UNIVERSIDADE DA BEIRA INTERIOR
Ciências Sociais e Humanas

Sovereign Wealth Funds: Theory and Practice

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Tese para obtenção do Grau de Doutor em

Economia

(3º ciclo de estudos)

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Covilhã, maio de 2020

Dedicatória / Dedication

Para a minha Mãe, em homenagem póstuma, e marido.

To my Mother, in posthumous honour, and husband.

Johnny Cash

I need your love in every way
I need your strength to make me great
I've been so wrong
Am I too late?

Just hold me like Johnny Cash
When I lost my mother
Whisper in my ear
Just like June Carter
And though I fight these tears that I hide
Just hold me tight for the rest of my life

I need your mind to understand
I need your soul
It makes me a better man
With you, by my side I'd have a chance

Just hold me like Johnny Cash
When I lost my mother
Whisper in my ear
Just like June Carter
And though I fight these tears that I hide
Just hold me tight for the rest of my life

With you, by my side I'd have a chance

Lenny Kravitz

Agradecimentos

É uma grande honra realizar este objetivo, que eu desejei alcançar, na grande instituição que é a Universidade da Beira Interior. A realização desta Tese de Doutoramento permitiu-me adquirir novas habilidades e competências e foi um grande desafio.

Em primeiro lugar, gostaria de expressar a minha sincera gratidão ao Professor Doutor José Alberto Serra Ferreira Rodrigues Fuinhas, pelo apoio contínuo que me deu durante este estudo de Doutoramento e pesquisas associadas, pela sua paciência, motivação e imenso conhecimento. A sua orientação foi determinante para mim neste trilho, eu não poderia imaginar ter um melhor orientador e mentor para esta etapa da minha vida. Além de agradecer ao meu orientador, gostaria de agradecer igualmente ao coorientador Professor Doutor António Manuel Cardoso Marques pelos seus comentários e sugestões.

Similarmente gostaria de agradecer à minha família e amigos. Especialmente à minha mãe, que apesar de já não estar entre nós, sempre me incentivou a continuar os meus estudos e ainda hoje é uma fonte de inspiração na minha vida. Por último, mas não menos importante, um agradecimento especial ao meu marido João Fernandes, que está sempre do meu lado a apoiar-me e a inspirar-me para continuar a alcançar vários objetivos na minha vida.

Acknowledgements

It is a great honour to achieve this goal, which I have longed to accomplish, in the great institution that is University Beira Interior. The achievement of this PhD Thesis gave me the acquisition of new skills and competences and it was a great challenge.

Firstly, I would like to express my sincere gratitude to Professor Doctor José Alberto Serra Ferreira Rodrigues Fuinhas for the continuous support during this PhD study and related research, for his patience, motivation, and immense knowledge. His guidance was determinant for me along this path; I could not have imagined having a better advisor and mentor for this stage of my life. Besides my advisor, I would like to thank the co-advisor Professor Doctor António Manuel Cardoso Marques for his comments and suggestions.

I would also like to thank you, my family and friends. Especially my mum, who although no longer with us, always encouraged me to undertake my studies and continues to be an inspirational person for me nowadays. And last but not least a special thank you to my husband João Fernandes who was always by my side supporting and inspiring me to continue to realize several goals in my life.

Fundos Soberanos: Teoria e Prática

Resumo

A constituição de Fundos Soberanos (FS) tem crescido e a partir dos anos 2000 observou-se um grande incremento dos mesmos o que levou ao aumento dos seus investimentos. Subsequentemente a este fenómeno, foram desenvolvidos trabalhos sobre os FS uma vez que os investigadores, devido ao seu grande aumento, acreditavam que estes fundos poderiam ser prejudiciais para os mercados financeiros e economia global. Uma vez observada esta tendência no seu comportamento e aferida esta opinião sobre os FS, definiu-se como prioritário explorar este tópico. Esta Tese é composta por três artigos e o seu objetivo global, por um lado, é o de darmos a conhecer as potencialidades deste tipo de fundos para que estes sejam utilizados de forma positiva na economia global. Por outro lado, esperamos contribuir para a desmistificação das ideias negativas existentes sobre os mesmos. De seguida descrevemos que tipo de trabalhos desenvolvemos para atingir este objetivo. No primeiro artigo efetuámos uma compilação da literatura que ajuda a definir o que são os FS. No segundo artigo, com a aplicação de um modelo gravitacional, testámos se variáveis económicas, financeiras, políticas, sociais e geográficas têm impacto na decisão de investimento que os FS efetuam em diversos países. No terceiro e último artigo com o método ARDL testámos se os investimentos efetuados pelos FS têm um impacto positivo no PIB das economias dos países onde efetuam os seus investimentos.

Palavras-chave: Fundos Soberanos (FS), Modelo Gravitacional, ARDL.

Fundos Soberanos: Teoria e Prática

Resumo alargado

Os Fundos Soberanos (FS) têm crescido e nos anos 2000 observou-se um grande aumento da sua constituição e como Rozanov (2005) descreve este fenómeno levou a que o investimento deste tipo de fundos aumentasse. Similarmente, Jen (2007) mencionou que a globalização alterou o balanço de poder entre o sector público e privado e estes fundos podem ser uma forma de o sector público ganhar influência sobre os mercados financeiros. Devido a estas questões foram surgindo trabalhos para avaliar os impactos desta tendência. Beck e Fidora (2008) averiguaram se este tipo de fundos podem ser prejudiciais para os mercados financeiros e Gieve (2008) estudou se podem ser prejudiciais para a economia global. Rozanov (2005), a Morgan Stanley Research Global (2007) e Johnson (2007) efetuaram trabalhos devido à dimensão dos ativos que estes fundos gerem e ao rápido crescimento da constituição destes. Igualmente a falta de transparência destes fundos tem sido uma preocupação e autores como Truman (2007) e Gieve (2008) estudaram este tema. Em contraponto, Jen (2007) argumenta que estes FS podem ser utilizados para proteger as economias de algum tipo de flutuações, choques e riscos. Blundell-Wignall et al. (2008) descreveu que de certa forma, os FS podem funcionar como uma poupança, que é utilizada para investir em alguns tipos de ativos que lhes trarão retorno.

Podemos então concluir que desde o momento em que estes tipos de fundos tomaram certas proporções no que diz respeito à sua presença na economia mundial, surgiram diversos estudos que abordam várias perspetivas. Ao repararmos nesta tendência na literatura, definimos como prioritário explorar este tópico na Tese de Doutoramento. Desta forma, iniciámos a construção da nossa perspetiva sobre os FS para definirmos o que poderia ser interessante abordar em cada um dos artigos. Ao iniciarmos este caminho deparamo-nos com alguma controvérsia na literatura no que dizia respeito ao ano do seu surgimento, nome a utilizar e definição a adotar. Devido a este facto decidimos no primeiro estudo fazer uma compilação de literatura para nos apoiar a

definir o que é um FS. Considerámos que este passo é importante para os artigos seguintes os quais contemplam modelos econométricos.

Assim sendo, nesta primeira fase descobrimos que segundo Rose (2011) e Aguilera et al. (2016) a história destes fundos remonta ao ano de 1854, que coincide com o ano em que foi fundado o Texas Permanent School Fund. No entanto, outros autores não o consideram como um FS. Por outro lado, Beck e Fidora (2008) e nos Princípios e Práticas geralmente aceites dos FS, "Santiago Principles" (SWFs GAPP 2008), consideram que a história deste tipo de fundos iniciou-se com a constituição do Kuwait Investment Authority (KIA) em 1953. Segundo estes princípios é o que tem as características que correspondem a este tipo de fundo.

Em relação ao nome pelo qual são designados encontrámos autores, tais como Arrau e Claessens (1992) e Davis et al. (2001), que os designam de fundos de estabilização de commodities, fundos de estabilização de cobre, fundos de recursos não renováveis e fundos de petróleo. E em 2005 Rozanov, foi o primeiro a dar-lhes o nome de FS.

Por último, encontrámos uma grande controvérsia no que diz respeito à definição associada a estes fundos, como mencionámos anteriormente. Autores como Rozanov (2005), Jen (2007), nos SWFs GAPP (2008) e Rose (2011) utilizam definições diferentes. Após agregarmos todas estas opiniões decidimos adotar a definição consagrada nos SWFs GAPP (2008) que é a seguinte: "Os FS são definidos como fundos ou acordos de investimento para fins especiais, propriedade do governo. Estes são criados pelo governo para fins macroeconómicos, os FS detêm, gerem ou governam os seus ativos para atingir objetivos financeiros e utilizam um conjunto de estratégias de investimento que inclui o investimento em ativos financeiros estrangeiros. Os FS são geralmente constituídos a partir de superavits da balança de pagamentos, operações oficiais em moeda estrangeira, receitas de privatizações, superavits fiscais e/ou recebimentos resultantes de exportações de commodities".

Com toda esta informação reunida decidimos seguir as diretrizes descritas pelo Fundo Monetário Internacional (FMI) que estão consagradas nos SWFs GAPP (2008), as quais consideram a definição transcrita no parágrafo anterior e descrevem que o surgimento destes fundos foi em 1953 com a constituição do KIA e adotaram o nome de FS que foi dado por Rozanov em 2005.

Com a base teórica definida iniciámos os artigos que incluem modelos econométricos. O primeiro pretende testar se variáveis económicas, financeiras, políticas, sociais e geográficas têm impacto na decisão de investimento que os FS efetuam em vários países. O segundo artigo tem o objetivo de compreendermos se os investimentos efetuados pelos FS melhoram o PIB das diversas economias onde investem. Com estes estudos queremos provar que apesar de uma grande maioria dos investigadores acreditarem que os FS podem ter um impacto negativo nos mercados financeiros e na economia global eles podem ser positivos para as economias. Esperamos assim incentivar a constituição deste tipo de fundos globalmente. Em ambos os estudos utilizámos os dados do Total de Ativos sob Gestão do Government Pension Fund Global (GPFG) que foi constituído pelo governo da Noruega, uma vez que estavam publicados no seu site.

Desta forma, no segundo artigo aplicámos um Modelo Gravitacional (MG) com os dados sobre o Total de Ativos sob Gestão do GPFG em 98 países durante 1998 a 2016 como variável dependente. Estes ativos compõem-se por ações, obrigações e imobiliário. Como variáveis independentes agregámos as que foram definidas por autores como variáveis base deste tipo de modelo e outras que achámos interessantes para a análise em questão. Tinbergen (1962) foi o primeiro a aplicar um MG aos fluxos internacionais de comércio tendo definido o Produto Interno Bruto (PIB) real e a distância como variáveis base para este tipo de modelo. Anderson (1979) acrescentou uma variável dummy para descrever a existência de fronteira comum. Da Costa e Lagoa (2018) adicionaram a Capitalização do Mercado Bolsista (CMB). Para além destas variáveis, acrescentámos o Índice de Desenvolvimento Humano (IDH), o Índice de Perceção de Corrupção (IPC) e a Estabilidade Política e Ausência de Violência (EPAV).

Com os dados agrupados, utilizámos o programa STATA para realizar os testes e regressões. Com a aplicação do modelo concluímos que o impacto das diversas variáveis na decisão de investimentos dos FS é o seguinte: o PIB, a CMB, o IPC e a EPAV são estatisticamente significantes a 1% e têm um efeito positivo; a distância também é estatisticamente significante a 1%, mas tem um efeito negativo; a existência de uma fronteira comum também demonstrou ser estatisticamente significante a 10% com um efeito negativo e apenas o IDH não demonstrou ser significativo para a nossa variável dependente.

No terceiro artigo aplicámos o método Auto-Regressive Distributed Lag (ARDL) de Pesaran e Shin (1999), utilizando a técnica Pooled Mean Group (PMG) formulada por

Pesaran, et al. (1997). Definindo como variável dependente o PIB, o qual caracteriza o estado das economias, de 21 países onde o GPFG fez investimentos durante 1998 a 2017. Como variáveis independentes agregámos o Total de Ativos sob Gestão do GPFG, o Gasto Final do Consumo das Administrações Públicas, o Índice de Globalização do KOF, a Energia Primária, as Exportações de Bens e Serviços e a Inflação na forma de primeiras diferenças e logaritmos naturais.

Assim, no que diz respeito aos impactos deste tipo de investimentos nas economias onde este género de fundos fazem os seus investimentos chegámos às seguintes conclusões na forma logarítmica. O Total de Ativos sob Gestão do GPFG demonstrou ser positivo e estatisticamente significante a 1% para a variável dependente, o que é o oposto do que a literatura geral demonstra e prova que este tipo de investimento tem benefícios para as economias. Além disso, o Gasto Final do Consumo das Administrações Públicas, a energia primária e as exportações de bens e serviços também demonstraram ser positivas e estatisticamente significantes a 1%. Apenas o Índice de Globalização do KOF é negativo e estatisticamente significativo a 1%. Ainda na forma de primeiras diferenças, as exportações de bens e serviços são positivas e estatisticamente significantes a 1% para a variável dependente. Por último, na forma de logaritmo e primeiras diferenças, a inflação é positiva e estatisticamente significante a 5%.

Em conclusão, com este caminho percorrido nestes três artigos esperamos por um lado incentivar a atração deste tipo de investimento, porque como provámos eles podem melhorar as economias destes países. Por outro lado, gostaríamos de contribuir para a constituição deste tipo de fundos pois acreditamos que são uma ótima forma das economias se protegerem de crises financeiras, choques de preços, entre outros. Também acreditamos que estes podem ser uma forma de não só melhorar o bem-estar das futuras gerações e as suas condições de vida, bem como a estabilidade dos países mundialmente. De forma geral, esperamos melhorar a perceção sobre os FS e seus investimentos.

Sovereign Wealth Funds: Theory and Practice

Abstract

The constitution of sovereign wealth funds (SWFs) has grown in recent years, and in the year 2000, there was a large rise which led to an increase in investment in them. After this phenomenon, more works have been carried out about SWFs as due to this large increase researchers began to believe that these funds can be detrimental to financial markets and the global economy. Once this trend in their behaviour had been observed and this opinion had been forwarded about SWFs, exploring this topic was defined as a priority. This thesis is composed of three papers and its overall objective, on the one hand, is to make the potential of this type of funds known so that they can be used positively to improve the global economy. On the other hand, we hope to contribute to demystifying the negative ideas that exist about them. We then describe the kind of work done to achieve this goal. In the first paper, we made a compilation of literature that helps to define SWFs. In the second paper, by applying a gravity model, we tested whether economic, financial, political, social and geographic variables have an impact on the investment decision that SWFs made in several countries. In the third and final paper we used the ARDL method to test whether investments made by SWFs have a positive impact on the GDP of the economies of the countries where they invest.

Keywords: Sovereign Wealth Funds (SWFs), Gravity Model, ARDL

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List of acronyms

ADF – Augmented Dickey-Fuller

ADIA - Abu Dhabi Investment Authority

ARDL - Auto-Regressive Distributed Lag

AUM - Assets Under Management

CB - Central Bank

CD - Cross Dependence

CIC - China Investment Corporation

CIPS - Cross-Sectionally Augmented IPS

CSD - Cross-Sectional Dependence

DFE - Dynamic Fixed Effects

EME - Emerging Market Economies

EU – European Union

FE - Fixed effects

GAPP - Generally Accepted Principles and Practices

GDP – Gross Domestic Product

GIC - Government of Singapore Investment Corporation

GM – Gravity Model

GNI - Gross National Income

GNP - Gross National Product

GPFG - Government Pension Fund Global

IFSWF - International Forum of Sovereign Wealth Funds

IMF - International Monetary Fund

IWG - International Working Group

KIA - Kuwait Investment Authority

KIC - Korea Investment Corporation

MG - Mean Group

OECD - Organisation for Economic Co-operation and Development

OLS - Ordinary Least Squares

PMG - Pooled Mean Group

PPRFs - Public Pension Reserve Fund

QIA - Qatar Investment Authority

RE - Random Effects

ROE – Return on Equity

SAMA - Saudi Arabian Monetary Authority

SWFs – Sovereign Wealth Funds

SWFs GAPP – Sovereign Wealth Funds Generally Accepted Principles and Practices

UAE - United Arab Emirates

US - United States

WGI - Worldwide Governance Indicators

Chapter 1: Introduction

According to Rozanov (2005), investments made by Sovereign Wealth Funds (SWFs) have grown in recent years. Jen (2007) observed that globalisation altered the balance of power between the public and private sector. For this author, a SWF is a means for the public sector to gain influence over financial markets. On the other hand, Blundell-Wignall et al. (2008) argue that SWFs work like savings in some ways and can shield economies from some types of fluctuations, shocks and risks. The savings can be used to ensure guarantees for future generations and to invest in some types of actives where they have financial returns. In view of these points, we consider that they constitute an important subject to study and exploit.

Due to their rapid growth in the 2000s, some official authorities felt that it would be important to constitute a forum where some topics about SWFs could be debated in order to increase transparency, governance and accountability. On 30 April 2008, the International Forum of Sovereign Wealth Funds (IFSWF) was established. Together with the International Monetary Fund (IMF), this entity published the Sovereign Wealth Funds Generally Accepted Principles and Practices (SWFs GAPP), "Santiago Principles", which established a general definition and also includes twenty-four principles. The thirty-one members have either implemented these principles and practices or intend to implement them on a voluntary basis. Each is subject to home country laws, regulations requirements and obligations.

In this chapter, we will characterise SWFs and focus on their history. Then we present a brief literature review, which summarises some aspects of SWFs found in the general literature. Some of this information is about their influence on financial markets and the global economy, other about the general perspective on them. In the last section, is a brief description of the objectives of our studies, and a description of the main conclusions achieved in the three papers undertaken during these years of studying SWFs. We believe that with these studies, we can change the general perspective about SWFs that we found in the literature.

1. Characterisation and history of SWFs

Our decision to do these papers on SWFs was taken as they seem highly a interesting theme to explore, and as Jen (2007) mentions, their constitution has grown in recent years, after appearing only a few decades ago. Because of this rapid growth, authors like Rozanov (2005) and Aizenman and Glick (2008) focused on the impact that these investments can have on financial markets. In view of to these two points, we felt that we could do something different and provide an excellent contribution to research on this recent topic.

In the following paragraphs, we will explain the topics explored in the first paper that we wrote, which is developed in more detail in Chapter two, section three of this thesis. Concerning their appearance in the financial market, for Rose (2011) and Aguilera et al. (2016), the history of SWFs dates back to 1854 when the Texas Permanent School Fund was founded. However, for Beck and Fidora (2008) and in the SWFs GAPP, "Santiago Principles" (2008), it is considered that the history of SWFs started with the constitution of Kuwait Investment Authority (KIA) in 1953. Until Rozanov (2005) gave them the name of SWFs, they had various names like commodity stabilisation funds, copper stabilisation funds, oil funds, and in some studies these denominations can still be found.

While review the literature on SWFs, we concluded that it would be important to delimitate the border about what type of funds to consider in our study as a SWF. The decision was taken to adopt the definition assembled by the IFSWF that was established in the SWFs GAPP, "Santiago Principles" (2008), mentioned in the previous paragraph, agreed with the IMF. This definition is as follows:

"*SWFs are defined as special purpose investment funds or arrangements, owned by the general government. Created by the general government for macroeconomic purposes, SWFs hold, manage, or administer assets to achieve financial objectives, and employ a set of investment strategies which include investing in foreign financial assets. The SWFs are commonly established out of balance of payments surpluses,*

official foreign currency operations, the proceeds of privatisations, fiscal surpluses, and/or receipts resulting from commodity exports."[1]

Globally we have more than eighty SWFs and until now thirty-one of them are members of the IFSWF as we can see in Table A1.1 "IFSWF members" in the appendix. In some way, those that are members represent what happens to SWFs globally. For this first description about SWFs, we will use them to characterise this situation. In the next paragraphs, we will expose some information about them such as year of constitution, revenues mostly used for investments, type of investments usually made, where they are located in geographic terms and finally about their most common objectives.

In terms of the constitution of SWFs as Jen (2007) and Johnson (2007) write, they grew in the 2000s, as we can see in Figure 1.1 where we show the constitutions of SWFs by year. We added Table A1.2 "IFSWF members and year of the constitution" in the appendix to detail the year of constitution of IFSWF members. As we can see, twenty-three of the thirty-one members of the IFSWF, represents seventy-four per cent of the sample, has been constituted since the year 2000. Also, the tendential line of the figure has a positive profile which has become more accentuated since the year 2000.

