06	1.045	Insig.	Insig.

TABLE 51: ODDS RATIOS FOR THE DEPENDENT VARIABLE OF EXTERNAL FUND MANAGERS

Descriptive Statistics

Variables	Obs	Mean	Std.Dev.	Min	Max	p1	p99	Skew.	Kurt.
Sustainability	616	1.622	1.08	0	3	0	3	-.153	1.753

Descriptive Statistics (Commodity Sample of 39 SWFs)

Variables	Obs	Mean	Std.Dev.	Min	Max	p1	p99	Skew.	Kurt.

Sustainability	407	1.536	1.082	0	3	0	3	-.039	1.729

Descriptive Statistics (Non-Commodity Sample of 17 SWFs)

Variables	Obs	Mean	Std.Dev.	Min	Max	p1	p99	Skew.	Kurt.
Sustainability	209	1.789	1.058	0	3	0	3	-.379	1.919

TABLE 52: SUMMARY STATISTICS FOR SUSTAINABILITY INDEX

Pairwise correlations (Full Sample of 56 SWFs)

Variables	(1)	(2)	(3)	(4)	(5)
(1) Sustainability	1.000				
(4) Human Development Index	0.308*	1.000			
(5) Innovation Index	0.438*	0.759*	1.000		
(6) Reputation Index	0.391*	0.689*	0.649*	1.000	
(7) Ln(FDI)	0.298*	0.552*	0.690*	0.177*	1.000

* shows significance at the 0.05 level

Pairwise correlations (Commodity Sample of 37 SWFs)

Variables	(1)	(2)	(3)	(4)	(5)
(1) Sustainability	1.000				
(4) Human Development Index	0.207*	0.207*			
(5) Innovation Index	0.313*	0.313*	0.313*		
(6) Reputation Index	0.308*	0.308*	0.308*	0.308*	
(7) Ln(FDI)	0.286*	0.286*	0.286*	0.286*	0.286*

* shows significance at the 0.05 level

Pairwise correlations (Non-Commodity Sample of 19 SWFs)

Variables	(1)	(2)	(3)	(4)	(5)
(1) Sustainability	1.000				
(4) Human Development Index	0.506*	0.506*			
(5) Innovation Index	0.650*	0.650*	0.650*		
(6) Reputation Index	0.478*	0.478*	0.478*	0.478*	
(7) Ln(FDI)	0.295*	0.295*	0.295*	0.295*	0.295*

* shows significance at the 0.05 level

TABLE 53: PAIRWISE CORRELATIONS FOR SUSTAINABILITY INDEX

Ordered logistic regression

Sustainability	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Human Devel. Ind	-3.247	4.830	-0.67	0.501	-12.714	6.219	
Innovation Ind	0.123	0.027	4.51	0.000	0.069	0.176	***
Reputation Ind	0.021	0.022	0.96	0.339	-0.022	0.064	
Ln (FDI)	-0.300	0.122	-2.46	0.014	-0.539	-0.062	**
cut1	-5.534	4.050	.b	.b	-13.472	2.403	
cut2	-3.669	4.057	.b	.b	-11.620	4.282	
cut3	-2.504	4.081	.b	.b	-10.502	5.495	

Mean dependent var	1.805	SD dependent var	1.072
Pseudo r-squared	0.107	Number of obs	257.000
Chi-square	63.291	Prob > chi2	0.000
Akaike crit. (AIC)	625.543	Bayesian crit. (BIC)	650.387

*** p<0.01, ** p<0.05, * p<0.1

Ordered logistic regression

Sustainability	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Human Devel. Ind	-6.513	4.862	-1.34	0.180	-16.043	3.016	
Innovation Ind	0.165	0.030	5.40	0.000	0.105	0.224	***
Reputation Ind	0.020	0.023	0.90	0.370	-0.024	0.065	
Ln (FDI)	-0.429	0.126	-3.40	0.001	-0.677	-0.182	***
2009b.year	0.000	.	.	.	.	.	
2011.year	-1.387	0.503	-2.75	0.006	-2.374	-0.400	***
2012.year	-1.537	0.517	-2.97	0.003	-2.551	-0.523	***
2013.year	-1.796	0.545	-3.30	0.001	-2.863	-0.728	***
2014.year	-1.446	0.527	-2.74	0.006	-2.479	-0.413	***
2015.year	-1.344	0.523	-2.57	0.010	-2.369	-0.318	**
2016.year	-1.473	0.518	-2.84	0.004	-2.489	-0.457	***
2017.year	-1.578	0.521	-3.03	0.002	-2.600	-0.557	***
cut1	-10.975	4.311	.b	.b	-19.424	-2.526	
cut2	-9.039	4.300	.b	.b	-17.466	-0.611	
cut3	-7.828	4.312	.b	.b	-16.280	0.624	

Mean dependent var	1.805	SD dependent var	1.072
Pseudo r-squared	0.124	Number of obs	257.000
Chi-square	69.565	Prob > chi2	0.000
Akaike crit. (AIC)	627.552	Bayesian crit. (BIC)	677.239