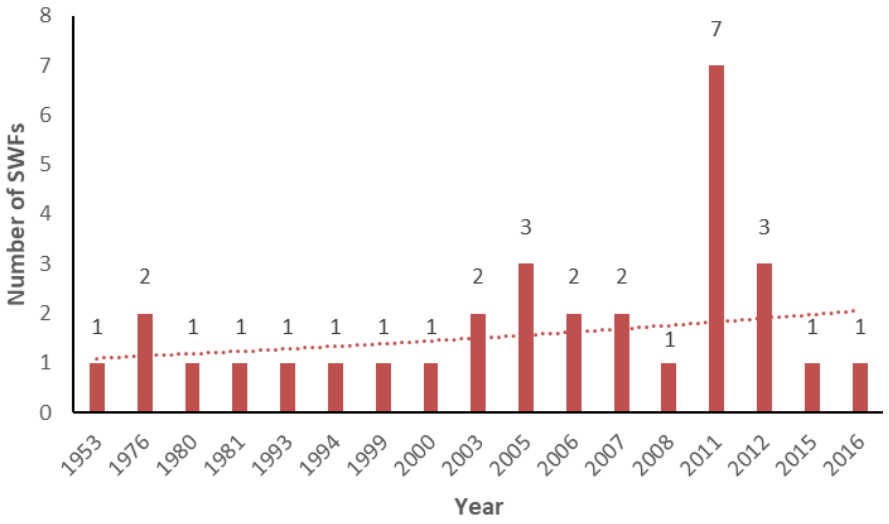

Figure 1.1 - IFSWF members by year of constitution

[1] Source: SWFs GAPP, "Santiago Principles", 2008.

Now we will focus on the revenues use for investments. We collected the ideas of authors like Rozanov (2005), Jen (2007), Johnson (2007), Allen and Caruana (2008), Blundell-Wignall et. al (2008), Aizenman and Glick (2008), Beck and Fidora (2008), Chwieroth (2014) and Gelb et al. (2014). In general, for these authors, the principal type of revenues is from natural resources, commodities, non-commodities, non-renewable resources, foreign exchange reserves, the sale of scarce resources and national savings. In the case of the members of the IFSWF, as we can see in Figure 1.2, fifty-two per cent use revenues from non-commodities, twenty-three per cent from oil and gas, nineteen per cent from oil and just three per cent from diamond exports and others. In Table A1.3 "IFSWF members by type of revenue" we can observe the type of revenue used by each IFSWF member in detail.

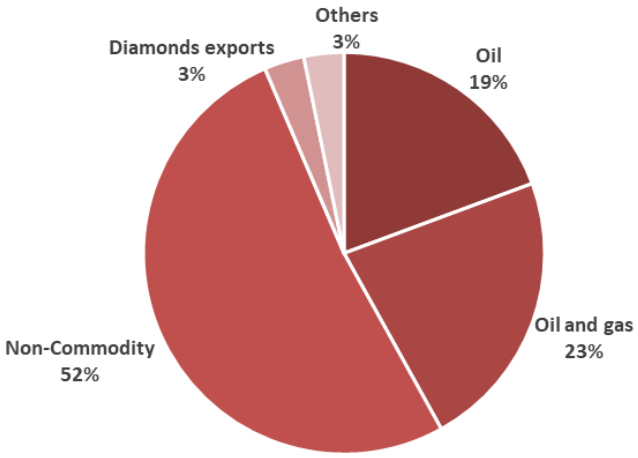

Figure 1.2 - IFSWF members by type of revenue

Concerning the type of investments made, we will present the opinions of authors such as Rozanov (2005), Jen (2007), Johnson (2007), Allen and Caruana (2008), Blundell-Wignall et. al (2008), Aizenman and Glick (2008), Beck and Fidora (2008), Chwieroth (2014) and Gelb et al. (2014). For these authors, long-term investments are preferred, in assets with more risks than the investments made by official reserves and they make little use of leverage in contrast to hedge funds and private equity funds. Typically, investments are made in international assets, external assets, especially securities, equities and bonds. Bortolotti (2016) might say that these funds have a

strategic asset allocation that can include equities, bonds, private equity, real estate, infrastructure, hedge funds, exchange-traded funds, futures contracts and commodities, among others, diversified by geographies and sectors to achieve the desired risk-return profile.

No less important, we will describe the principal objectives of a SWF with reference to the ideas of Rozanov (2005), Jen (2007), Johnson (2007), Allen and Caruana (2008), Blundell-Wignall et. al (2008), Aizenman and Glick (2008), Beck and Fidora (2008), Chwieroth (2014) and Gelb et al. (2014). Therefore, SWFs can protect the budget of an economy, help monetary authorities, make savings for future generations and for the social advance, block instabilities from oil prices, diversify and improve the return on foreign exchange reserves, promote industrialization, promote strategic and politic objectives, sterilize the effects of balance of payments inflows on domestic inflation, among others.

Last of all, in order to have a figure about the way in which they are spread geographically in the world with the thirty-one members of the IFSWF, we made Figure 1.3, which demonstrates that fourteen of them are located in Asia followed by Africa with six SWFs, and Europe in third place with five SWFs. These represent forty-five, nineteen and sixteen per cent of the thirty-one members, respectively. In Table A1.4 “IFSWF members by geographic zone” we have the corresponding continent for each IFSWF member. Additionally, Table A1.5 “IFSWF members by country” as the country of each SWF.

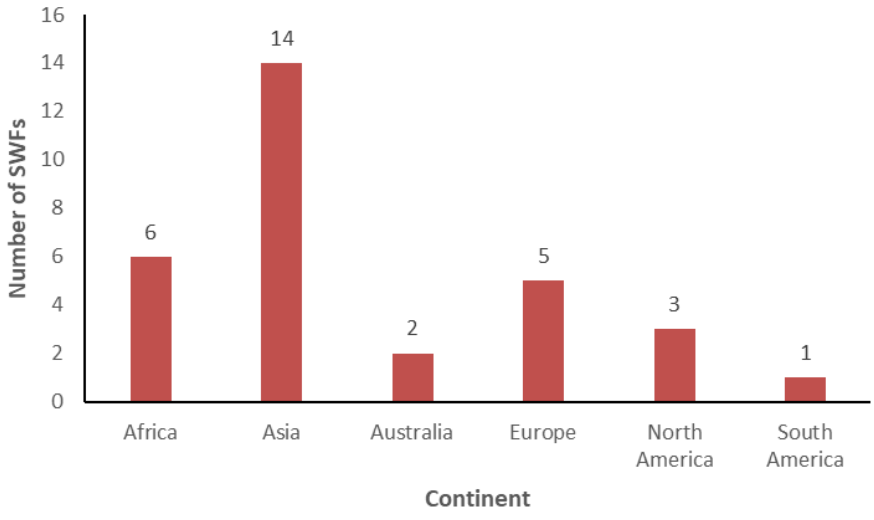

Figure 1.3 - IFSWF members by geographic zone

Having characterized SWFs and written about their history to introduce the topic to readers that do not know SWFs, in the following section, we will transcribe some of the literature that exists about SWFs and the studies that have been mostly carried out.

2. Brief literature review on SWFs

As mentioned in the section above, studies on SWFs increased in the 2000s due to their rapidly growth, which made the international economy believe that they can be a threat to financial markets. Therefore, the literature is more focused on topics like the assets under management, the importance of transparency, the ills that they may make to international financial markets and the global economy. Nonetheless, we can also find studies about their governance and structure, political relations and the preferred investments from the firm level.

Therefore, Rozanov (2005), the Morgan Stanley Research Global (2007) and Johnson (2007) focused on the assets under management. Rozanov (2005) expresses concerns about their growth and refers that due to their size, some of them can be put on a par with some of the largest public-pension and central bank reserves. Morgan Stanley Research Global (2007) concludes that they will achieve US$12 trillion in 2015 and that by the end of 2011 they could exceed the total size of the world is reserves. Because of this, they argue that SWFs will have a significant impact on financial markets. Johnson (2007) states that their impact on the global economy will depend on the size that they can reach.

Truman (2007) and Gieve (2008) express concerns about their transparency. On one hand, for Truman (2007) it is important to improve transparency and accountability in the management of SWFs. In this perspective, if a SWF operates outside its borders and can affect other markets and economies, there is a responsibility to increase transparency and make accountability less confidential. For Truman, the goal of SWFs should be to contribute to the financial stability of the country and for the countries directly involved and also to international financial stability. On the other hand, Gieve (2008) points out that it would be good for the transparency of SWFs to grow in order to ensure that they contribute to further global financial integration.

Beck and Fidora (2008) investigate whether SWFs harm global financial markets. In their view, transparency about their size would be good to decrease doubt in financial markets. However, they conclude that a transfer of sizeable amounts of traditional foreign exchange reserves to SWFs investments may have an impact on global financial markets as they have a different strategy from central banks (CBs). Gieve (2008) looks at the global economy and concludes that SWFs are prominent and essential players in many financial markets, and states that we cannot exaggerate their impact on the global financial system.

Al-Hassan et al. (2013) from the IMF explain the governance structure of SWFs. For them, authority and responsibilities should be separate. For this, they need a delegated mandate, defined roles, accountability, transparency, professionalism, and an excellent human resources policy in order to ensure the integrity and effective control of SWF management activities.

Avendano (2012) observed SWF investments at a firm-level during 2006-2009 with equities. He places them as a function of funds objectives and characteristics. Moreover, he considers the origin of the fund resources as commodity or non-commodity depending on whether they follow the investment guidelines of Organisation for Economic Cooperation and Development (OECD) and if the investment destination is domestic or foreign. He concludes that depending on these factors, SWFs choose different types of firms, but most SWFs are attracted to large firms, with profits and international activities. However, he uses a gravity-model to explore whether all investments are explained by firm variables. This provided the following results: factors related to diversification and natural endowments explain the change of SWF investments to the commodities sector and natural resources.

Knill, Lee, and Mauck (2011) looked at the influence of bilateral political relations on SWFs investments. Moreover, their results suggest that political relations play a role in their investment decisions and that they use non-financial motives in these. Also, they prefer to invest in nations which have a weaker political relation and they behave in a different way from rational investors, who maximise return while minimising risk. This suggests that SWFs use non-financial motives in investment decisions. Their conclusion is that SWFs investment improves and has a positive impact on political relations when the investment takes place in relatively closed countries.

Following this section, we will explain the research objectives and the contributions we hope to make with our papers. Our proposal is to complement currently existing studies on SWFs.

3. Research objectives and main contributions

The three papers are presented using a similar structure to papers submitted for consideration and publication in international journals. As the three papers were prepared to be read independently, the second and third paper have a similar section about the Government Pension Fund Global (GPFG), which we believe is important, since it explains to readers what this is and gives some information about the Norwegian fund.

The work of this thesis is organised as follows. In the next three chapters, we present the papers that compiled. The first paper is a theoretical approach about SWFs; in the other two papers we put into practice two econometric models that we formulated to test the hypothesis that we were interested in exploring. The theoretical paper is organised as follows: the first section has an introduction, the second section presents a literature review, the third section gives us information about how to set a SWF and the fourth section presents the main conclusions. In the other two papers, we use the same type of organisation for the sake of consistency. Therefore, the first section is an introduction, section two presents a literature review, the third section is about the data and applied methodology to the econometric model and the fourth section explains the main conclusions that we made.

On one hand, with these three papers, we hope to encourage the attraction to this type of investments by countries. Because as we conclude, the investments in SWFs are influenced by indicators which show in some way that countries need to have steady behaviour which will be good for future generations. On the other hand, we would like to contribute to the constitution of SWFs, as we believe that they are an excellent way for economies to protect themselves from financial crises an improve the well-being of future generations, in addition to their living conditions and the stability of countries worldwide. Overall, we expect to improve the understanding of SWFs and their investments.

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5. Appendix

Table A1.1 - IFSWF members

SWF Name
Abu Dhabi Investment Authority
Agaciro Development Fund
Alaska Permanent Fund
Budgetary Income Stabilization Fund
CDP Equity SpA
China Investment Corporation
Fondo de Ahorro de Panamá
Fundo Soberano de Angola
Future Fund
GIC Private Limited
Heritage and Stabilization Fund
Intergenerational Trust Fund for the People of the Republic of Nauru
Ireland Strategic Investment Fund
Ithmar Capital
Joint Stock Company Sovereign Wealth Fund Samruk-Kazyna
JSC National Investment Corporation of the National Bank of Kazakhstan
Khazanah Nasional Berhad
Korea Investment Corporation
Kuwait Investment Authority
Libyan Investment Authority
National Development Fund of Iran
New Zealand Superannuation Fund
Nigeria Sovereign Investment Authority
Palestine Investment Fund
Qatar Investment Authority
Russian Direct Investment Fund
State General Reserve Fund
State Oil Fund of the Republic of Azerbaijan
The Pula Fund
Timor-Leste Petroleum Fund
Turkey Wealth Fund

Table A1.2 - IFSWF members and year of constitution

SWF Name	Year
Abu Dhabi Investment Authority	1976
Agaciro Development Fund	2011
Alaska Permanent Fund	1976
Budgetary Income Stabilization Fund	2000
CDP Equity SpA	2011
China Investment Corporation	2007
Fondo de Ahorro de Panamá	2012
Fundo Soberano de Angola	2012
Future Fund	2006
GIC Private Limited	1981
Heritage and Stabilization Fund	2007
Intergenerational Trust Fund for the People of the Republic of Nauru	2015
Ireland Strategic Investment Fund	2011
Ithmar Capital	2011
Joint Stock Company Sovereign Wealth Fund Samruk-Kazyna	2008
JSC National Investment Corporation of the National Bank of Kazakhstan	2012
Khazanah Nasional Berhad	1994
Korea Investment Corporation	2005
Kuwait Investment Authority	1953
Libyan Investment Authority	2006
National Development Fund of Iran	2011
New Zealand Superannuation Fund	2003
Nigeria Sovereign Investment Authority	2011
Palestine Investment Fund	2003
Qatar Investment Authority	2005
Russian Direct Investment Fund	2011
State General Reserve Fund	1980
State Oil Fund of the Republic of Azerbaijan	1999
The Pula Fund	1993
Timor-Leste Petroleum Fund	2005
Turkey Wealth Fund	2016

Table A1.3 - IFSWF members by type of revenue

SWF Name	Revenues
Abu Dhabi Investment Authority	Oil
Agaciro Development Fund	Non-Commodity
Alaska Permanent Fund	Oil
Budgetary Income Stabilization Fund	Oil
CDP Equity SpA	Non-Commodity
China Investment Corporation	Non-Commodity
Fondo de Ahorro de Panamá	Non-Commodity
Fundo Soberano de Angola	Oil
Future Fund	Non-Commodity
GIC Private Limited	Non-Commodity
Heritage and Stabilization Fund	Oil and gas
Intergenerational Trust Fund for the People of the Republic of Nauru	Others[2]
Ireland Strategic Investment Fund	Non-Commodity
Ithmar Capital	Non-Commodity
Joint Stock Company Sovereign Wealth Fund Samruk-Kazyna	Non-Commodity
JSC National Investment Corporation of the National Bank of Kazakhstan	Non-Commodity
Khazanah Nasional Berhad	Non-Commodity
Korea Investment Corporation	Non-Commodity
Kuwait Investment Authority	Oil
Libyan Investment Authority	Oil and gas
National Development Fund of Iran	Oil and gas
New Zealand Superannuation Fund	Non-Commodity
Nigeria Sovereign Investment Authority	Oil
Palestine Investment Fund	Non-Commodity
Qatar Investment Authority	Oil and gas
Russian Direct Investment Fund	Non-Commodity
State General Reserve Fund	Oil and gas
State Oil Fund of the Republic of Azerbaijan	Oil and gas
The Pula Fund	Diamonds exports
Timor-Leste Petroleum Fund	Oil and gas
Turkey Wealth Fund	Non-Commodity

[2] Phosphate, fisheries, visa fees, tariffs.

Table A1.4 – IFSWF members by geographic zone

SWF Name	Continent
Abu Dhabi Investment Authority	Asia
Agaciro Development Fund	Africa
Alaska Permanent Fund	North America
Budgetary Income Stabilization Fund	North America
CDP Equity SpA	Europe
China Investment Corporation	Asia
Fondo de Ahorro de Panamá	North America
Fundo Soberano de Angola	Africa
Future Fund	Australia
GIC Private Limited	Asia
Heritage and Stabilization Fund	South America
Intergenerational Trust Fund for the People of the Republic of Nauru	Australia
Ireland Strategic Investment Fund	Europe
Ithmar Capital	Africa
Joint Stock Company Sovereign Wealth Fund Samruk-Kazyna	Asia
JSC National Investment Corporation of the National Bank of Kazakhstan	Asia
Khazanah Nasional Berhad	Asia
Korea Investment Corporation	Asia
Kuwait Investment Authority	Asia
Libyan Investment Authority	Africa
National Development Fund of Iran	Asia
New Zealand Superannuation Fund	Asia
Nigeria Sovereign Investment Authority	Africa
Palestine Investment Fund	Asia
Qatar Investment Authority	Asia
Russian Direct Investment Fund	Europe
State General Reserve Fund	Asia
State Oil Fund of the Republic of Azerbaijan	Europe
The Pula Fund	Africa
Timor-Leste Petroleum Fund	Asia
Turkey Wealth Fund	Europe

Table A1.5 – IFSWF members by country

Fund Name	Country
Abu Dhabi Investment Authority	The UAEmirates[3]
Agaciro Development Fund	Rwanda
Alaska Permanent Fund	The United States
Budgetary Income Stabilization Fund	Mexico
CDP Equity SpA	Italy
China Investment Corporation	China
Fondo de Ahorro de Panamá	Panama
Fundo Soberano de Angola	Angola
Future Fund	Australia
GIC Private Limited	Singapore
Heritage and Stabilization Fund	Trinidad & Tobago
Intergenerational Trust Fund for the People of the Republic of Nauru	Nauru
Ireland Strategic Investment Fund	Ireland
Ithmar Capital	Morocco
Joint Stock Company Sovereign Wealth Fund Samruk-Kazyna	Kazakhstan
JSC National Investment Corporation of the National Bank of Kazakhstan	Kazakhstan
Khazanah Nasional Berhad	Malaysia
Korea Investment Corporation	Korea
Kuwait Investment Authority	Kuwait
Libyan Investment Authority	Libya
National Development Fund of Iran	Iran
New Zealand Superannuation Fund	New Zealand
Nigeria Sovereign Investment Authority	Nigeria
Palestine Investment Fund	Palestine
Qatar Investment Authority	Qatar
Russian Direct Investment Fund	Russia
State General Reserve Fund	Oman
State Oil Fund of the Republic of Azerbaijan	Azerbaijan
The Pula Fund	Botswana
Timor-Leste Petroleum Fund	Timor-Leste
Turkey Wealth Fund	Turkey

[3] The United Arab Emirates

Chapter 2: How to set up sovereign wealth funds

Abstract

In this paper, we perform a review of the literature on the history of sovereign wealth funds (SWFs) concerning their emergence, name and definition, as different perspectives were found among researchers. After collecting this information, we conclude that the best guidelines to follow are those described by the International Monetary Fund (IMF) established in the Sovereign Wealth Funds Generally Accepted Principles and Practices (SWFs GAPP) (2008). According to this document, the history of SWFs dates from 1953 with the constitution of the Kuwait Investment Authority. Regarding the name, they denominate them as SWFs, and lastly, the definition is described in this document.

JEL Classification: N00, *F01*, *F21*.

***Keywords*:** Sovereign Wealth Funds (SWFs), Sovereign Wealth Funds Generally Accepted Principles and Practices (SWFs GAPP), International Monetary Fund (IMF).

Como definir os Fundos Soberanos

Resumo

Neste artigo efetuámos uma revisão de literatura sobre a história dos Fundos Soberanos (FS) no que diz respeito ao seu surgimento, nome e definição a adotar, pois encontrámos diferentes perspetivas sobre estes tópicos entre os investigadores. Após agregarmos informações sobre estes pontos, concluímos que as melhores diretrizes são as descritas pelo Fundo Monetário Internacional (FMI) que estão consagradas nos Princípios e Práticas geralmente aceites dos FS (2008). Segundo este documento a história dos FS iniciou-se com a constituição do *Kuwait Investment Authority* em 1953. Em relação ao nome, denominam-nos como FS e a definição está espelhada neste documento.

Classificação JEL: N00, *F01*, *F21*.

***Palavras-chave*:** Fundos Soberanos (FS), Princípios e Práticas geralmente aceites dos Fundos Soberanos (SWFs GAPP), Fundo Monetário Internacional (FMI).

1. Introduction

Sovereign wealth funds (SWFs) are a topic that has been more thoroughly explored since they grew rapidly in the two thousands (Rozanov, 2005). In addition, Jen (2007) argues that they only appeared a few decades ago. Moreover, for this author, SWFs can be a good instrument for the public sector to gain influence over financial markets due to the transformation of the equilibrium of power with globalisation. In fact, SWFs are a new type of investment and currently there is little information about them and few studies have been applied to them.

However, we believe that they can be used in a positive way for world economies and we consider that exploring this topic is a priority. With the public debt crisis that we have witnessed in some countries in the European Union (EU) and the United States (US) in recent years, it has become more urgent to establish and search for ways to manage the economic stability of countries and to ensure guarantees for future generations. SWFs can stimulate and stabilise an economy, shielding it from some types of fluctuations, shocks and risks. In a certain way, they can work like savings, which then are used to invest in some types of actives where they have financial returns (Blundell-Wignall et al. 2008). In recent years, this asset pool has continued to grow so that they can have a potential impact on various asset markets.

Rozanov (2005) points out another of their characteristics and says that they are used to accumulate massive foreign exchange reserves. This is another reason to look closely at them, and he has some doubts as to whether SWFs act like a central bank (CB). On this idea, Aizenman and Glick (2008) argue that they are fundamentally different from monetary authorities that hold official foreign reserves because CBs need a short investment horizon and low-risk tolerance. Still they invest in conservative foreign exchange reserves and safe marketable instruments that are readily available to monetary authorities to meet the balance of payments needs. In contrast, SWFs typically seek to diversify foreign exchange assets and earn a higher return by investing in a border range of asset classes, including longer-term government bonds, agency and asset-backed securities, corporate bonds, equities, commodities, real estate, derivatives and foreign direct investment.

Despite their relevance and the wide existence of studies about SWFs, upon starting to examine information about SWFs in the literature, we found different perspectives concerning some points. Therefore, we will explore three notions in this paper: their emergence, the name attributed to them and their definition. To accomplish this objective, we will make a survey of SWFs and a comprehensive literature review.

First, we want to find a consensus about the emergence of SWFs. Rose (2011) and Aguilera et al. (2016) consider that the history of SWFs dates back to 1854 when the Texas Permanent School Fund was founded. However, for other authors like Beck and Fidora (2008), the history of SWFs is more recent, and the Kuwait Investment Authority was the first to be founded in 1953. Regarding their defined name, until the present they have been identified by many different names like commodity stabilisation funds, copper stabilisation funds or oil funds. Only in 2005 Rozanov give them the name SWFs, but we still find different names in some studies.

The last point is about their definition; this is what is most debated in the literature. We consider it very important to decide which type of definition to adopt for our studies as, based on this, we will define which SWFs to consider. In general terms, SWFs have several sources of capital such as foreign exchange reserves from the sale of scarce resources such as oil or general tax and other revenues. They have a number of potential objectives, some of these being to diversify assets, to get a better return on reserves, to provide pensions in the future, to provide savings for future generations when natural resources run out, to create price stabilization schemes, to promote industrialization and to promote strategic and political objectives (Blundell-Wignall et al. 2008). However, on 30 April 2008, the International Forum of Sovereign Wealth Funds (IFSWF) was established, and in October 2008, they published the Sovereign Wealth Funds Generally Accepted Principles and Practices (SWFs GAPP), "Santiago Principles" that established a general definition. Nevertheless, the discussion remains open until the present day.

This paper is divided into four parts (five including the references). In the second section, we will perform a comprehensive literature review, which will be essential to make our conclusions. In the third section, we will achieve how to set up an SWF, writing about the state of the art of the topics we are exploring. In the fourth section, the main conclusions can be found.

2. Literature review

As stated in the previous section, when we started to review the literature on SWFs, we found different perspectives. Therefore, in this paper, we will deconstruct some notions about their emergence, name and definition.

Regarding the emergence of this type of funds, authors like Hildebrand (2007), Bakker et al. (2008), Rose (2011), Chwieroth (2014), Aguilera et al. (2016), and the SWFs GAPP, "Santiago Principles" (2008) mention different dates for the constitution of the first SWF. Rose (2011) and Aguilera et al. (2016), consider that the history of SWFs dates from 1854 with the constitution of the Texas Permanent Fund. This fund was constituted with a $2,000,000 appropriation by the legislature of the same year, for the benefit of public schools in Texas. The value applied in the fund was the result of a $10 million payment from the US government in exchange for giving up claims to western lands claimed by the former Republic of Texas (Texas Permanent School Fund, An Investment Fund of the State of Texas Comprehensive Annual Financial Report Fiscal 2016). In 2016 Hay and Beaverstock stated that subnational SWFs do not have the same weight with regard to geopolitics and the international political economy as SWFs supported by nation states. For authors like Hildebrand (2007), Bakker et al. (2008) or Chwieroth (2014), and in the SWFs GAPP, "Santiago Principles" (2008) the history of SWFs dates back to 1953 when the Kuwait Investment Authority (KIA) was established in London. The capital is from oil revenues and it is a fund that has the objective of protecting Kuwait from the depletion of its finite natural resources of oil in order to improve the welfare of future generations.

Afterwards, we found that until 2005, researchers gave several names to SWFs. Due to the fact that only when Rozanov (2005) wrote a paper about their growth in number and volume around the year two thousand, did he give them the name SWF and then, in general, the name began to be applied to this type of funds. Further, Johnson (2007) might say that SWFs was a new name for something that had exist for some years. Until their work, various names for them could be found in the literature, which impeded research and the certainty that when we read a paper, they are writing about SWFs. Nevertheless, with a brief exploration, we can see that before 2005 some authors, Arrau and Claessens (1992) and Davis et al. (2001) refer to them as commodity stabilisation funds, copper stabilisation funds, non-renewable resource funds or oil

funds. To complement this, in 2008 the IFSWF for SWFs was established and adopted this denomination from the outset.

Nevertheless, the point in which we find more controversy, due to different perspectives, was the definition of SWFs. In view of this, we will present a script and tables which summarise different opinions in order to reach a conclusion and understand the path of this topic better. For us, as mentioned above, it is essential to use the correct definition for them to apply in our papers as a guideline.

For Capapé and Guerrero (2013), most authors are in consensus that SWFs are investment vehicles, and that they are in the hands of governments.

Rozanov (2005) put funds which the source is from non-commodity or natural resources in the same group. In their opinion, they are constituted of national budget surpluses and they have a long-term investment strategy and expenditure constraints. Usually, their objectives are to protect the budget of an economy from the volatility of revenues, help monetary authorities avert unwanted liquidity, create savings for future generations or use the cash for economic and social welfare.

Jen (2007) defines SWFs as government investment vehicles that have equities, corporate bonds, and other assets in their portfolio, all with more risk than the investment made by official reserves. For him, they appear to help block out instabilities from oil prices on the budget, monetary policy, and the economy of oil-exporting countries. However, with the recent profile, SWFs have evolved from ‘stabilisation funds’ to ‘wealth accumulation’ or ‘wealth preservation’ funds.

According to Johnson (2007), SWFs and other forms of investment supported by the government may inspire capital protection, via which countries choose what to invest in. He claims that the International Monetary Fund (IMF) does not have the responsibility of doing something about the lack of knowledge of information about SWFs. However, this were the first institution to advise countries with non-renewable resources to have funds with savings for rainy days, and it is time to know what information they have and are willing to give.

For Hildebrand (2007), they are government-owned investment corporations which invest their reserves in foreign currency assets and they are usually managed separately from CB reserves. However, unlike other publicly owned pools of capital, such as social security funds or public pension funds, SWFs have no explicit liabilities.

According to Blundell-Wignall et al. (2008), SWFs are like pools with assets owned and managed directly or indirectly by governments to reach national objectives like diversification and improvement of return on foreign exchange reserves or commodity. Typically, they come from oil revenues and their objectives are to shield domestic economy from fluctuations in commodity prices, to provide sustainability for future generations when natural resources run out, to promote industrialisation and to promote strategic and political objectives. They may be constituted with the value of foreign exchange reserves or with the revenues from the sale of scarce resources such as oil and from the general tax. They hold that a single accepted definition does not exist.

For Aizenman and Glick (2008), SWFs are savings funds controlled by sovereign governments that hold and manage foreign assets. Usually, they are commodity SWFs which are funded with commodity and non-commodity exports, typically by the transfer of assets from official foreign exchange reserves. Generally, they are established for various purposes which can be for stabilisation of fiscal revenues, management of inter-generational savings, or to sterilise the effects of balance of payments inflows on domestic inflation. In some cases, these savings are used as a financial stabiliser if commodity prices fall. In other cases, SWFs serve as a mechanism to transform concentrated exposure of public assets to volatile commodity prices into a more balanced and diversified exposure, thereby protecting the income of future generations. Typically, they make little use of leverage, in contrast to hedge funds and private equity funds. SWFs might differ from large institutional private investors such as mutual and insurance funds. However, they hold assets and generally do not have specific liabilities to be paid to shareholders or policyholders. They differ from sovereign pension funds in that the latter, while government-owned, have explicit liabilities, such as worker pensions. For this reason, SWFs have typically had less incentive to be transparent about their investment and management practices.

After this, Beck and Fidora (2008) give an overview of the impact of SWFs on global financial markets, and they expose three elements for the definition of SWFs: they are state-owned, they do not have explicit liabilities or these are limited, and finally their management is separate from official foreign exchange reserves. They mention that most of the countries that have constituted SWFs are resource-rich economies, and they have the purpose of making savings for future generations. Another group of them, many from Asia, are constituted with reserves that they accumulate over time,

which may be required for intervention or balance-of-payment purposes. They state that the IMF was working on a definition for SWFs.

For Allen and Caruana (2008), they are government-owned investment funds, set up for a variety of macroeconomic purposes. Commonly they are funded by the transfer of foreign exchange assets that are invested in the long term, overseas. They distinguish five types of SWFs based on their main objective: (i) *stabilization funds*, whose primary objective is to insulate the budget and the economy against commodity (usually oil) price swings; (ii) *savings funds* for future generations, whose aim is to convert non-renewable assets into a more diversified portfolio of assets and mitigate the effects of Dutch disease; (iii) *reserve investment corporations*, whose assets are often still counted as reserve assets, and are established to increase the return on reserves; (iv) *development funds*, which typically help socio-economic projects or promote industrial policies that might raise a country is potential output growth; and (v) *contingent pension reserve funds*.

Gieve (2008), says that what he had in mind was a government investment vehicle that manages foreign assets with higher risk tolerance and higher expected returns than for CB foreign currency reserves.

In the same year (2008) on 30 April and 1 May, the International Working Group (IWG) for SWFs was established. They changed the name to IFSWF in 2009, and in October of 2008, they published the SWFs GAPP, "Santiago Principles". The IFSWF had three meetings in the year to discuss investment practices and objectives that are now established in the principles. Until 2017, they had thirty-one members from thirty countries around the world. This group was initiated and coordinated by the IMF. Their objectives are: to help maintain the stability of the global financial system; to meet the terms of all the applicable regulations and requirements of the countries where the funds made investments; to make investments considering the returns versus the financial risk that the fund incurs; and to have a transparent governance structure.

With the SWFs GAPP, "Santiago Principles", the following definition was determined:

"SWFs are defined as special purpose investment funds or arrangements, owned by the general government. Created by the general government for macroeconomic purposes, SWFs hold, manage, or administer assets to achieve financial objectives, and employ a set of investment strategies which include investing in foreign financial

assets. The SWFs are commonly established out of balance of payments surpluses, official foreign currency operations, the proceeds of privatizations, fiscal surpluses, and/or receipts resulting from commodity exports."[4]

Even with this definition, the discussion in the literature remains open. It is our objective to discuss this and to look at the state and evolution of the different opinions about the definition. The Financial Stability Review European Central Bank (ECB 2009) states that SWFs are usually created with reserves or other foreign currency sources like commodity or export revenues, although they consider that they are special investment funds created/owned by a government that have assets with long-term purposes. Helleiner (2009), claims that the definition varies from author to author. Generally, they are defined as state-owned or state-controlled pools of capital that invest partially outside the country.

Moreover, in April 2009 the Monitor Group and Fondazione Eni Enrico Mattei formulated a definition where the focus was to meet five criteria that differentiate them from other government-owned investment vehicles. They are transcribed below.

"1. It is owned directly by a sovereign government;

2. It is managed independently of other state financial institutions;

3. It does not have predominant explicit pension obligations;

4. It invests in a diverse set of financial asset classes in pursuit of commercial returns;

5. It has made a significant proportion of its publicly reported investments internationally".[5]

They made an exception to the first criteria for funds based in Abu Dhabi, Dubai, and Ras Al Khaimah because they believe that the emirates within United Arab Emirates federation possess decision rights but they do not believe that sub-national governments in North America possess decision rights.

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[4] Source: SWFs GAPP, "Santiago Principles", 2008.

[5] Source: Monitor Group and Fondazione Eni Enrico Mattei 2009

Coissard et al. (2010), mentioned that a universal definition for SWFs does not exist. For these authors, the two sources of data do not have the same criteria and classification; some are considered SWFs by the IFSWF but not by the Monitor Group and Fondazione Eni Enrico Mattei. For these authors, the IMF definition is more rigid, although their position is not steady. For them, it is ideal to follow the principles described in the Santiago Principles made by the IFSWF. Moreover, two criteria exist to classify them: the origin of resources, like the surplus of the balance of trade or exportation of commodities, and the political objectives like stabilisation funds, saving funds, funds to increase the reserves, development funds or reserve funds.

Later, Rose (2011) mentions that they are defined as "government-owned and controlled (directly or indirectly) investment fund that has no outside liabilities or beneficiaries (beyond the government or the citizenry in abstract) and that invest their assets, either in the short or long-term, according to interests and objectives of the supporting government."[6] For Rose, under this definition, we can consider the funds that operate under the "endowment" model, and because of this some SWFs created by acts of the U.S. Congress and state legislatures cannot be considered SWFs. He concludes that funds that do not have designated beneficiaries outside of governments and citizens in general, arguably a constraint to categorisation as SWF.

Chwieroth (2014), mentions that an agreement about the definition of SWFs does not exist, but he argues that most authors agree on the fact that SWFs are government-managed investment vehicles and they purchase international assets with national savings without incurring significant explicit short-term liabilities. He explains that this definition only considers pension reserve funds, which do not have explicit pension liabilities and excludes funds that only invest in domestic assets, government-employee pension funds, social security funds, government lending funds and government-owned banks and enterprises. Based on their primary funding source, he divides them into three categories: those who receive funds from commodity, others from reserves transferred from the CB and lastly from budgetary surpluses.

[6] Rose, Paul. 2011. American Sovereign Wealth.

Gelb et al. (2014) describe that SWFs represent a large and growing pool of savings. Many are owned by natural resource-exporting countries and have long-term objectives, including inter-generational wealth transfer. Traditionally these funds have invested in external assets, especially securities traded in major markets for several reasons including sterilisation and lack of domestic investment opportunities. Over time, and in part reflecting low returns in developed countries after the financial crisis, their investment holdings have broadened to include real property and investments in developing economies. Potentially competitive returns in developing economies and the sharp reductions in traditional sources of long-term financing after the financial crisis have contributed to growing interest among national authorities in permitting and even encouraging the national SWF to invest domestically, to finance long-term infrastructure investments. Such pressure is inevitable, because many countries with substantial savings, several of them recent resource-exporters, also have urgent needs. A few existing SWFs now invest a portion of their portfolios domestically, and more are being created to play this role.

For Megginson and Fotak (2015), definitions diverge because there are significant differences between funds concerning organisational structure, investment objectives, compensation policies and status of fund managers and degree of financial transparency. However, generally, they are defined as state-owned investment funds that make long-term domestic and international investments in search of commercial returns. In their survey, the base of the definition that they use is of the Sovereign Investment Laboratory, which is now constituted by the research team that worked in the Monitor Group and Fondazione Eni Enrico Mattei. In the end, they say that this sounds clear, but ambiguities remain.

These are some points about SWFs that hinders study about them. In order to develop a better work is it important for us to clarify these questions.

3. How to define SWFs

As we mentioned above during our study about SWFs, we found different points of view about some topics that raised doubts in our mind. As described in the previous section, some of them are: When was the first constitution of a SWF? Which name should we

give to them? What is the best definition for SWFs? After this course and based on the diverse literature that we read, we will summarise what we read in order to make a conclusion for our questions.

The two first questions are less complex, and we will begin with them. Therefore, in the literature, we found that the authors diverge in their opinions regarding the emergence of SWFs. For Rose (2011) and Aguilera et al. (2016) the history of SWFs dates back to 1854 when the Texas Permanent Fund was constituted. For others like Hildebrand (2007), Bakker et al. (2008), Chwieroth (2014), and in the SWFs GAPP, "Santiago Principles" (2008), KIA is considered to be the first fund to be established in the year of 1953 in London.

Then we find different ways of naming this type of investment. Arrau and Claessens (1992) and Davis et al. (2001) gave names like commodity stabilisation funds, copper stabilisation funds, non-renewable resource funds or oil funds, adapted to their various purposes, shielding budgets from revenue uncertainty, volatility and making savings for future generations. Despite their long existence, it was only in the year 2005 that Rozanov gave them the name SWFs, as they were boosted with the growth of this type of investment near the 2000s.

As regards the last point, the definition of SWFs became more complex once we found more perspectives. We read a lot of papers about the topic but some of them do not mention a definition , and others adopt the same definition. So upon finishing this collection, we considered approximately seventy papers to reach a conclusion about the best definition to adopt. Considering just papers since 2005, when they gained the name SWFs, we can find various ideas. We organised the main characteristics that the authors use to define SWFs into five categories; source of capital to constitute them, ownership, type of investments that they make, objectives that they want to accomplish with their revenue, and their characteristics about liabilities.

Starting with the first point, the source of capital used to constitute SWFs for the authors are diverse. For Rozanov (2005), Johnson (2007), Beck and Fidora (2008) and Gelb et al. (2014) they are constituted with revenues from natural resources that are non-renewable and non-commodity. Blundell-Wignall et al. (2008) consider that the source of the capital is from foreign exchange reserves and revenues from the sale of scarce resources similar to the first authors mentioned. For Aizenman and Glick (2008), the main source of capital is from commodity and non-commodity and the ECB (2009)

mention in their financial stability report that they use reserves or other sources of foreign currency like commodity exports. Chwieroth (2014), refers to national savings. Lastly the opinion of SWFs GAPP, "Santiago Principles" (2008) is that the source of capital is from commodities, balance of payments surpluses and official foreign currency operations. In Table 2.1 "Source of SWFs" below we have a brief summary of the opinions.

Table 2.1 – Source of SWFs

Author	**Year**	**Source**
Rozanov	2005	Natural resources and non-commodity.
Johnson	2007	Non-renewable resources.
Blundell-Wignall et al.	2008	Foreign exchange reserves and revenues from the sale of scarce resources.
Aizenman and Glick	2008	Commodity and non-commodity.
Beck and Fidora	2008	Natural resources and non-commodity.
SWFs GAPP, "Santiago Principles"	2008	Commodities, balance of payments surpluses and official foreign currency operations.
ECB	2009	Reserves or other foreign currency sources like commodities exports.
Chwieroth	2014	National savings.
Gelb et al.	2014	Natural resources.

As concerns ownership, the opinion of the authors that we considered does not diverge greatly. Jen (2007), Hildebrand (2007), Blundell-Wignall et al. (2008), Aizenman and Glick (2008), Allen and Caruana (2008), Gieve (2008), SWFs GAPP, "Santiago Principles" (2008), the Monitor Group and Fondazione Eni Enrico Mattei (2009), Rose (2011) and Chwieroth (2014) mention that they are owned by the government. However, Beck and Fidora (2008), and Megginson and Fotak (2015) state that they are state-owned, which we consider is a different way to say owned by the government.

Concerning the type of investments made, Rozanov (2005), and Allen and Caruana (2008) describe that they are long-term investments. Bortolotti et al. (2014) adds domestic and international investments. Rose (2011) adds short-term investments, while others like Monitor Group and Fondazione Eni Enrico Mattei (2009) and Chwieroth (2014) talk about international assets. Jen (2007) says that they invest in equities, bonds and other assets with more risks than the investment made by official reserves. Aizenman and Glick (2008) mention that they make little use of leverage in contrast to hedge funds and private equity funds. For Gieve (2008), SWFs have higher risk tolerance and higher expected returns than CBs. For Gelb et al. (2014), SWFs apply their revenues in external assets, in other words internationally, especially securities traded in major markets including sterilisation and lack of domestic. In the built definition made by SWFs GAPP, "Santiago Principles" (2008), the assets and the various investment strategies include investing in foreign financial assets. Below in Table 2.2 "Investment type done by SWFs" we have a summary.