*** p<0.01, ** p<0.05, * p<0.1

TABLE 54: ORDERED LOGISTIC REGRESSION FOR COMBINED SUSTAINABILITY INDEX (FULL SAMPLE)

Ordered logistic regression

Sustainability Index	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Human Development Index	10.030	3.113	3.22	0.001	3.928	16.132	***
cut1	6.371	2.566	.b	.b	1.341	11.401	
cut2	8.123	2.672	.b	.b	2.887	13.359	
cut3	9.172	2.745	.b	.b	3.792	14.551	

Mean dependent var	1.805	SD dependent var	1.072
Pseudo r-squared	0.057	Number of obs	257.000
Chi-square	10.379	Prob > chi2	0.001
Akaike crit. (AIC)	653.315	Bayesian crit. (BIC)	667.511

*** p<0.01, ** p<0.05, * p<0.1

Ordered logistic regression

Sustainability Index	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Innovation Index	0.087	0.015	5.94	0.000	0.058	0.115	***
cut1	1.759	0.649	.b	.b	0.487	3.031	
cut2	3.602	0.712	.b	.b	2.206	4.997	
cut3	4.694	0.760	.b	.b	3.205	6.184	

Mean dependent var	1.805	SD dependent var	1.072
Pseudo r-squared	0.087	Number of obs	257.000
Chi-square	35.249	Prob > chi2	0.000
Akaike crit. (AIC)	633.023	Bayesian crit. (BIC)	647.220

*** p<0.01, ** p<0.05, * p<0.1

Ordered logistic regression

Sustainability Index	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Reputation Index	0.070	0.014	5.08	0.000	0.043	0.097	***
cut1	1.613	0.714	.b	.b	0.215	3.012	
cut2	3.304	0.763	.b	.b	1.809	4.800	
cut3	4.371	0.827	.b	.b	2.749	5.992	

Mean dependent var	1.805	SD dependent var	1.072
Pseudo r-squared	0.064	Number of obs	257.000
Chi-square	25.752	Prob > chi2	0.000
Akaike crit. (AIC)	648.726	Bayesian crit. (BIC)	662.922

*** p<0.01, ** p<0.05, * p<0.1

Ordered logistic regression

Sustainability Index	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Ln (FDI)	0.196	0.079	2.47	0.014	0.040	0.352	**
cut1	2.853	1.995	.b	.b	-1.059	6.764	
cut2	4.414	1.976	.b	.b	0.541	8.286	
cut3	5.339	1.976	.b	.b	1.466	9.211	

Mean dependent var	1.805	SD dependent var	1.072
Pseudo r-squared	0.011	Number of obs	257.000

Chi-square	6.084	Prob > chi2	0.014
Akaike crit. (AIC)	685.126	Bayesian crit. (BIC)	699.322

*** p<0.01, ** p<0.05, * p<0.1

TABLE 55: ORDERED LOGISTIC REGRESSION FOR COMBINED SUSTAINABILITY INDEX AND INDIVIDUAL STRATEGIC RESOURCES (FULL SAMPLE)

Ordered logistic regression

Sustainability Index	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Strategic Resources Indes	9.040	3.344	2.70	0.007	2.486	15.595	***
cut1	5.997	2.933	.b	.b	0.249	11.745	
cut2	7.675	2.983	.b	.b	1.829	13.522	
cut3	8.649	3.029	.b	.b	2.712	14.586	

Mean dependent var	1.812	SD dependent var	1.070
Pseudo r-squared	0.039	Number of obs	255.000
Chi-square	7.307	Prob > chi2	0.007
Akaike crit. (AIC)	659.217	Bayesian crit. (BIC)	673.382

*** p<0.01, ** p<0.05, * p<0.1

Ordered logistic regression

Sustainability Index	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Strategic Resources Indes	9.055	3.352	2.70	0.007	2.484	15.625	***
2009b.year	0.000	.	.	.	.	.	
2011.year	-0.165	0.462	-0.36	0.722	-1.071	0.742	
2012.year	-0.069	0.450	-0.15	0.878	-0.950	0.812	
2013.year	-0.377	0.466	-0.81	0.418	-1.290	0.536	
2014.year	-0.057	0.443	-0.13	0.898	-0.924	0.810	
2015.year	-0.093	0.443	-0.21	0.834	-0.960	0.775	
2016.year	-0.241	0.442	-0.54	0.586	-1.107	0.625	
2017.year	-0.174	0.434	-0.40	0.689	-1.024	0.676	
cut1	5.857	2.936	.b	.b	0.103	11.611	
cut2	7.540	2.988	.b	.b	1.684	13.396	
cut3	8.516	3.034	.b	.b	2.568	14.463	

Mean dependent var	1.812	SD dependent var	1.070
Pseudo r-squared	0.040	Number of obs	255.000
Chi-square	7.925	Prob > chi2	0.441
Akaike crit. (AIC)	672.345	Bayesian crit. (BIC)	711.299

*** p<0.01, ** p<0.05, * p<0.1

TABLE 56: ORDERED LOGISTIC REGRESSION FOR COMBINED SUSTAINABILITY INDEX AND COMBINED STRATEGIC RESOURCES INDEX (FULL SAMPLE)