Table 2.2 – Investment type done by SWFs

Author	Year	Investment type
Rozanov	2005	Long-term investment.
Jen	2007	Equities bonds and other assets with more risks than the investment made by official reserves.
Aizenman and Glick	2008	Little use of leverage in contrast to hedge funds and private equity funds.
Allen and Caruana	2008	Long-term investments.
Gieve	2008	Higher risk tolerance and higher expected returns than CBs.
SWFs GAPP, "Santiago Principles"	2008	Assets and various investment strategies that include investing in foreign financial assets.
Monitor Group and Fondazione Eni Enrico Mattei	2009	Invests in a diverse set of financial asset classes in pursuit of commercial returns and internationally.
Rose	2011	Short-term or long-term investment.
Chwieroth	2014	International assets.

Table 2.2 – Continued

Author	Year	Investment type
Gelb et al.	2014	External assets, especially securities traded in major markets including sterilisation and lack of domestic.
Megginson and Fotak	2015	Long-term investment, domestic and international.

The fourth point concerns the objectives of SWFs. In general terms, their purposes are related to special and macroeconomic purpose investments as we can ascertain in the definition by SWFs GAPP, "Santiago Principles" (2008). Some of them are related to social welfare, while Rozanov (2005), Blundell-Wignall et al. (2008), Aizenman and Glick (2008), Beck and Fidora (2008), Allen and Caruana (2008) and Gelb et al. (2014) mention that they make savings to help future generations and for social welfare. Others are related to economic and politic development like Blundell-Wignall et al. (2008), who mention that they promote industrialisation and promote strategic and politic objectives.

In economic terms they have objectives like protecting the budget of an economy, blocking instabilities from oil prices, helping economies that are oil-exporting countries, protecting commodities from fluctuations in prices, stabilizing fiscal revenues. These are some points cited by Rozanov (2005), Jen (2007), Blundell-Wignall et al. (2008), Aizenman and Glick (2008). Even so, Allen and Caruana (2008) describe that they have various macroeconomic purposes and work like stabilisation funds, reserve investment corporations or development funds. They have objectives linked with helping monetary authorities or diversifying and improving the return on foreign exchange reserves; Rozanov (2005) and Jen (2007) mention these in the definition that they present. In Table 2.3 "Objectives of SWFs", we made a summary of their objectives.

Table 2.3 – Objectives of SWFs

Author	Year	Objectives
Rozanov	2005	Protect the budget of an economy, help monetary authorities, save for future generations and for social welfare.
Jen	2007	Block instabilities from the oil price, monetary policy, and help economies that are oil-exporting countries.
Blundell-Wignall, et al.	2008	Diversify and improve the return on foreign exchange reserves or protect the commodities from fluctuations in prices, help future generations, promote industrialisation, promote strategic and political objectives.
Aizenman and Glick	2008	Stabilisation of fiscal revenues, management of inter-generational savings, sterilising the effects of balance of payments inflows on domestic inflation.
Beck and Fidora	2008	Constitute savings for future generations.
Allen and Caruana	2008	Various macroeconomic purposes, stabilisation funds, reserve investment corporations, development funds.
SWFs GAPP, "Santiago Principles"	2008	Special purpose investment with macroeconomic purpose.
Gelb et al.	2014	Long-term objectives, including inter-generational wealth transfer.

Regarding the characteristics which concern liabilities, Hildebrand (2007), Aizenman and Glick (2008), Beck and Fidora (2008) and Rose (2011) mention that SWFs have no explicit liabilities and to combat this the SWFs GAPP, "Santiago Principles" (2008) proposes that the policy should be clearly defined and publicly disclosed.

Having done this survey and gathered the opinions, we are prepared to take a position and to explain our conclusions, in the next section, about the three topics that we discuss in this paper.

4. Conclusion

As mentioned above, based on the literature and different perspectives from the various authors, we will now express our opinion about the three topics that we discussed in the course of this paper. First we will express our opinion about the definition, which will help us define the other two answers: when the first constitution of SWFs was and which name to give to them.

In this journey, we read more than fifty papers that include a definition for SWFs, and we found that more than thirty have different definitions. This confirms our feeling that too many different opinions exist about the topic. However, with this survey, we realise that we have two definitions that are best composed. One from the SWFs GAPP, "Santiago Principles" (2008) and the other from the Monitor Group and Fondazione Eni Enrico Mattei (2009). The other definitions that we encountered in the literature are not as embracing as these two. However, the definition made by Monitor Group and Fondazione Eni Enrico Mattei (2009) it was only identified in three papers and considered studies which do not give us too much confidence to use it. We think that the first one mentioned is firmer, better planned and less restricted. To support our stance, we find authors like Coissard et al. (2010), who have the same opinion. They say that the definition made by the SWFs GAPP, "Santiago Principles" (2008) is stronger and comprehensive than the one formulated by the Monitor Group and Fondazione Eni Enrico Mattei (2009). They also say that more type of funds can be considered with the first definition than with the second.

Thus, we encountered five works made by the IMF some with the collaboration of the Organisation for Economic Co-operation and Development (OECD) around the composition of the best definition. Some of the work originate from the IFSWF and the SWFs GAPP. Eight other papers use the SWFs GAPP definition; considering that the definition was closed in 2008, and we are in 2017, we think that it is a good acceptance of the definition. They have another good point: the IFSWF holds meetings periodically which keeps this type of investment alive and in progress and all the theory around them. Then they support the definition and the investments with the principles. Therefore, the IFSWF is good to develop the topics in this field and to make the information about this funds and resilient the use of them more transparent.

For us, these are excellent points to make the definition more reliable, and the evolution of the SWFs clearer. They receive input from a few recipient countries, the European Commission that is acting on behalf of the European Commission, the OECD, and the World Bank. To complement the work, the IMF facilitated and coordinated the IFSWF is work acting as its secretariat.

Taking this into account, we decided to considered the SWFs GAPP, "Santiago Principles" (2008) definition, because we think that it is more robust and structured than the others. Having defined this step, we can answer the other two questions because they have a clear and straight opinion. For them, the first constitution of a fund was in the year 1953 in London with KIA. Lastly, they adopt the name SWFs which Rozanov (2005) gave to them and for us this is the one that best describes this type of investments.

Therefore, we consider that we have set up SWFs in the most significant way to do studies or to understand them better.

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Chapter 3: Which country characteristics attract sovereign wealth fund investments

Abstract

The aims of this paper are to study whether the investments of sovereign wealth funds (SWFs) are influenced by economic, financial, political, social and geographic variables. Using data about the investments from the Government Pension Fund Global in 98 countries from 1998 to 2016, we apply a gravity model. This led us to the following conclusions: gross domestic product, stock market capitalization, corruption perception index, political stability and absence of violence, and distance are statistically significant at the 1% level for the dependent variable. The first ones have a positive effect and distance a negative effect. The existence of a common border is statistically significant at 10% with a positive effect. These variables prove to be country characteristics that attract SWF investments.

JEL Classification: *F01, F21, G15, O16.*

Keywords: Sovereign Wealth Funds (SWFs), Investments, Gravity Model (GM), Government Pension Fund Global (GPFG).

Quais as características dos países que atraem os investimentos dos Fundos Soberanos

Resumo

Os objetivos deste artigo são os de aferir se os investimentos efetuados pelos Fundos Soberanos (FS) são influenciados por variáveis económicas, financeiras, sociais e geográficas. Utilizámos os dados dos investimentos efetuados pelo *Government Pension Fund Global* em 98 países entre 1998 e 2016 e aplicámos um modelo gravitacional, com o qual obtivemos as seguintes conclusões: o Produto Interno Bruto, a Capitalização do Mercado Bolsista, o Índice de Perceção da Corrupção, a Estabilidade Política e a Ausência de Violência e a distância são estatisticamente significantes a 1% para a variável dependente. As primeiras variáveis têm um efeito positivo e a distância tem um efeito negativo. A existência de uma fronteira comum é estatisticamente significante a 10% com um efeito positivo. Estas variáveis provaram que são características dos países que atraem os investimentos dos FS.

Classificação JEL: F01, F21, G15, O16.

Palavras-chave: Fundos Soberanos (FS), Investimentos, Modelo Gravitacional (MG), Government Pension Fund Global (GPFG).

1. Introduction

According to Rozanov (2005) in his paper "Who holds the wealth of nations?", the investments made by sovereign wealth funds (SWFs) have grown in recent years. Later, Jen (2007) states that globalisation has not only disturbed the balance of power between the US and the rest of the world, it has also altered the balance of power between the public and private sector, and one of the channels in which the public sector can gain influence over financial markets is an SWF. With these two premises, we consider it to be very important to study these funds and ascertain if some indicators that are used to measure the performance of the countries in several areas help to attract the investments made by SWFs.

To explore the topic, we decide to apply a gravity model (GM) with data from a Norwegian SWF, the Government Pension Fund Global (GPFG), which was set up in 1990. While this fund is not a member of the International Forum of Sovereign Wealth Funds (IFSWF) it fully supports these principles and is treating your adherence. However, it ranks first in the Sovereign Wealth Funds Institute league table of largest public funds in the SWF category in June 2017.[7] We attempted to do this study for other funds, insufficient available data was found. Further, in the second quarter of 2017, the fund had ten points in the Linaburg-Maduell Transparency Index which was developed at that institute by Carl Linaburg and Michael Maduell.[8] The IFSWF helps to improve good governance practices of the members exchanging experiences and applying the Santiago Principles.

We decided to use the GM to analyse whether economic, financial, political, social and geographic indicators attract the investment decision of SWFs. We found no works that study the investments made by SWFs taking into account the indicators of recipient countries with this type of model. However, we think that it can give some good explanations about the selection of investments by SWFs because it is usually used to explain the patterns of bilateral trade, capital flow and migration between countries.

[7]Source: https://www.swfinstitute.org/sovereign-wealth-fund-rankings/

[8]Source : https://www.swfinstitute.org/statistics-research/linaburg-maduell-transparency-index/

Usually, the authors use Newton is law of universal gravitation as an analogy to explain what a GM is. It says that the attraction between two bodies is proportional to the product of their masses and inversely related to the distance between them. In its most basic form, trade between country I and country j is proportional to the product of gross national product I (GNP) and GNP j, and inversely related to the distance between them. They often add variables like population, land areas, and dummy variables representing common borders, common languages, and common membership in regional trading arrangements (J. Frankel 1997).

Tinbergen (1962) was the first to use a GM to explain the international flows of trade. He defines GDP and distance as base variables of the model. Later, Anderson (1979) used a proxy for borders between countries and other authors like Linnemann (1966) and Deardorff (1995) gave different theoretical considerations.

This paper is divided into four sections. In the second section, we will review the literature on works that inspired the study. In the third section, we will have some theory about SWFs and the GPFG, and we will express the hypothesis that we intend to test. Having completed these steps, in the same section, we will formulate our model and test our hypothesis before data collection. In the fourth and last section, we transcribe our main conclusions.

2. Literature review

In this work, we want to check if the investment choices made by SWFs are influenced by indicators that characterise the recipient countries in several areas. To test our ideas, we decided to use a GM as stated in the previous section. The GM has been used to explain bilateral trade, capital flows and migration between countries. The model is inspired by Newton is law of universal gravitation – in mathematical terms, the force equals the product of the two masses multiplied by the gravitational constant and divided by the square of the distance (M. Almeida and M. Costa, 2012). This principle explains the fact that each variable observation of GPFG will be multiplied by the variable observation of each country where the GPFG made their investments. For example, we will have the GDP observation for the country of the GPFG fund I that will be multiplied by the GDP of country j where the fund of country I made their

investments. Moreover, the type of data that we will use in some way characterises the weight of the economies that are proportional to talk about economies' mass. The axiom of this model says that the flow of trade between the two countries is positively related to the mass of the economy and negatively related to the distance between the countries (Frankel, 1997). This model defines bilateral trade as a function of two key variables, the economic mass of two countries and the distance between them, but we can add another type of variable that may be interesting for the work.

Now we will write about the application of this model in the general history of the discipline of economics. Tinbergen (1962) introduced the model, and it was the winner of the first Alfred Nobel Memorial Prize for economics in 1969 (Starck, 2012). Their sample had forty-two countries, and the GM was tested to explain the international trade flow. This was when he defined that the basic model needs to have GDP and distance as base variables; below we put the equation (1) that represents this format and the description of the variables. Other theoretical considerations were made by Linnemann (1966), and in 1979, Anderson demonstrated the importance of shared border effects, applying them in the GM equation. Then in 1995, Deardorff studied the determinants of bilateral trade.

$$F_{ij} = G\,\frac{M_i\,M_j}{D_{ij}} \qquad (1)$$

The variables have the following definitions:

F_{ij} – The volume of trade between country I and j

G – Constant

M_i – Economic greatness of country I, typically represented by GDP

M_j – Economic greatness of country j, typically represented by GDP

D_{ij} – Distance between the countries I and j

To complement the information about the developments in the GM through the years, in 2012, Starck discovered that, although this is one of the most applied models to explain international trade flows, she did not find much information about its evolution. First, the author states that in the traditional form of the equation, all the researchers put the variable GDP in positive relation to the bilateral trade flow, and the variable distance between countries with a negative relation. Her findings were that through the years, authors that use the models make certain developments. McCallum (1995) introduced the border puzzle in the GM, and he proved that they have a decisive effect on continental trade patterns. Anderson and Wincoop (2001) developed multilateral resistance, which allows the use of GM in international economics. Starck concludes that the GM is usually estimated like an ordinary least squares (OLS) regression analysis like equation (2) below.

$$\mathrm{Log}(X_{ij}) = \log A + \alpha \log(Y_i) + \beta \log(Y_j) - \gamma \log(D_{ij}) + \varepsilon_{ij} \qquad (2)$$

The equation can be understood as follows: if the exporting country is GDP (Y_i) grows by one per cent, the export volume grows by α per cent, everything else held constant. Also, if the distance between countries I and j grows by one per cent, trade flows will decline by γ per cent ceteris paribus. It is assumed that the error term ε_{ij} is independent and log-normally distributed.

Below we will present some works carried out with the GM by authors like Portes et al. (1999), Portes et al. (2001), Grinblatt and Keloharju (2001), Flavin et al. (2002).

Opening with Portes et al. (1999), they studied the market capital of Europe, US, and Asia, estimating transnational capital flows with a panel of fourteen countries for the years 1989 to 1996. They conclude that the flows depend on the dimension of the market, efficiency, transaction technology and information. Moreover, distance has an important role because it has a strong and robust effect on the flow of the transactions. They showed that the geographical component is very important in the international flow of assets.

In 2001, Portes et al. investigated the importance of the information concerning the transaction of shares, corporate bonds and public debt securities for foreign traders. For this they used bilateral flows between the US and forty advanced and emerging markets between 1988 to 1998. They conclude that the correlation of the transactions decreases with distance, although for the public debt securities distance does not have any influence in the negotiation. The results support the hypothesis that information asymmetries are responsible for the strong negative relation between transactions and distance.

Grinblatt and Keloharju (2001) then demonstrated with the stock market of Finland that the influences of distance, culture, and language are generally more important than we think. They conclude that in the investment choices made by institutions that have more experience, these three factors are less important, but for families and institutions that have less experience, they are very important. Because of this, they noted that it is more probable that an investor will hold, buy and sell the stocks of Finnish firms that are located close to the investor.

Later, Flavin et al. (2002) used the GM to explain the pattern of exchange in the market of assets, and stocks between countries. Their sample has twenty-seven countries for the year 1999. In the first phase, they consider the following variables: minimum distance between countries, their dimension, and sharing a common border. They also inserted variables like language, colonial linkages, and the currency. In the second phase of the work, they consider variables associated with the financial market. One of the innovations in the work was that they used the number of hours in which the markets of each country are open simultaneously. They conclude that geographic variables, ignorance of the language, and different accounting rules can be significant barriers in this type of transactions.

In order to complement our work, we researched works that have used the GM related to SWFs; two were found, one applied by Allen and Caruana (2008) and the other by Avendano (2012).

The first work was prepared by the Monetary and Capital Markets and Policy Development and Review Departments of the International Monetary Fund (IMF) and approved by Allen and Caruana (2008). This work aimed to analyse the repercussion for the international economy of the fast growth of SWFs in number and size with two objectives. First, to set ways to improve surveillance over the operations of SWFs due

to their importance for domestic economic policy and their effects on international financial markets. Second, to discuss a set of voluntary best practices which would provide guidance on how to improve institutional arrangements, organisational structures and risk management, and disseminate practices of information. The GM was used to asses the geographic distribution of SWF assets with the data of Norway and Temasek (Singapore). Because it was the available data, the model works better for the first set of data than for Temasek data which invests heavily in Asia. The results reinforce the fact that the geographic diversification of sovereign asset holdings may increase with the shift from reserve holdings to assets under management of SWFs. For instance, the US and other advanced economies would likely receive lower inflows if assets are held by SWFs rather then reserves. In summary, the GM application indicates that it is crucial to monitor the investments made by SWFs because thus we can access changes in capital flows to countries and the asset prices, all of which could have implications for financial stability.

After this, Avendano (2012), observed the investments made by SWFs from a firm-level perspective. He studied the investments made by SWFs during 2006-2009 as a function of the fund is objectives and characteristics. Due to this, he finds significant differences in investment allocation depending on factors like a commodity or non-commodity source of the revenue, investment guidelines of Organisation for Economic Co-operation and Development (OECD) or non-OECD and domestic or foreign investment destination. However, he discovers that the investments of the funds are naturally attracted to large firms. In the GM he has the following variables: distance as the original form of the model; USD total assets for the size; leverage; return on equity (ROE); research and development index; foreign sales; capital expenditure and dividend yield.

Knill et al. (2011) explore whether bilateral political relations have an influence on SWFs investment decisions because they find evidence in studies that investment motivations may go beyond the financial to include the political. The aim of the work, always considering political relations, was to evaluate if those characteristics determine the choice and amount to invest in a specific country. As regards the first point, they conclude, contrary to the foreign direct investments predictions in the literature, that SWFs make more investments in assets of countries where they have a weaker political relation. They say that this suggests that SWFs seams make investment decisions from a different perspective than other rational investors concerning

political relations. About the second point, they checked that this variable is of account in the determination of how much to invest in the assets. The major conclusion is that investments have a positive impact for relatively closed countries and a negative impact for relatively open countries and the results suggest that SWFs use non-financial motives in investment decisions.

However, the type of works that discuss and do econometric works with data about SWFs are scarce, perhaps due to the difficulty of obtaining or finding available data. Despite this, most works are about three themes. The first is about the lack of transparency of data and investments made and what can be done to improve this fact. The second point is about estimating the value of assets under management (AUM) by SWFs. In third place, most works that we encounter discuss the size of investments made and the implications of this for the international economy.

Regarding the first point, Jen (2007) states that only the GPFG of Norway has transparent reporting of its investment objectives, strategies, activities and performance. Transparency is an excellent way to deal with corruption, and it is good for recipient countries to accept capital inflows and minimise barriers to investment. In conclusion, how a SWF is transparent with their investments more open will be the market for their investments. He writes that it is very important to inform shareholders and the public about their options in the investments. Nonetheless, Blundell-Wignall et al. (2008) express their concerns about the fact that transparency is different between SWFs but, public pension reserve funds (PPRFs) seem to have better transparency maybe because they have a clear mandate and it is generally accepted wisdom in the area. This concern is greater when taking into account that they are growing rapidly. Gieve (2008) points out that would be good for transparency to grow in order to ensure that they contribute to further global financial integration rather than act as a catalyst for a new wave of financial protectionism.

As concerns the second theme, we found studies by Rozanov (2005), Johnson (2007), Hildebrand (2007) and Morgan Stanley Research Global (2007). Rozanov (2005), estimates that the aggregate total of this asset pool globally is at least $895 billion, which is still less than a quarter of the $3.8 trillion of the total reserves managed by central banks (CB) or a third of $3 trillion of American public pension money. Johnson (2007), says that they have existed since the 1950s and they have increased sharply in size over the past 10-15 years; in 1990 SWFs held, at most, $500 billion; and in 2007 he estimates $2-3 trillion, and for Johnson, SWFs would reach $10 trillion by 2012. He

writes that $3 trillion is significant but not huge taking into consideration that the US GDP is $12 trillion, the total value of traded securities, debt, and equities denominated in US dollars is estimated to be more than $50 trillion, and the global value of traded securities is about $165 trillion. Hildebrand (2007) presents an estimation of $2.2 trillion AUM for the fourteen largest SWFs that constitute nearly half the size of the world is total official foreign exchange reserves. For him, the assets managed by SWFs exceed the combined pool of assets managed by hedge funds and private equity firms but remain small compared with global pension funds ($21.6 trillion) and mutual funds ($19.3 trillion). The Morgan Stanley Research Global (2007) made another estimation of what the size of SWFs will be in 2015, and they say that SWFs will have powerful implications for the financial markets in a not distant future. They were increasingly concerned about financial globalisation, as a reaction to the emergence of these funds.

Concerning the third point, Rozanov (2005), Johnson (2007), Hildebrand (2007), Gieve (2008) and Ficova and Sipko (2014) also have opinions. For Rozanov (2005), it is very important to monitor these funds because their growth can have a potential impact on various asset markets. For Johnson (2007), a potential impact of a particular pool of money on financial stability depends not only on AUM but also on the potential leverage used in investment strategies. Moreover, Hildebrand (2007), warns that SWFs are growing rapidly; this can be good because they have been a welcome source of capital that can give strength to some of the worlds is largest financial institutions' balance sheets. However, it can be harmful because they can generate considerable political controversy and media coverage, because of their rapid growth. Gieve (2008) argues that the rapid growth of SWFs is a result of large and persistent global imbalances that have helped create vulnerabilities in the world economy and financial system. Ficova and Sipko (2014) conclude that the return of fourteen funds is closely related to fund value, GDP growth and inflation rate of the country at 95% probability.

Nevertheless, Al-Hassan et al. (2013), Bernstein et al. (2013) and Gelb et al. (2014) carried out works about investment strategies, governance, and all of these refer to the growth of SWFs.

Al-Hassan et al. (2013) explore information about governance structure and objectives of the investments, ensuring efficient operation and financial performance. They also discuss the importance of SWFs in macroeconomic management and the need for coordination with other macroeconomic and financial policies for the global financial stability; they have concerns about their rapid growth in the last years.

Bernstein et al. (2013) present diverse characteristics of SWFs: why they emerge, their estimated size, why are they an excellent opportunity for investment, but also what their limitations are. After the discussion of general points about SWFs, they consider the institutional arrangements under which many of the SWFs operate and how such arrangements can influence the effectiveness of their investments. In the conclusion of the work, they also refer to the lack of transparency and the rapid growth.

Gelb et al. (2014) propose some basic elements of a conceptual framework to ensure that SWFs do not undermine macroeconomic management or become a vehicle for politically driven investments. They show that SWFs represent a large and growing pool of savings and explain their elementary characteristics.

Given this state of the art of the works carried out on SWFs, our work aims to better understand their investments in the world economy. We want to ascertain whether the decisions to invest in assets are influenced by certain economic, financial, political, geographic or other type of variables of the chosen countries. For example, does the GDP of recipient countries of SWFs investments influence the investment choices of SWFs? Our motivation to do this work was that we did not find studies in the literature where the focus was the characteristics of SWFs' country of origin and the recipient countries of SWF investments. As we can find, Allen and Caruana (2008) analyse the repercussion of the fast growth of SWFs in number and size for the international economy with two objectives. Knill et al. (2011) tested if the political relations between countries influence their investments, and Avendano (2012) studied investments made by SWFs from a firm-level perspective. None of these works has the perspective that we want to explore in our work, but are good inspirations.

In summary, with this literature review, we have a brief description about the type of works that were done about SWFs and that use multiple types of variables. This will help us to refine what to develop in our study, although our perspective is different from their works. As regards the application of a GM now we have indications of the types of variables with which to compose the model. Some of them were defined in the first application of the model, like GDP and distance added by Tinbergen (1962), others have been aggregated through the years like border sharing added by Anderson (1979) and language that was added by Grinblatt and Keloharju (2001), as we can observe in Figure 3.1 "Base variables of GM through the years" below.

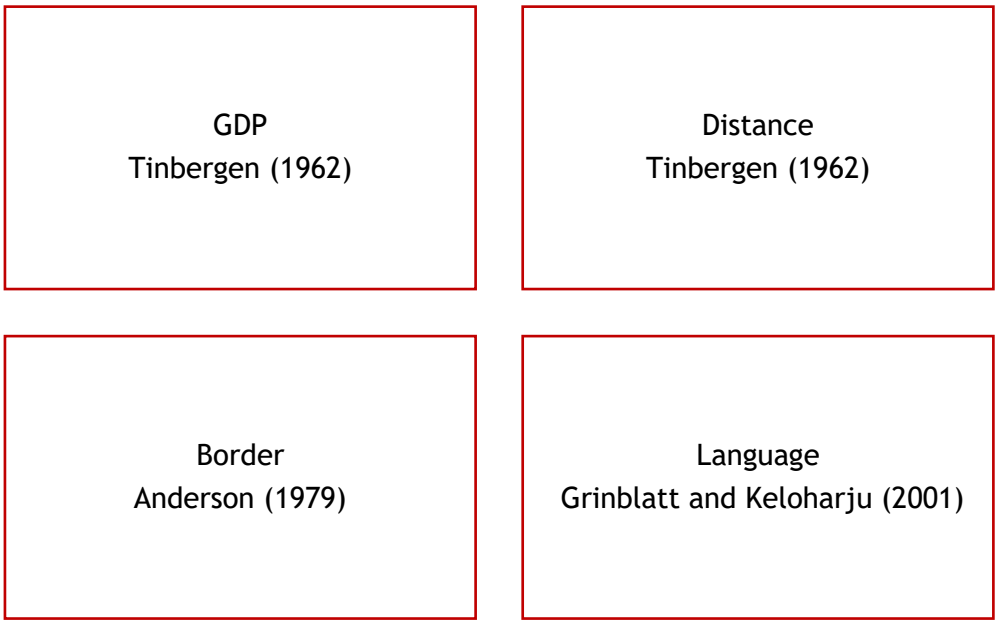

Figure 3.1 - Base variables of GM through the years

This brief literature review will help us to undertake our next step, which is choosing which hypothesis we want to test in our model and which variables to use in its formulation.

3. Data and methodology

3.1. Government Pension Fund Global

As we wrote previously, we will use the data of GPFG in our econometric study, because it was the only one that we encountered reported on their site.[9] GPFG was constituted in 1990 first with the name of Government Petroleum Fund, which they changed to the current name in 2006. The objectives of the fund are to manage petroleum wealth from a long-term perspective in the benefit of current and future Norwegian generations, shielding the country from the effects of oil price fluctuations. The capital of the fund is invested in equity, fixed income and real estate of diverse countries and currencies to have greater exposure to global economic growth and to achieve high long-term return with an acceptable level of risk through an efficient organisation. To clarify, despite its name the fund has no formal pension liabilities; no political decision was taken that says that the fund may be used to cover future pension costs.

Since 1998 the Norges Bank Investment Management manages the fund capital on behalf of the Ministry of Finance, which owns the fund on behalf of the Norwegian people, during the years they made changes in the investments. In the first half of 1998, they converted more or less forty per cent of bonds portfolio into equities, in 2007 the Ministry of Finance decided to increase the fund is share of equities from forty to sixty per cent, and in June 2009 this reached sixty per cent. During 2002 corporate and securitised bonds were added. In 2008 the Ministry of Finance included real estate with a maximum of five per cent of total assets, in 2010 they mandated to increase this type of investment, and in 2011 they made the first investment in this area. In 2017, they increased this to represent up to seven per cent of the investment portfolio. However, in 2012, they wanted to reduce the share of European holdings to forty per cent and increase the investment in emerging markets by ten per cent. Finally, for the first time in 2017, the fund value reached 1 trillion dollars. Below we

[9] Source: Site of the Government Pension Fund Global https://www.nbim.no/en/.

can observe Figure 3.2 "Total market value by type of investment (millions of USD)" which has a graph with the behaviour of the type of investments and the total market value through the years. When we aggregated the data, it was in billions of kroner (Norway currency – NOK) update for 2017 to 30 September, but we decided to apply the exchange rate NOK/USD (United States Dollar); lastly the real estate data only included unlisted real estate.

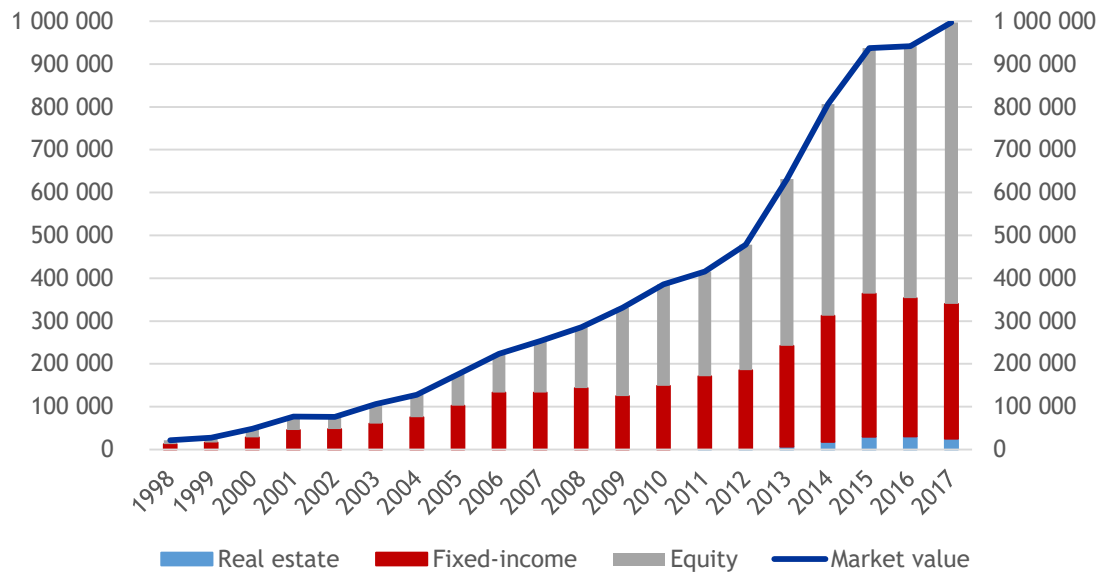

Figure 3.2 - Total market value by type of investment (millions of USD)[10]

In the next section, based on the literature review of the second section and the data of this fund, we will define the hypothesis that we want to test and how we will formulate our GM.

[10] Source: https://www.nbim.no/en/the-fund/market-value/

3.2. Hypothesis and model formulation

In this work, we take into consideration the definition and assumptions of SWFs constructed by the IFSWF that are established in the Sovereign Wealth Funds Generally Accepted Principles and Practices (SWFs GAPP), "Santiago Principles" (2008). Their definition is as follows: "*SWFs are defined as special purpose investment funds or arrangements, owned by the general government. Created by the general government for macroeconomic purposes, SWFs hold, manage, or administer assets to achieve financial objectives, and employ a set of investment strategies which include investing in foreign financial assets. The SWFs are commonly established out of balance of payments surpluses, official foreign currency operations, the proceeds of privatizations, fiscal surpluses, and/or receipts resulting from commodity exports.*"[11]

As we stated above, we want to ascertain whether some economic, financial, political, social and other type of indicators attract the investment decision of SWFs. With these premises, our hypotheses will be the ones below.

H_1 : The economic performance of a country attracts SWF investments.

H_2 : The market value of a country attracts SWF investments.

H_3 : Countries with political stability and less violence attract SWF investments.

H_4 : The human development of a country attracts SWF investments.

H_5 : The perception of corruption ponders SWF investments.

H_6 : Geographic characteristics like distance and the sharing of border attracts SWF investments.

To prove our hypotheses, first we search and think about which type of variables can best represent our thoughts. As we described in the previous section, our dependent

[11] Source: SWFs GAPP, "Santiago Principles", 2008.

variable will be the AUM of the Norwegian SWF GPFG, between 1998 and 2016. Then, as we concluded with the literature review, some of the variables are traditionally used in the GM. They are real GDP that satisfies our first hypothesis and distance between the countries that answers our sixth hypothesis; these were defined by Tinbergen (1962). Anderson (1979) then added a variable that characterises the border sharing, which corresponds to our sixth hypothesis. About these type of variables that were added to the GM during the years, Grinblatt and Keloharju (2001) added one that describes sharing the same language. However, we decided that these do not bring too much to our model, because our data is from a fund constitute in Norway, so we did not have another country with the same language.

However, we want to explore this type of investment in greater depth, and we will add other variables that correspond to our hypothesis and curiosity about choices. In this path, to analyse the second premise which is more linked to the financial area, we added the stock market capitalization of listed companies' % of GDP[12] (SMC) as Da Costa and Lagoa (2018) did because it is a variable which is used to rank the size of companies negotiated in financial markets and the size of stock exchanges. Then we added another three variables to answer hypotheses three, four and five which are linked to political and social characterístics of the countries involved in our study, political stability and absence of violence/terrorism (PSAV) the human development index (HDI) and the corruption perception index (CPI). We decided to incorporate this type of variable to understand if the funds are concerned about the promotion of the well-being of the population in the world and if these variables weigh in their investment decisions, because in a certain way they influence the perception of a country is level of risk and development. In the next paragraph, we will write about these variables briefly.

The PSAV is one of six indicators collected by the Worldwide Governance Indicators (WGI)[13] project, and is available at World Bank database, which aims to measure perceptions of the likelihood of political instability and/or politically-motivated

[12] Source: https://data.worldbank.org/indicator/CM.MKT.LCAP.GD.ZS

[13]Source: http://info.worldbank.org/governance/wgi/index.aspx#home.

violence, including terrorism. The variable HDI[14] is also available in the World Bank dataset and was created to emphasise that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone. It is a geometric mean of three normalised indices: first the long and healthy life, the second being knowledge and in third place a decent standard of living. The first dimension is achieved by life expectancy at birth; the second is calculated with the education dimension measured by mean years of schooling for adults aged twenty-five years and by expected years of schooling for children of an age to enter school. The third indicator is measured by gross national income (GNI) per capita. Lastly, the CPI is an indicator used to measure perceptions of corruption in the public sector in different countries around the world, and was established in 1995 by Transparency International.[15]

On this path, we think that these variables will be useful to portray the behaviour of the investments made by SWFs in the way that we want to explore them. Having taken these steps, equation 3 below is the formulation of our GM with the chosen variables. To complement in Table 3.1 "Description of variables", we have the description of the variables that compose the GM.

$$\begin{aligned} \ln\,(AUM_{n,j,t}) = {} & \beta_0 + \beta_1 \ln\left(GDP_{n,t}\, GDP_{j,t}\right) + \beta_2 \ln\left(SMC_{n,t}\, SMC_{j,t}\right) \\ & + \beta_3 \ln\left(HDI_{n,t}\, HDI_{j,t}\right) + \beta_4 \ln\left(CPI_{n,t}\, CPI_{j,t}\right) \\ & + \beta_5 \ln\left(PSAV_{n,t}\, PSAV_{j,t}\right) + \beta_6\, D_{n,j} + \beta_7\, B_{n,j} + \varepsilon_{n,j,t} \end{aligned} \tag{3}$$

[14]Source: http://hdr.undp.org/en/content/human-development-index-hdi.

[15]Source: https://www.transparency.org/.

Table 3.1 - Description of variables

$AUM_{n,j,t}$	Total assets under management by the GPFG (n) of the country j, in year t
$GDP_{n,t}$	Real GDP of GPFG country (n), in the year t
$GDP_{j,t}$	Real GDP of country j where the GPFG made investments, in year t
$SMC_{n,t}$	Stock market capitalization of listed companies of GPFG country (n), in year t
$SMC_{j,t}$	Stock market capitalization of listed companies of country j where the GPFG made investments, in year t
$HDI_{n,t}$	Human development index of GPFG country (n), in the year t
$HDI_{j,t}$	Human development index of country j where the GPFG made investments, in year t
$CPI_{n,t}$	Corruption perception index of GPFG country (n), in year t
$CPI_{j,t}$	Corruption perception index of country j where the GPFG made investments, in year t
$PSAV_{n,t}$	Political stability and absence of violence/terrorism in GPFG country (n), in year t
$PSAV_{j,t}$	Political stability and absence of violence/terrorism in country j where the GPFG made investments, in year t
$D_{n,j}$	Distance from the capital country of GPFG (n) to country capital of the country (j) where the GPFG made investments
$B_{n,j}$	Dummy variable that assumes the value 1 if the country (j) where the GPFG (n) made their investments shares a common border and 0 if the contrary
$\varepsilon_{n,j,t}$	Random error

We aggregate data of 98 countries, the names of which can be consulted in Table A3.1 “Countries present in the gravity model” of the paper is appendix, section 6.

In the appendix, section 6, we can also consult the data used in the study from Table A3.2. to Table A3.8. Although, as the data is too large, because of the number of

countries and years, involved, we decided to put only the data about twenty-one countries that are in the third paper. With our model formulated in the next section, we will write about the steps that we took to get our conclusions.

3.3. Empirical results

Observing our data, we are working towards panel data, also known as longitudinal or cross-sectional time-series data. This type of data allows us to perceive the behaviour of entities across time, control for variables that we cannot measure like cultural factors and variables that change over time, and also include variables at different levels of analysis over several periods. Baltagi (2005) lists several benefits and limitations of using panel data, and mentions that panel data models allow us to construct and test more complicated behavioural models than true cross-sectional or time-series data.

Using STATA, we began to do the steps to achieve our conclusions. First, as is recommended, we started to make a descriptive statistic of our data to examine it better and ascertain whether it is good to be used for the study. Therefore, we did a summary with the original data before we multiplied the value for Norway to all other of the values and converted it into a logarithm to apply the GM. As we can see in Table 3.2 "Variables summarised", the number of observations is not equal for all the variables, and we have different types of variables.

Table 3.2 - Variables summarised

Variable	Obs	Mean	Std. Dev.	Min	Max
$\ln\ (AUM_{n,j,t})$	1048	19.9492	2.9062	5.9789	29.1728
$\ln\ (GDP_{n,t}\ GDP_{j,t})$	1024	52.7974	2.2873	24.395	57.4298
$\ln\ (SMC_{n,t}\ SMC_{j,t})$	796	7.9794	0.9659	3.58	11.6174
$\ln\ (HDI_{n,t}\ HDI_{j,t})$	937	-0.2753	0.1258	-0.9824	-0.1057

Table 3.2 – Continued

Variable	Obs	Mean	Std. Dev.	Min	Max
$\ln\left(CPI_{n,t}\, CPI_{j,t}\right)$	1007	8.4641	0.409	7.3139	9.116
$\ln\left(PSAV_{n,t}\, PSAV_{j,t}\right)$	983	8.395	0.7956	4.5156	9.189
$D_{n,j}$	1042	5127.702	4245.311	417.5658	17991.74
$B_{n,j}$	1051	0.0485	0.215	0	1

We then started to test which type of techniques was the best option to estimate our model, ordinary least squares (OLS), random effects (RE) or fixed effects (FE). On this path, we declared in STATA that our type of data is a panel data, and we verified that our panel is unbalanced due to the presence of gaps in our data, which is a typical situation because the data represent investments made by GPFG in various countries, which is not constant through the years of observation.

First, we tested if we would use an OLS or RE model to estimate our results with a Breusch and Pagan Lagrangian multiplier. For these, we made preliminary estimations. In Table 3.3 "Model estimation", we have the principal results of the estimations that we made. Concerning OLS regression, five of seven independent variables are statistically significant at 1%. Another one is statistically significant at 10%. We then did a RE regression, and again in Table 3.3 "Model estimation", we can observe that only four of seven independent variables are statistically significant at 1%. In a RE model, the variation across entities is assumed to be random and uncorrelated with the predictor or independent variables in the model.

Table 3.3 – Model estimation

	Dependent variable: ln $(AUM_{n,j,t})$		
Variables	**OLS**	**RE**	**FE**
ln $(GDP_{n,t}\, GDP_{j,t})$	1.2048***	1.4045***	1.4751***
ln $(SMC_{n,t}\, SMC_{j,t})$	.3635***	.2205***	.1664**
ln $(HDI_{n,t}\, HDI_{j,t})$	1.2141	5.4951***	7.0774***
ln $(CPI_{n,t}\, CPI_{j,t})$	1.7187***	1.2488***	.9465**
ln $(PSAV_{n,t}\, PSAV_{j,t})$	.2550***	-.0768	-.0983
$D_{n,j}$	-.0000***	.0000	0 (omitted)
$B_{n,j}$	.6494*	.6670	0 (omitted)
F	249.37***		177.15***
χ^2		1022.50***	
Adj R-squared	0.7254		

Note: ***, ** and * denote statistically significant at 1%, 5% and 10% level, respectively

With both estimations made, now we are ready to apply a Breusch and Pagan Lagrangian multiplier, and we reach the conclusion that RE is the appropriate estimator. However, as we can see in Table 3.4 "Breusch and Pagan Lagrangian multiplier" the F test of RE is bigger than 0.05 which means that our model is not good, so we cannot use RE to estimate the GM.

Table 3.4 - Breusch and Pagan Lagrangian multiplier

	Var	sd = sqrt(Var)
ln $(\boldsymbol{AUM_{n,j,t}})$	7.353016	2.711645
E	.933947	.9664093
U	1.323089	1.150256

Test: Var(u) = 0

chibar2(01) = 358.05

Prob > chibar2 = 0.0000

We then proceeded to do the Hausman test to find if we must use an FE model. First, we did the FE regression. Usually, we use an FE model because it controls for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics, like culture, religion or gender, among others. We also tested whether the results change for a robust FE, but the two variables were omitted the same way. In this estimation, only two of the seven independent variables are statistically significant at 1%. Another two independent variables are significant for the dependent variable at 5%. The estimation has another problem; two of the variables are omitted because of collinearity. They are $D_{n,j}$ and $B_{n,j}$, which typically are base variables in the GM. Due to this aspect we did not want to remove their effect in the model. First of all, they are base variables in a GM, and then some authors like Portes et al. (1999) proved that distance has an essential role concerning the international trade. In 2001, Portes et al. concluded in another study that the correlation of the transactions decreases with distance, although for the public debt securities, distance does not have any influence in their negotiation. Grinblatt and Keloharju (2001) studied the stock market of Finland and demonstrated that the influence of distance is more important than we think. Moreover, the axiom of this model says that the flow of trade between the two countries is positively related to the economy mass and negatively related to the distance between the countries (Frankel, 1997).

Then we did the Hausman test - Table 3.5 “Hausman test” to decide between the OLS model or FE model, and the test indicated that FE is appropriate. However, as stated

in the previous paragraph, we do not want to remove the two variables that are omitted in the FE model. Additionally, due to this, we cannot compare the two models (OLS and FE), because we do not have results for all the variables as we have in the OLS model. We did the Hausman test with sigmamore to compare changes in the results, but the results were the same; only the chi-squared was equal to 40.52, and FE was still appropriate. With the three types of estimations done and the differences found between them, we decided to use the OLS regression to apply our model. At least we confirmed whether there is a correlation between the variables which can comprise our estimation.

Table 3.5- Hausman test

	Fixed	Random	Difference	S.E.
$\ln\left(GDP_{n,t}\, GDP_{j,t}\right)$	1.4751	1.4045	.0706	.0647
$\ln\left(SMC_{n,t}\, SMC_{j,t}\right)$	.1664	.2205	-.0541	.0149
$\ln\left(HDI_{n,t}\, HDI_{j,t}\right)$	7.0774	5.4951	1.5823	1.0141
$\ln\left(CPI_{n,t}\, CPI_{j,t}\right)$	.9465	1.2488	-.3023	.3219
$\ln\left(PSAV_{n,t}\, PSAV_{j,t}\right)$	-.0983	-.0768	-.0215	.0374

chi2(5) = 67.39 ***

Note: *** denote statistically significant at 1%

As we can see in Table 3.6 “Correlations matrix”, all the results are smaller than 0.8, which reveals that we did not have a strong correlation. If we had obtained values greater than these, we would have had to test if they had multicollinearity between them, which could be a problem for our model. We concluded that correlation is not present, and we can accept the results of the OLS regression.

Table 3.6 - Correlations matrix

	$\ln(GDP_{n,t}\, GDP_{j,t})$	$\ln(SMC_{n,t}\, SMC_{j,t})$	$\ln(HDI_{n,t}\, HDI_{j,t})$
$\ln(GDP_{n,t}\, GDP_{j,t})$	1.0000		
$\ln(SMC_{n,t}\, SMC_{j,t})$	0.0900	1.0000	
$ln(HDI_{n,t}\, HDI_{j,t})$	0.1017	0.1075	1.0000
$\ln(CPI_{n,t}\, CPI_{j,t})$	-0.0086	0.3452	0.7765
$\ln(PSAV_{n,t}\, PSAV_{j,t})$	-0.1033	0.1049	0.6045
$D_{n,j}$	-0.0150	0.1788	-0.2770
$B_{n,j}$	0.0083	-0.0021	0.0444

Table 3.6 - Continued

	$\ln(CPI_{n,t}\, CPI_{j,t})$	$\ln(PSAV_{n,t}\, PSAV_{j,t})$	$D_{n,j}$	$B_{n,j}$
$\ln(GDP_{n,t}\, GDP_{j,t})$				
$\ln(SMC_{n,t}\, SMC_{j,t})$				
$\ln(HDI_{n,t}\, HDI_{j,t})$				
$\ln(CPI_{n,t}\, CPI_{j,t})$	1.0000			
$\ln(PSAV_{n,t}\, PSAV_{j,t})$	0.6512	1.0000		
$D_{n,j}$	-0.1538	-0.1651	1.0000	
$B_{n,j}$	-0.0086	-0.0871	-0.1595	1.0000

Here we will describe the results that we can observe in Table 3.3 "Model estimation" which shows the application of OLS regression. In fact, Anderson and Wincoop (2001) concluded that the GM is usually estimated as an OLS regression. As we stated in the previous paragraphs, five of the seven independent variables are statistically significant at 1%, and they are GDP, SMC, CPI, PSAV, and distance. Lastly, the sharing of a border is statistically significant at 10%. This result

means that a variation of 1% in the independent variable has an impact on the AUM. The indicator says that only distance has a negative impact on AUM, while all the others impact the dependent variable positively, which is consistent with the literature. Frankel (1997), writes that the flow of trade between the two countries is positively related to the economy mass and negatively related to the distance between countries. So, we can conclude that these are the country characteristics that attract investments made by SWFs. In the next section, we give the conclusion of our work.

4. Conclusion

The purpose of our work is to study if economic, financial, political, social and geographic variables attract investments made by SWFs, in order to encourage more countries to behave well and for their prosperity. Our econometric model had variables from these different dimensions. To represent the economic variable, we choose the real GDP and for financial characterisation, we introduce the SMC. For social and political behaviour, we choose HDI, CPI and PSAV. Our initial perception is that at least the latter two influence the countries' economies more visibly because the news about it usually influences country risk. Concerning the HDI, we usually associate high levels of the indicator with the most economically developed countries. Lastly, we have the distance between capital countries and the share of the border as geographic variables. In addition to that, as a dependent variable, we used the data about the AUM of GPFG, the Norwegian SWF, because they have all the information disaggregated and available on their site. We constituted panel data between the year 1998 to 2016 with all the variables, and then we started to formulate and test our GM.

Therefore, we can estimate the regression as an OLS, RE or FE. When we finished this first step, we decided to adopt the OLS method to do our estimation. With the regression, we conclude that GDP, SMC, CPI, PSAV and distance are statistically significant at 1%. However, the first ones have a positive effect on the dependent variable, and distance has a negative impact which is consistent with the literature. The sharing of a border is statistically significant at 10% and has a positive effect on the dependent variable.

It was demonstrated that a variation in these variables would have an impact on the AUM; in other words, these indicators weigh on the investment choices of SWFs. Somehow, these variables characterise the risks to which a SWFs is subject when making investments. This is a concern for them, as they need to ensure that the investments made will have a positive return and they do not suffer losses. In the perspective of the potential recipient countries of SWFs investments, we think that it is positive to attract this type of investment, so our study can be a guideline to follow if they want to improve the entry of these capitals which will also improve the development of their countries in different areas.

By way of conclusion, countries must prove themselves to be credible, transparent and have financial institutions with good solvency as this improves the perception of risk for SWFs that will make investments in the countries, although information asymmetries always end up playing a negative role in this struggle. Thus, we hope to encourage countries that do not have a SWF to constitute one. We believe that it is an excellent way to improve the well-being of future generations and to improve living conditions and stability of countries globally.

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6. Appendix

Table A3.1 – Countries present in the Gravity Model

Country			
Antigua and Barbuda	Egypt	Lebanon	Singapore
Argentina	El Salvador	Liberia	Slovakia
Aruba	Estonia	Lithuania	Slovenia
Australia	Faroe Islands	Luxembourg	South Africa
Austria	Finland	Malaysia	South Korea
Bahamas	France	Malta	Spain
Bahrain	Georgia	Mauritius	Sri Lanka
Bangladesh	Germany	Mexico	Sweden
Barbados	Ghana	Mongolia	Switzerland
Belgium	Greece	Morocco	Tanzania
Bermuda	Greenland	Netherlands	Thailand
Botswana	Hong Kong	New Zealand	Trinidad and Tobago
Brazil	Hungary	Nigeria	Tunisia
British Virgin Islands	Iceland	Oman	Turkey
Bulgaria	India	Panama	Uganda
Canada	Indonesia	Papua New Guinea	Ukraine
Cayman Islands	Ireland	Peru	United Arab Emirates
Chile	Israel	Philippines	United Kingdom
China	Italy	Poland	United States
Colombia	Japan	Portugal	Uruguay
Costa Rica	Jordan	Puerto Rico	Venezuela
Croatia	Kazakhstan	Qatar	Vietnam
Cyprus	Kenya	Romania	Zambia
Czech Republic	Kuwait	Russia	
Denmark	Latvia	Saudi Arabia	

Table A3.2 – Value of Assets Under Management

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	360.265	433.757	647.656	1 143.118	800.163	1 259.398	1 587.944	1 902.774	2 728.532	1 885.720
Austria	253.257	400.556	438.150	679.529	1 287.890	2 249.296	2 702.981	1 900.197	4 056.723	4 974.336
Belgium	349.628	243.809	542.538	650.252	-254.523	1 025.323	977.633	527.860	638.074	6 399.894
Canada	355.101	527.563	1 134.490	742.352	4 858.530	2 380.377	4 323.227	3 436.875	6 346.540	6 207.459
Denmark	233.703	219.505	376.133	642.686	2 336.260	2 378.167	2 407.745	3 484.822	4 008.971	4 746.235
Finland	372.811	468.429	463.184	737.672	840.780	772.353	878.543	832.438	1 550.728	3 510.392
France	1 568.763	1 858.480	3 025.315	3 229.264	5 593.776	8 391.174	14 067.828	13 610.507	22 375.157	29 071.053
Germany	2 776.486	3 539.912	3 719.725	6 405.718	15 853.133	20 483.865	29 632.474	31 902.178	56 673.661	54 108.802
Hong Kong	127.936	176.104	295.063	427.830	422.990	598.044	613.500	870.941	1 747.643	2 867.049
Ireland	150.250	122.732	215.295	366.609	469.268	571.343	636.654	628.936	2 006.744	3 358.525
Italy	1 286.522	1 601.584	4 963.849	5 474.593	5 368.520	6 387.620	7 411.669	10 484.071	17 025.723	16 969.574
Japan	4 025.402	5 166.963	7 591.953	9 310.988	7 873.331	10 531.744	13 052.301	18 220.186	19 616.290	23 785.917
Netherlands	685.045	915.754	1 157.034	2 046.942	3 252.879	4 162.124	5 317.682	5 212.853	6 840.905	12 152.899
New Zealand	33.887	28.320	11.584	23.369	151.316	233.630	251.723	205.378	110.154	304.885
Portugal	130.360	130.838	146.959	320.027	576.606	623.695	633.071	1 434.254	2 983.842	3 895.130
Singapore	21.659	59.734	92.537	151.575	374.386	501.621	635.688	1 013.823	1 290.779	1 356.648
Spain	717.407	687.473	1 967.574	2 496.887	2 025.209	5 987.772	7 543.008	7 684.818	12 647.033	24 485.408
Sweden	307.139	529.590	731.235	1 018.265	1 121.411	1 474.308	1 061.045	3 104.321	5 778.048	9 878.170
Switzerland	608.321	629.916	1 195.991	1 860.205	2 098.868	3 478.235	4 461.276	5 113.600	7 191.094	11 381.074
United Kingdom	1 850.312	2 631.965	4 930.802	8 504.369	9 377.715	14 070.369	15 204.089	11 877.936	27 717.396	34 469.046
United States	5 412.412	6 713.191	10 843.475	18 048.897	22 358.568	32 601.270	45 890.411	47 406.600	73 731.785	88 043.095

Table A3.2 – Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016
Australia	4 173.608	7 297.921	8 283.885	7 223.962	14 941.975	17 498.582	18 622.405	17 623.368	18 982.571
Austria	4 367.280	3 678.370	3 989.327	4 486.641	4 412.447	3 956.209	4 101.501	4 143.719	4 966.642
Belgium	5 174.803	4 090.143	5 442.029	5 514.008	4 896.380	6 796.734	6 731.900	6 445.069	7 421.719
Canada	8 652.041	12 320.654	15 107.083	15 465.168	21 032.442	24 621.501	25 345.547	21 490.820	24 594.508
Denmark	3 509.317	3 656.291	5 398.028	5 716.401	5 356.062	6 291.612	6 354.161	7 598.770	7 657.626
Finland	3 168.296	3 391.480	4 163.518	4 384.295	5 360.729	7 337.970	6 807.228	6 168.957	5 513.930
France	28 814.157	38 078.108	41 468.970	113 040.253	67 665.931	72 352.068	74 577.809	160 676.222	208 398.498
Germany	42 215.817	39 128.142	41 631.761	37 910.882	50 562.396	65 765.502	60 597.223	71 683.302	71 408.868
Hong Kong	2 134.381	2 844.918	3 639.252	4 523.697	7 464.726	7 147.189	7 087.573	7 248.159	8 021.786
Ireland	4 272.001	3 602.518	3 538.505	2 979.272	2 774.119	2 522.658	1 756.223	1 697.676	953.115
Italy	18 397.076	15 517.768	19 076.523	13 731.307	13 649.485	15 852.337	16 926.000	13 858.919	13 806.803
Japan	23 440.669	24 006.485	27 928.084	29 866.404	41 378.462	59 655.011	67 332.296	75 481.752	72 934.621
Netherlands	10 250.303	12 009.975	14 096.936	15 177.265	17 135.273	20 805.591	16 536.186	13 966.015	14 591.526
New Zealand	230.732	301.385	395.077	136.628	816.927	1 082.126	1 088.907	1 477.260	1 747.426
Portugal	3 569.370	2 720.740	2 780.876	2 193.562	1 241.875	1 448.430	1 196.392	1 176.927	1 208.763
Singapore	1 095.415	1 711.217	1 881.975	1 309.822	3 248.233	3 882.635	4 678.005	4 319.462	4 162.139
Spain	23 149.731	25 330.102	24 862.173	22 355.925	19 799.502	23 721.211	22 076.589	17 143.755	14 540.683
Sweden	7 188.144	8 037.724	11 188.287	13 990.778	15 625.757	20 251.016	18 175.424	17 431.948	16 422.528
Switzerland	11 167.769	16 913.023	20 503.316	22 683.864	32 891.980	36 891.337	36 345.321	32 986.941	31 408.671
United Kingdom	51 938.443	71 749.309	79 439.374	522 316.890	231 216.284	290 153.889	624 259.227	1 139 215.753	1 022 505.305
United States	102 894.268	131 303.073	155 438.873	159 944.582	196 539.482	257 094.065	687 111.022	4 597 387.966	4 672 716.543

Source: https://www.nbim.no/en/the-fund/holdings/holdings-as-at-31.12.2018/. Value: 10^6 USD.

Table A3.3 – GDP (current US$)

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	399 778.878	389 146.510	415 446.210	378 899.860	394 635.831	466 853.232	613 329.777	693 764.096	747 572.627	853 764.623
Austria	218 259.904	217 185.787	196 799.779	197 337.879	213 377.772	261 695.779	300 904.222	315 974.419	335 998.557	388 691.445
Belgium	260 601.912	260 202.429	237 904.920	237 841.969	258 860.437	319 002.822	370 885.026	387 365.751	409 813.198	471 821.106
Canada	631 813.279	676 082.655	742 293.448	736 379.778	757 950.679	892 380.986	1 023 196.003	1 169 357.980	1 315 415.197	1 464 977.190
Denmark	176 992.001	177 965.225	164 158.800	164 791.416	178 635.160	218 095.997	251 373.037	264 467.308	282 884.913	319 423.370
Finland	133 936.360	135 225.868	125 539.893	129 250.112	139 552.983	171 071.106	196 768.066	204 436.015	216 552.503	255 384.615
France	1 510 758.283	1 500 275.943	1 368 438.364	1 382 218.345	1 500 337.851	1 848 124.153	2 124 112.242	2 203 678.647	2 325 011.918	2 663 112.510
Germany	2 243 225.520	2 199 957.383	1 949 953.934	1 950 648.770	2 079 136.081	2 505 733.634	2 819 245.096	2 861 410.272	3 002 446.368	3 439 953.463
Hong Kong	168 886.163	165 768.095	171 668.164	169 403.242	166 349.229	161 384.523	169 099.769	181 570.082	193 536.265	211 597.406
Ireland	90 082.030	98 691.940	99 853.529	109 133.516	127 945.378	164 285.115	193 870.345	211 650.759	232 085.534	269 917.518
Italy	1 266 309.245	1 248 563.179	1 141 759.996	1 162 317.852	1 266 510.634	1 569 649.661	1 798 314.750	1 852 661.982	1 942 633.798	2 203 053.381
Japan	4 032 509.761	4 562 078.822	4 887 519.661	4 303 544.260	4 115 116.279	4 445 658.071	4 815 148.854	4 755 410.631	4 530 377.225	4 515 264.514
Netherlands	432 476.116	441 975.282	412 807.260	426 573.602	465 368.906	571 863.431	650 532.655	678 533.764	726 649.103	839 419.655
New Zealand	56 227.170	58 761.742	52 623.282	53 872.426	66 628.222	88 250.886	103 905.882	114 719.425	111 606.900	137 314.617
Portugal	123 981.736	127 465.545	118 358.490	121 545.881	134 228.698	164 964.195	189 187.437	197 304.513	208 566.949	240 169.336
Singapore	85 707.636	86 283.127	95 833.933	89 286.209	91 941.193	97 001.378	114 188.558	127 417.688	147 797.218	179 981.289
Spain	617 041.987	633 194.119	595 402.617	625 975.839	705 145.869	906 853.273	1 069 555.500	1 157 276.458	1 264 551.499	1 479 341.637
Sweden	266 800.463	270 847.938	259 802.013	239 917.321	263 926.220	331 108.913	381 705.425	389 042.298	420 032.122	487 816.328
Switzerland	295 045.152	289 912.492	272 055.500	278 631.271	301 416.810	352 914.821	394 163.689	408 689.354	430 921.192	479 913.034
United Kingdom	1 638 511.096	1 665 623.685	1 647 951.279	1 621 510.004	1 768 408.273	2 038 395.102	2 398 555.474	2 520 701.818	2 692 612.695	3 074 359.744
United States	9 089 168.000	9 660 624.000	10 284 779.000	10 621 824.000	10 977 514.000	11 510 670.000	12 274 928.000	13 093 726.000	13 855 888.000	14 477 635.000

Table A3.3 – Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016
Australia	1 055 334.825	927 168.311	1 142 876.773	1 390 557.034	1 538 194.473	1 567 178.619	1 459 597.907	1 345 383.143	1 204 616.440
Austria	430 294.287	400 172.298	391 892.747	431 120.310	409 425.234	430 068.713	441 885.416	382 065.930	390 799.991
Belgium	518 625.897	484 552.792	483 548.031	527 008.454	497 884.217	520 925.469	531 075.861	455 200.045	467 955.710
Canada	1 549 131.209	1 371 153.005	1 613 464.423	1 788 647.906	1 824 288.757	1 842 628.006	1 792 883.226	1 552 807.652	1 529 760.492
Denmark	353 361.056	321 241.396	321 995.350	344 003.210	327 148.900	343 584.386	352 993.633	301 298.465	306 899.653
Finland	283 742.493	251 499.028	247 799.816	273 674.237	256 706.466	269 980.112	272 609.289	232 439.325	238 502.900
France	2 923 465.651	2 693 827.452	2 646 837.112	2 862 680.143	2 681 416.109	2 808 511.203	2 849 305.323	2 433 562.016	2 465 453.975
Germany	3 752 365.607	3 418 005.001	3 417 094.563	3 757 698.281	3 543 983.909	3 752 513.503	3 890 606.893	3 375 611.101	3 477 796.274
Hong Kong	219 279.678	214 046.415	228 637.698	248 513.618	262 629.441	275 696.880	291 459.357	309 403.880	320 914.303
Ireland	275 020.018	236 311.338	221 951.354	239 018.540	225 571.858	239 389.337	258 099.015	290 617.007	304 819.021
Italy	2 390 729.164	2 185 160.183	2 125 058.244	2 276 292.405	2 072 823.157	2 130 491.321	2 151 732.868	1 832 347.451	1 858 913.164
Japan	5 037 908.465	5 231 382.675	5 700 098.115	6 157 459.595	6 203 213.121	5 155 717.056	4 848 733.416	4 383 076.298	4 940 158.777
Netherlands	936 228.212	857 932.759	836 389.937	893 757.287	828 946.812	866 680.000	879 635.084	757 999.453	777 227.542
New Zealand	133 279.679	121 337.373	146 580.949	168 461.999	176 192.887	190 521.142	200 696.292	175 562.976	184 969.147
Portugal	262 007.590	243 745.749	238 303.443	244 895.102	216 368.179	226 073.493	229 629.822	199 420.256	204 836.598
Singapore	192 225.882	192 408.388	236 421.782	275 599.459	289 162.119	302 510.669	308 142.767	296 840.704	296 975.679
Spain	1 635 015.380	1 499 099.750	1 431 616.750	1 488 067.258	1 336 018.950	1 361 854.207	1 376 910.811	1 197 789.903	1 237 255.020
Sweden	513 965.651	429 657.033	488 377.690	563 109.663	543 880.648	578 742.001	573 817.719	497 918.109	514 459.973
Switzerland	554 363.487	541 506.500	583 782.978	699 579.639	668 043.614	688 504.173	709 182.560	679 289.167	668 851.296
United Kingdom	2 890 564.338	2 382 825.985	2 441 173.395	2 619 700.405	2 662 085.168	2 739 818.681	3 022 827.782	2 885 570.309	2 647 898.655
United States	14 718 582.000	14 418 739.000	14 964 372.000	15 517 926.000	16 155 255.000	16 691 517.000	17 393 103.000	18 120 714.000	18 624 475.000

Source: https://data.worldbank.org/. Value: 10^6 USD.

Table A3.4 – Stock Market Capitalization of listed companies % of GDP

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	82.28	109.94	89.73	99.01	96.31	125.42	126.59	115.89	146.59	152.07
Austria	1.19	15.20	15.21	12.77	15.74	21.60	29.17	39.96	57.37	60.83
Belgium	93.64	70.77	76.70	69.73	49.28	54.40	73.67	74.47	96.67	81.72
Canada	171.24	214.22	103.85	83.55	117.25	102.00	115.08	126.75	129.29	149.25
Denmark	55.86	54.76	68.12	51.67	42.96	55.77	60.21	-	-	-
Finland	115.60	258.38	233.90	147.35	99.48	99.54	93.39	-	-	-
France	10.00	100.18	105.71	84.98	64.45	73.37	73.40	79.80	104.44	102.90
Germany	48.78	65.10	65.14	54.94	33.00	43.06	42.37	42.01	54.54	61.20
Hong Kong	203.43	366.87	363.14	298.74	278.36	442.79	509.44	581.04	886.11	1 254.47
Ireland	77.35	69.68	82.00	69.00	46.85	51.78	58.85	53.90	70.35	53.31
Italy	-	58.33	67.30	45.38	37.67	39.17	43.91	43.08	52.84	48.68
Japan	60.50	97.66	64.60	52.62	50.29	66.43	73.89	96.16	101.85	95.92
Netherlands	139.47	157.03	155.15	117.92	86.23	85.45	82.80	87.37	107.28	113.91
New Zealand	44.08	48.25	35.37	33.08	32.66	37.45	42.09	35.38	40.16	34.58
Portugal	50.78	53.46	51.27	38.12	31.92	35.33	37.13	33.94	49.95	55.06
Singapore	110.83	223.66	159.47	129.57	110.38	153.09	190.47	201.97	260.01	299.57
Spain	65.18	68.05	84.69	74.80	65.46	80.08	87.95	82.95	104.62	121.66
Sweden	104.46	137.82	126.38	98.58	67.87	87.55	-	-	-	-
Switzerland	233.59	233.94	291.23	189.27	203.26	206.03	210.34	229.68	281.38	265.60
United Kingdom	140.23	177.40	156.38	132.56	104.96	119.01	117.40	121.32	140.43	125.11
United States	142.18	152.97	146.89	131.65	100.70	123.94	132.98	129.84	141.23	137.61

Table A3.4 – Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016
Australia	64.80	136.10	127.27	86.17	90.16	87.16	88.29	88.23	105.30
Austria	17.73	28.51	32.16	19.78	25.90	27.36	21.90	25.15	30.96
Belgium	32.24	53.61	55.57	43.51	60.16	71.86	71.28	91.07	80.72
Canada	66.72	122.34	134.57	106.95	112.92	114.72	116.87	102.61	130.32
Denmark	-	-	-	-	-	-	-	-	-
Finland	-	-	-	-	-	-	-	-	-
France	50.37	72.25	72.22	54.28	67.43	81.93	73.21	85.81	87.48
Germany	29.60	37.81	41.84	31.52	41.94	51.59	44.69	50.83	49.34
Hong Kong	605.97	1 076.94	1 185.86	908.62	1 078.30	1 124.71	1 109.26	1 029.36	995.06
Ireland	18.00	25.94	27.20	45.35	48.32	71.07	55.59	44.05	39.31
Italy	21.84	30.01	25.18	18.96	23.24	28.89	27.29	-	-
Japan	61.85	63.20	67.15	54.01	56.08	88.12	90.29	111.68	100.31
Netherlands	41.52	65.18	79.04	66.53	78.51	94.36	89.42	96.11	109.92
New Zealand	18.16	29.26	-	-	30.01	34.62	37.08	42.35	43.28
Portugal	26.29	40.31	34.41	25.19	30.28	35.02	25.16	30.01	27.92
Singapore	137.85	250.12	273.76	217.08	264.58	246.08	244.31	215.59	215.65
Spain	58.00	95.69	81.84	69.28	74.48	81.99	72.11	65.72	56.94
Sweden	-	-	-	-	-	-	-	-	-
Switzerland	158.80	196.62	210.58	155.74	184.63	223.77	210.85	223.66	209.82
United Kingdom	64.63	-	-	-	-	-	-	-	-
United States	78.75	104.57	115.50	100.79	115.56	143.99	151.39	138.34	146.86

Source: http://info.worldbank.org/governance/wgi/index.aspx#home.

Table A3.5 – Human Development Index

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	0.894	0.8970	0.899	0.902	0.905	0.908	0.91	0.915	0.918	0.921
Austria	0.833	0.8330	0.837	0.847	0.837	0.841	0.848	0.854	0.86	0.864
Belgium	0.865	0.8690	0.873	0.875	0.878	0.88	0.861	0.865	0.871	0.874
Canada	0.861	0.8640	0.867	0.872	0.877	0.881	0.886	0.891	0.894	0.897
Denmark	0.848	0.8600	0.862	0.875	0.882	0.893	0.897	0.902	0.904	0.906
Finland	0.839	0.8470	0.856	0.863	0.866	0.869	0.864	0.869	0.873	0.876
France	0.839	0.8440	0.849	0.851	0.852	0.857	0.86	0.87	0.873	0.877
Germany	0.85	0.8550	0.86	0.867	0.872	0.877	0.884	0.892	0.898	0.903
Hong Kong	0.816	0.8190	0.825	0.833	0.841	0.851	0.861	0.87	0.881	0.887
Ireland	0.84	0.8480	0.857	0.862	0.87	0.88	0.889	0.896	0.902	0.908
Italy	0.818	0.8230	0.828	0.836	0.841	0.846	0.851	0.856	0.862	0.866
Japan	0.848	0.8520	0.856	0.86	0.863	0.866	0.87	0.873	0.877	0.88
Netherlands	0.869	0.8730	0.878	0.882	0.881	0.885	0.888	0.893	0.899	0.905
New Zealand	0.863	0.8640	0.868	0.873	0.881	0.884	0.886	0.888	0.891	0.894
Portugal	0.779	0.7770	0.782	0.788	0.789	0.792	0.79	0.793	0.797	0.804
Singapore	0.801	0.8100	0.82	0.818	0.819	0.82	0.821	0.839	0.873	0.88
Spain	0.815	0.8200	0.825	0.828	0.83	0.833	0.837	0.844	0.849	0.854
Sweden	0.867	0.8730	0.877	0.88	0.882	0.888	0.89	0.892	0.895	0.897
Switzerland	0.872	0.8790	0.888	0.89	0.889	0.895	0.899	0.904	0.911	0.914
United Kingdom	0.854	0.8600	0.866	0.87	0.874	0.878	0.886	0.89	0.889	0.892
United States	0.884	0.8850	0.884	0.887	0.889	0.892	0.895	0.898	0.901	0.905

Table A3.5 – Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016
Australia	0.925	0.927	0.927	0.93	0.933	0.936	0.937	0.939	-
Austria	0.87	0.872	0.88	0.884	0.887	0.892	0.892	0.893	-
Belgium	0.876	0.878	0.884	0.886	0.889	0.89	0.895	0.896	-
Canada	0.898	0.898	0.903	0.907	0.909	0.912	0.919	0.92	-
Denmark	0.906	0.906	0.91	0.922	0.924	0.926	0.923	0.925	-
Finland	0.878	0.874	0.878	0.884	0.887	0.89	0.893	0.895	-
France	0.879	0.879	0.882	0.885	0.887	0.89	0.894	0.897	-
Germany	0.906	0.907	0.912	0.916	0.919	0.92	0.924	0.926	-
Hong Kong	0.892	0.894	0.898	0.905	0.907	0.913	0.916	0.917	-
Ireland	0.909	0.907	0.909	0.895	0.902	0.91	0.92	0.923	-
Italy	0.868	0.869	0.872	0.877	0.876	0.877	0.881	0.887	-
Japan	0.881	0.879	0.884	0.889	0.894	0.899	0.902	0.903	-
Netherlands	0.906	0.906	0.911	0.921	0.922	0.923	0.923	0.924	-
New Zealand	0.895	0.899	0.901	0.904	0.908	0.91	0.913	0.915	-
Portugal	0.809	0.812	0.818	0.824	0.827	0.837	0.841	0.843	-
Singapore	0.887	0.889	0.911	0.917	0.92	0.922	0.924	0.925	-
Spain	0.858	0.86	0.867	0.871	0.874	0.877	0.882	0.884	-
Sweden	0.898	0.895	0.901	0.903	0.904	0.906	0.909	0.913	-
Switzerland	0.916	0.92	0.932	0.932	0.934	0.936	0.938	0.939	-
United Kingdom	0.895	0.895	0.902	0.898	0.899	0.904	0.908	0.91	-
United States	0.907	0.907	0.91	0.913	0.915	0.916	0.918	0.92	-

Source: http://hdr.undp.org/en/content/human-development-index-hdi.

Table A3.6 – Corruption Perception Index

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	7 830	7 743	7 553	7 310	7 310	7 744	7 832	7 832	7 656	7 482
Austria	6 750	6 764	7 007	6 708	6 630	7 040	7 476	7 743	7 568	7 047
Belgium	4 860	4 717	5 551	5 676	6 035	6 688	6 675	6 586	6 424	6 177
Canada	8 280	8 188	8 372	7 654	7 650	7 656	7 565	7 476	7 480	7 569
Denmark	9 000	8 900	8 918	8 170	8 075	8 360	8 455	8 455	8 360	8 178
Finland	8 640	8 722	9 100	8 514	8 245	8 536	8 633	8 544	8 448	8 178
France	6 030	5 874	6 097	5 762	5 355	6 072	6 319	6 675	6 512	6 351
Germany	7 110	7 120	6 916	6 364	6 205	6 776	7 298	7 298	7 040	6 786
Hong Kong	7 020	6 853	7 007	6 794	6 970	7 040	7 120	7 387	7 304	7 221
Ireland	7 380	6 853	6 552	6 450	5 865	6 600	6 675	6 586	6 512	6 525
Italy	4 140	4 183	4 186	4 730	4 420	4 664	4 272	4 450	-00	4 524
Japan	5 220	5 340	5 824	6 106	6 035	6 160	6 141	6 497	6 688	6 525
Netherlands	8 100	8 010	8 099	7 568	7 650	7 832	7 743	7 654	7 656	7 830
New Zealand	8 460	8 366	8 554	8 084	8 075	8 360	8 544	8 544	8 448	8 178
Portugal	5 850	5 963	5 824	5 418	5 355	5 808	5 607	5 785	5 808	5 655
Singapore	8 190	8 099	8 281	7 912	7 905	8 272	8 277	8 366	8 272	8 091
Spain	5 490	5 874	6 370	6 020	6 035	6 072	6 319	6 230	5 984	5 829
Sweden	8 550	8 366	8 554	7 740	7 905	8 184	8 188	8 188	8 096	8 091
Switzerland	8 010	7 921	7 826	7 224	7 225	7 744	8 099	8 099	8 008	7 830
United Kingdom	7 830	7 654	7 917	7 138	7 395	7 656	7 654	7 654	7 568	7 308
United States	6 750	6 675	7 098	6 536	6 545	6 600	6 675	6 764	6 424	6 264

Table A3.6 – Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016
Australia	6 873	7 482	7 482	7 960	7 225	6 966	6 880	6 952	6 715
Austria	6 399	6 794	6 794	7 008	5 865	5 934	6 192	6 688	6 375
Belgium	5 767	6 106	6 106	6 739	6 375	6 450	6 536	6 776	6 545
Canada	6 873	7 482	7 654	7 805	7 140	6 966	6 966	7 304	6 970
Denmark	7 347	7 998	7 998	8 453	7 650	7 826	7 912	8 008	7 650
Finland	7 110	7 654	7 912	8 464	7 650	7 654	7 654	7 920	7 565
France	5 451	5 934	5 848	6 305	6 035	6 106	5 934	6 160	5 865
Germany	6 241	6 880	6 794	7 242	6 715	6 708	6 794	7 128	6 885
Hong Kong	6 399	7 052	7 224	7 551	6 545	6 450	6 364	6 600	6 545
Ireland	6 083	6 880	6 880	6 782	5 865	6 192	6 364	6 600	6 205
Italy	3 792	3 698	3 354	3 516	3 570	3 698	3 698	3 872	3 995
Japan	5 767	6 622	6 708	7 237	6 290	6 364	6 536	6 600	6 120
Netherlands	7 031	7 654	7 568	8 005	7 140	7 138	7 138	7 392	7 055
New Zealand	7 347	8 084	7 998	8 516	7 650	7 826	7 826	8 008	7 650
Portugal	4 819	4 988	5 160	5 488	5 355	5 332	5 418	5 632	5 270
Singapore	7 268	7 912	7 998	8 250	7 395	7 396	7 224	7 480	7 140
Spain	5 135	5 246	5 246	5 607	5 525	5 074	5 160	5 104	4 930
Sweden	7 347	7 912	7 912	8 369	7 480	7 654	7 482	7 832	7 480
Switzerland	7 110	7 740	7 482	7 922	7 310	7 310	7 396	7 568	7 310
United Kingdom	6 083	6 622	6 536	6 998	6 290	6 536	6 708	7 128	6 885
United States	5 767	6 450	6 106	6 422	6 205	6 278	6 364	6 688	6 290

Source: https://www.transparency.org/.

Table A3.7 – Political Stability and Absence of Violence

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Australia	82.98	-	93.12	-	89.42	75.88	78.64	76.21	78.74	78.74	80.29	76.78	78.20	74.88	82.46	83.41	85.24	75.71	81.90
Austria	88.30	-	76.19	-	94.71	80.40	84.95	86.41	86.47	96.14	98.56	91.00	89.10	91.47	96.21	96.21	95.24	90.48	72.86
Belgium	81.91	-	83.60	-	91.53	74.37	71.84	70.39	73.91	72.46	67.79	75.36	74.41	78.20	76.30	77.73	69.52	64.76	61.43
Canada	79.26	-	87.30	-	89.95	84.42	76.21	72.82	82.61	82.13	85.10	89.10	81.04	86.26	89.10	86.73	92.86	95.24	93.33
Denmark	97.34	-	95.77	-	96.83	93.97	83.98	85.44	85.02	91.30	86.06	85.31	86.26	87.20	75.83	80.09	78.57	76.67	74.76
Finland	98.94	-	99.47	-	100.00	100.00	100.00	100.00	100.00	100.00	99.52	99.05	97.16	98.10	98.10	97.16	96.19	87.14	80.95
France	69.68	-	74.07	-	79.89	50.25	56.80	57.77	64.25	64.73	64.90	63.51	68.72	65.40	63.51	62.09	58.10	51.43	44.29
Germany	92.02	-	95.24	-	86.24	65.33	67.96	75.73	82.13	81.16	79.81	77.25	73.46	71.56	71.09	76.30	78.10	68.57	70.95
Hong Kong	70.21	-	79.89	-	78.31	79.90	89.81	95.63	91.30	90.34	90.87	83.89	80.57	77.25	83.41	75.83	90.95	88.10	74.29
Ireland	99.47	-	97.88	-	96.30	96.98	91.75	94.17	91.79	93.24	93.27	86.26	84.83	77.73	77.73	75.36	87.14	77.62	76.67
Italy	90.96	-	78.84	-	75.66	59.80	54.85	63.11	62.32	60.39	65.38	54.50	62.56	62.56	63.03	63.98	60.48	58.57	58.10
Japan	93.09	-	88.36	-	88.89	82.91	82.52	82.52	90.82	82.61	77.40	84.83	77.73	81.99	78.20	82.94	80.00	89.05	86.19
Netherlands	100.00	-	100.00	-	93.65	87.44	81.55	79.13	75.85	73.43	76.44	81.99	81.52	89.57	91.47	91.00	86.19	80.48	77.62
New Zealand	93.62	-	93.65	-	94.18	93.47	99.03	91.75	94.20	94.69	91.83	86.73	91.47	97.63	96.68	98.58	99.52	99.05	99.05
Portugal	94.68	-	94.71	-	95.24	95.98	79.61	80.58	79.23	76.81	81.25	72.99	71.09	69.67	70.62	68.72	74.29	78.10	88.10
Singapore	78.19	-	84.13	-	90.48	75.38	85.44	88.83	93.24	92.75	99.04	90.52	90.52	91.00	97.16	96.68	93.33	96.19	99.52
Spain	52.13	-	65.61	-	62.96	41.21	41.75	53.40	41.06	35.75	30.29	30.33	33.65	48.34	42.65	46.92	55.24	55.71	61.90
Sweden	96.28	-	94.18	-	95.77	96.48	96.60	94.66	95.65	95.65	90.38	87.20	87.68	92.42	90.05	90.05	88.10	80.95	82.38
Switzerland	98.40	-	97.35	-	97.35	94.97	93.20	90.78	95.17	94.20	94.71	94.79	92.42	94.31	98.58	98.10	98.10	96.67	95.71
United Kingdom	78.72	-	81.48	-	69.31	54.27	49.51	50.97	66.18	66.18	61.06	48.34	60.19	58.77	59.72	63.03	59.52	61.43	59.05
United States	76.60	-	82.54	-	54.50	46.73	37.38	43.69	60.87	57.00	66.83	61.61	60.66	64.45	66.35	66.82	65.71	67.14	58.57

Table A3.7 – Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016
Australia	80.29	76.78	78.20	74.88	82.46	83.41	85.24	75.71	81.90
Austria	98.56	91.00	89.10	91.47	96.21	96.21	95.24	90.48	72.86
Belgium	67.79	75.36	74.41	78.20	76.30	77.73	69.52	64.76	61.43
Canada	85.10	89.10	81.04	86.26	89.10	86.73	92.86	95.24	93.33
Denmark	86.06	85.31	86.26	87.20	75.83	80.09	78.57	76.67	74.76
Finland	99.52	99.05	97.16	98.10	98.10	97.16	96.19	87.14	80.95
France	64.90	63.51	68.72	65.40	63.51	62.09	58.10	51.43	44.29
Germany	79.81	77.25	73.46	71.56	71.09	76.30	78.10	68.57	70.95
Hong Kong	90.87	83.89	80.57	77.25	83.41	75.83	90.95	88.10	74.29
Ireland	93.27	86.26	84.83	77.73	77.73	75.36	87.14	77.62	76.67
Italy	65.38	54.50	62.56	62.56	63.03	63.98	60.48	58.57	58.10
Japan	77.40	84.83	77.73	81.99	78.20	82.94	80.00	89.05	86.19
Netherlands	76.44	81.99	81.52	89.57	91.47	91.00	86.19	80.48	77.62
New Zealand	91.83	86.73	91.47	97.63	96.68	98.58	99.52	99.05	99.05
Portugal	81.25	72.99	71.09	69.67	70.62	68.72	74.29	78.10	88.10
Singapore	99.04	90.52	90.52	91.00	97.16	96.68	93.33	96.19	99.52
Spain	30.29	30.33	33.65	48.34	42.65	46.92	55.24	55.71	61.90
Sweden	90.38	87.20	87.68	92.42	90.05	90.05	88.10	80.95	82.38
Switzerland	94.71	94.79	92.42	94.31	98.58	98.10	98.10	96.67	95.71
United Kingdom	61.06	48.34	60.19	58.77	59.72	63.03	59.52	61.43	59.05
United States	66.83	61.61	60.66	64.45	66.35	66.82	65.71	67.14	58.57

Source: http://info.worldbank.org/governance/wgi/index.aspx#home.

Table A3.8 – Distance and dummy for sharing border

Country	Distance	Border
Australia	15 963.53	0
Austria	1 351.70	0
Belgium	1 087.77	0
Canada	5 941.59	0
Denmark	485.31	0
Finland	791.24	1
France	1 342.89	0
Germany	969.28	0
Hong Kong	8 599.98	0
Ireland	1 267.02	0
Italy	2 010.68	0
Japan	8 417.14	0
Netherlands	916.16	0
New Zealand	17 991.74	0
Portugal	-	0
Singapore	-	0
Spain	-	0
Sweden	-	1
Switzerland	1 459.38	0
United Kingdom	-	0
United States	6 239.55	0

Source: http://www.cepii.fr/CEPII/en/bdd_modele/bdd_modele.asp.

Chapter 4: Sovereign Wealth Funds investments and their influence on the development of recipient economies

Abstract

In this paper, we want to demonstrate that the SWF investments can improve the economies where they invest. We define the GDP of 21 countries where the Government Pension Fund Global (GPFG) made investments from 1998 to 2017 as a dependent variable. Then with the application of an ARDL method, and using the PMG, we obtain the following conclusions. The Total Assets Under Management of GPFG are shown to be positive and statistically significant at 1%, which suggests that their investments are good for the development of recipient economies. Beyond other variables like the general government final consumption expenditure, primary energy, the exports of goods and services, the KOF Globalisation Index in logarithm form are shown to be statistically significant at 1%, the first ones with a positive effect and the last with a negative effect. Still, in first differences form, the exports of goods and services are positive and statistically significant at 1%. Lastly, in the form of logarithm and the first differences, we have inflation that is positive and statistically significant at 5%.

JEL Classification: *F01, F21, G15, O16.*

Keywords: Auto-Regressive Distributed Lag, (ARDL), Government Pension Fund Global (GPFG), Investments, Pooled Mean Group (PMG), Sovereign Wealth Funds (SWFs).

A influência dos investimentos dos Fundos Soberanos no desenvolvimento das economias que os rececionam

Resumo

Neste artigo, queremos demonstrar que os investimentos efetuados pelos Fundos Soberanos (FS) podem melhorar as economias onde fazem os seus investimentos. Definimos como variável dependente o PIB de 21 países onde o *Government Pension Fund Global* (GPFG) fez investimentos entre 1998 e 2017. Com a aplicação do método ARDL e PMG, concluímos que: o Total de Ativos sobre Gestão do GPFG demonstrou ser positivo e estatisticamente significativo a 1%, o que sugere que os investimentos dos FS são bons para o desenvolvimento dos países onde efetuam investimentos. Para além desta conclusão outras variáveis como o Gasto Final do Consumo das Administrações Públicas, a Energia Primária, as Exportações de Bens e Serviços, o Índice de Globalização do *KOF* na forma logarítmica demonstraram ser estatisticamente significantes a 1%. As primeiras têm um efeito positivo e a última um efeito negativo. Ainda na forma de primeiras diferenças as Exportações de Bens e Serviços são positivas e estatisticamente significantes a 1%. Por último, na forma de logaritmo e primeiras diferenças a Inflação demonstrou ser positiva e estatisticamente significante a 5%.

Classificação JEL: F01, F21, G15, O16.

Palavras-chave: ARDL, Fundos Soberanos (FS), Government Pension Fund Global (GPFG), Investments, PMG.

1. Introduction

The idea of this work arose following the papers developed previously and through the various literature read so far. Along this path, we realise that the available literature about sovereign wealth funds (SWFs) are much more focused on the size of the assets managed by them due to their rapid growth in the 2000s, e.g. Rozanov (2005), Morgan Stanley Research Global (2007) and Johnson (2007). Nevertheless, Truman (2007) and Gieve (2008), described the importance of transparency. Moreover, Beck and Fidora (2008), dedicated themselves to the ills that they may do to international financial markets. Gieve (2008) explored the ills that SWFs investments may do to the global economy. However, Al-Hassan et al. (2013) explore their structure and governance and meantime Avendano (2012) investigates the investment preferences of SWFs from the firm-level. In turn, Knill et al., (2011) dealt with the issues about bilateral political relations and their investments.

We then found a work by Devlin and Lewin (2005) in the book Managing Economic Volatility and Crises: A Practitioner's Guide, published by Aizenman and Pinto about managing oil booms and busts in developing countries. They consider that a SWF is a good way to protect oil-rich countries and oil revenues from price shocks. We find this interesting because many SWFs are related to oil-rich countries and oil revenues and these authors write about SWFs positively. This topic leads us to studies about the Dutch disease, the resource curse and SWFs, described by authors such as Corden (1984), Frankel (2010), Corden (2011), Gottschalk et al. (2014), and Wills et al. (2016).

With this work, we intend to diversify the studies about SWFs and change the general perspective that they may be harmful to the world economy — sensitising the world is economies to the potential positive effects of international SWF investments and making them realise that these investments make their economies thrive. On the other hand, as we have shown in the previous paper, specific economic, social, and political indicators make this investment attractive. We also hope that less developed economies, seeing that these investments have a positive effect on economies, will adopt behaviours to increase their indicators to attract these investments that will improve their economy. In this way, we will have a win-win partnership between the various economies of the world.

This research is divided into four sections. In the second section, we have a description of the literature that inspired this study. In the third section, we describe some theory about SWFs to frame the topic, and about the fund whose data we will use for our econometric study, the Government Pension Fund Global (GPFG). Then in the fourth section, we will express our hypothesis, formulate our model and test the hypothesis. In the fifth and last section, we give our main conclusions.

2. Literature review

As stated in the introduction, the idea of developing this work emerged during the reading of various documents while carrying out the other two works about SWFs. On this path, the first work that we did explained the theory about SWFs, as the topic is not easy to understand and define to do econometric studies. With this first objective accomplished, in the second paper, we applied a gravity model to test whether economic, financial, political, social, and geographic variables influence the decision of SWFs to invest in recipient countries. Now in this third work, we want to understand if SWF investments have a positive influence on country variables, which we believe to be true. We hope that this work changes the general idea about SWFs because nowadays we encounter many works that say that they can be harmful to the international financial market.

On the other hand, if we prove that the impact of their investments is positive for different types of variables, the economies in the world will want to attract these investments. Therefore, as we prove in the previous work, various type of variables attract SWF investment decisions, so the recipient countries need to have good indicators. This indicates that if the countries want to attract SWF, they need to have good practices. This will be a win-win relation, because SWFs will have good returns on their investments, and the recipient countries will see their indicators improved.

Before we have an idea of what to develop in our work, we start by searching for similar works. The most comparable work that we found was written by Schimbor (2009). He studied the impacts of SWF investments on listed United States companies. He decided to develop this topic because he says that despite the increase of oil price during 2002-2007, SWFs became more active in the investment of equity in the United

States and the debate about this impact became even more critical due to the subprime mortgage crisis in summer of 2007. It was a moment when the United States financial sector needed other flows to clean their market from the toxic mortgage-backed securities and prevent insolvency, and SWFs from the Middle East, China, and Singapore seized the moment to buy significant shares in some of the pillars of the American financial sector, as is stated in Beck and Fidora is (2008) work. They concluded that we do not need to be afraid of SWF investments because they seem to purchase small stakes in the target companies. Their quantitative analysis shows that on average, these investments lead to negative returns on the day of the announcement, which indicates that SWF investments are not welcome. However, he also writes that if SWFs starts to be more transparent the perception that their investments are not suitable for the economies will disappear. However, in six months the returns are positive, suggesting that SWF investments may monitor the management behaviour over that time horizon.

As stated at the beginning of the literature review, in some ways SWFs are not well perceived by global economies due to various aspects. The studies mentioned in our introduction can confirm this; they are about the increase of assets managed by SWFs because of their rapid growth, others about their transparency, the impact of their investments in global financial markets and global economy and lastly about their structure and governance.

Firstly, Rozanov (2005) expresses concern about the rapid growth of SWFs during recent years, and particularly about the rapid accumulation of assets made by them. According to him, they are growing in several new constitutions. He argues that this growth put some of the SWFs on a par with some of the largest public-pension and central bank (CB) reserves. This was the first paper where this type of funds was designated as SWFs and the general concept about them was written.

In 2007 the Morgan Stanley Research Global made a prediction about what the size of SWFs would be in 2015. They concluded that they would probably reach US$12 trillion and by the end of 2011 they were predicted to exceed the total size of the world is official reserves. Because of this projection, they argued that SWFs would have a significant impact on the market, for example, of the dollar, US Treasuries and risky assets.

For, Johnson (2007) the impacts of SWFs depend on their size. If we are talking about $3 trillion, this is a significant number but not huge compared with some economic indicators in the world. For Johnson, it is essential to determine what information countries can share, what information it makes sense to ask for, and what information can be used in our global economic and financial analysis.

However, Truman (2007) alerts to the need for improved transparency and accountability in the management of SWFs. However, attention to these funds has increased due to their absence of transparency and their potential to disturb the world is financial markets. From his perspective, if SWFs operate outside their borders and can affect other markets and economies, they have the responsibility to be less confidential. The goal of SWFs should be to contribute not only to financial stability in the countries directly involved but also to international financial stability by increasing transparency and accountability.

Beck and Fidora (2008) explore if the investments made by SWFs have an impact on global financial markets. In their opinion, transparency about their size is crucial to decrease doubt in financial markets. While some observers expressed concerns about the acquirement of stakes by SWFs in companies of sensitive industries, there is no firm evidence that such investment patterns would hurt market integrity. However, they conclude that a transfer of sizeable amounts of traditional foreign exchange reserves to SWFs investments may have an impact on the global financial landscape because they have a different strategy from central banks.

Nonetheless, for Gieve (2008), SWFs are prominent and essential players in many financial markets, yet even so, we cannot exaggerate their impact on the global financial system. In aggregate terms, their assets under management (AUM) were less than twenty per cent of what it is held by private sector participants such as a pension, insurance, and mutual funds as well as hedge funds and private equity. Moreover, in 2008 it represented about two per cent of the total size of equity and bond markets globally. However, for Gieve, the growth of SWFs is also a result of persistent global imbalances in trade, which helps to create vulnerabilities in financial markets and in the broader economy. He points out that it would be good for transparency to grow to ensure that they contribute to further global financial integration rather than acting as a catalyst for a new wave of financial protectionism.

Al-Hassan et al. (2013), from the International Monetary Fund, explains that the governance structure and investment management for SWFs ensure its efficient operational and financial performance. For him, their organisational structure should have a clear separation of authority and responsibilities. The investment objectives should be aligned with the purpose of the SWF, and concerning risks, they need to define the level that they are prepared to support. Furthermore, they need to have a delegated mandate, defined roles and responsibilities, be accountable, transparent, professional, and have an excellent human resources policy. All of these points lead to a well-defined structure that will ensure the integrity and effective control over SWFs management activities.

Knill, Lee, and Mauck (2011) later studied bilateral political relations and their impacts on investments and Avendano (2012) explored the investment preferences from the firm-level.

Therefore, Knill, Lee, and Mauck (2011) obtained the following results about bilateral political relations influence on SWFs investments. Moreover, their results suggest that political relations play a role in investment decisions and that they use non-financial motives in investment decisions. On the one hand, they prefer to invest in nations which have a weaker political relation, but on the other hand, they behave in a different way from rational investors who maximise return while minimising risk. Their conclusions were that SWFs investments improve and have a positive impact on political relations when the investments take place in relatively closed countries. The results suggest that SWFs use non-financial motives in investment decisions. They reached these conclusions with a two-stage Cragg model, which recognises that SWF investment decisions consist of determining a country in which to invest and determining how much to invest.

Then Avendano (2012), placed equities investments made during 2006-2009 as a function of funds objectives and characteristics to understand SWF investment preferences at the firm and fund level. He considered the origin of the fund resources as commodity or non-commodity if they follow the investment guidelines of the Organisation for Economic Co-operation and Development (OECD) or not and if the investments destinations are domestic or foreign. He concludes that depending on these factors, SWFs choose different types of firms, but most SWFs are attracted to large firms, with profits and international activities. Although firm variables do not explain all investments, and he does a gravity model to explore the topic and get the

following result, factors related to diversification and natural endowments explain the change of SWFs investments to the commodities sector and natural resources.

However, SWFs can protect economies that are oil-rich and have oil revenues. One example is described by Devlin and Lewin (2005) in their work called Managing Oil Booms and Busts in Developing Countries. As stated in the introduction of this study, it is a part of the book Managing Economic Volatility and Crises: A Practitioner's Guide published by Aizenman and Pinto. The literature states that historically these countries suffer from a phenomenon called Dutch disease, which is covered in the works of Corden, W. (1984), Corden, W. (2011), and Gottschalk et al. (2014). Another possible phenomenon that occurs in that type of countries is the natural resource curse, which and Frankel (2010), Chwieroth (2014) and Wills et al. (2016) described. SWFs are one of the means which countries can use to protect their economies.

Starting with Devlin and Lewin (2005), they describe ways that oil-rich countries can apply their revenues to protect their economies from oil booms and busts through government expenditure management, self-insurance, and asset diversification. One of the ways mentioned is to constitute stabilisation and savings funds as a measure of self-insurance and deal with volatile oil revenues. For them, when a country constitutes this type of funds, they have to follow some crucial points to have success. The keys are transparency integrated with the budgetary, parliamentary/legislative oversight; the assets of the fund should not be used as collateral, and they should be prohibited from holding public debt. The assets management strategy needs to be thought out and consistent with the debt management operations of the ministry of finance. Therefore, they recommend this type of funds and give suggestions about their constitution.

Corden, W. (1984) consolidates information about Dutch disease. The author explains that the term initially refers to the adverse effects on Dutch manufacturing of the natural gas discoveries of the nineteen sixties, through the subsequent appreciation of the Dutch real exchange rate. There are episodes where sectoral booms harm the general equilibrium in other sectors. Usually, we have three sectors, the booming sector, the lagging sector, which is tradable, and lastly a non-tradable sector. A boom in the booming sector has the first effect of raising aggregate incomes of the factors initially employed there. Sometimes the government protects the lagging sector or parts of it from the adverse effects of a boom. Next we have two examples of works were this effect was studied.

In 2011 Corden, W. presented the case of Australia, which suffered from Dutch disease from 2005 to 2011 due a growth of about 90% of the mining industry. During this period, we observed the following events: the value of Australian Gross Domestic Product (GDP) grew about 43% and the exports of the mining industry, principally iron ore and coal, grew about 140%. These caused a considerable increase in prices, originally due to an increase in demand from China. He points out three options to deal with it: do nothing, piecemeal protectionism, and establish a SWF. Their conclusion was if we cannot clearly distinguish the sector of firms and industries, to the non-tradable sector and the lagging sector, the best policy to adopt is doing nothing. Lastly, he proved that the implications of direct intervention by the CB in the foreign exchange market when combined with an appropriate fiscal policy have certain similarities with the effects of a SWF.

Afterwards, Gottschalk et al. (2014) investigate the transmission mechanism behind the effects of Dutch disease and which policy options are better to mitigate this effect using a Dynamic Stochastic General Equilibrium method. One of the tested hypotheses is to constitute a SWF with savings of a significant part of natural resources inflows, and they conclude that this can be very effective to avoid Dutch disease. Furthermore, these effects can be mitigated by concentrating on spending on tradable and public investments. They also conclude that monetary policy alone is not effective concerning the mitigation of these effects.

About the natural resource curse, Frankel (2010) points out that it was observed some decades ago and occurs when a country with oil, natural gas, or other valuable mineral deposits or natural resources failed to grow more rapidly than those without them. He describes that some African countries like Angola, Nigeria, Sudan, and the Congo are rich in oil, diamonds, or other minerals, but their people continue to experience low per capita income and low quality of life. These conclusions were reached with some statistical works that he quoted. He then exposes a wide variety of measures that were proposed to stabilise this effect. The work ends with a list of ideas to increase the economic success of these countries; in short policies and institutions must be tailored to local circumstances country by country, with good intentions because there is no reason why resource-rich countries fall to the curse. Below we point out two works that mentioned this event.

Chwieroth (2014) might say that policy “fashions” and “fads” play an essential role in the creation of SWFs. He also argues that the efficacy of SWFs in helping countries to

manage natural resource curse remains ambiguous. He leaves the note that most studies by the International Monetary Fund (IMF) and the World Bank are usually in favour of the constitution of SWFs, finding inconclusive evidence that SWFs reduce economic volatility or other outcomes related to the resource curse. About this conclusion, he quotes the works of Ross (2012:2017), Crain and Devlin (2002), Davis et al. (2003), York and Zhan (2009), and Bagattini (2011). The Norwegian GPFG is an example of avoiding the natural resource curse with the constitution of a SWF.

Later, Wills et al. (2016) did a study where they investigated if African countries should follow the advice of constituting SWFs for future generations and to protect their economies from the resource curse and Dutch disease. This work is a combination of three papers; the first shows that developing countries should make domestic investments, supported by parking and stabilisation funds. The second paper supports the first and argues that the nature of these investments is crucial. Lastly, the third paper provides detail on how public investment in developing countries can be improved. In these works, they test three variables that can be the motivations for constituting a SWF: the intergenerational transfer, parking, and stabilisation. However, for them, there are other reasons, such as political accountability, portfolio diversification of investment returns. In conclusion, this paper demonstrates that developing countries should not constitute a SWF, but it is more important to use their revenues to accelerate development.

As we will use an auto-regressive distributed lag (ARDL) model in our work, we searched for works that write about the model and their origin to understand it better and apply it to our study.

Pesaran and Smith (1995) might say that in panel data four procedures are usually used: pooling, aggregating, averaging group estimates and cross-section regression, all of them related to the ARDL model. With a case about the UK labour demand for 38 industries for 30 years, they demonstrate which type of results these procedures typically gave. They conclude that only in a dynamic case when the coefficients differ across groups can the cross-section regression provide consistent estimates of the long-run effects. Pooling and aggregating in these type of panel data gives inconsistent and potentially highly misleading estimates of the coefficients. Therefore, in a static case, if the coefficients differ randomly, all four procedures give unbiased estimates of coefficient means.

However, Pesaran and Shin (1997) compare different econometric techniques with the ARDL method, analysing long-run relations when the underlying variables are non-stationary I(1). Although the paper focuses on single-equation estimation techniques, they also examine the relationship between the ARDL and the fully modified ordinary least squares (OLS) approach of Phillips and Hansen to the estimation of cointegration relations and compare the small sample performance of these two approaches through Monte Carlo experiments. The ARDL approach is demonstrated to have an additional advantage like the yielding consistent estimates of the long-run coefficients that are asymptotically normal, irrespective of whether the underlying regressor is non-stationary I(1) or stationary I(0). This analysis and the Monte Carlo outcomes show robust signs in favour of rehabilitation of the traditional ARDL approach to econometric modelling of time series.

In the meantime, with a model about consumption functions of 24 OECD economies, Pesaran et al. (1997) demonstrated the application of a procedure that they called pooled mean group (PMG). This method is related to the ARDL model and constrains the long-run coefficients to be identical and allows the short-run coefficients and error variances to differ across groups. The paper deals with the problem of estimating the parameters of a dynamic model in a panel data with relatively large time-series observations on several groups. Usually, with this type of data, we estimate N separate regressions and calculate their means, that is called mean group (MG) estimator, and with this paper, they propose a new way to work with this type of panel data.

Pesaran et al. (1999) compare three different techniques: the MG, PMG, and dynamic fixed effects (DFE) with dynamic panels data models, where the number of time series observations is relatively large and with several groups of the same order of magnitude. They use two outstanding empirical examples, firstly the consumption function in OECD economies with the second being about energy demand in developing Asian economies. Usually, the MG and DFE were used for this type of panel data, but in this paper, they propose an intermediate model – the PMG. As Pesaran and Smith (1995) wrote, the MG procedure will produce consistent estimates of the average of the parameters; however, it does not take into account the fact that specific parameters may be the same across groups. Then we have the DFE that is on the other extreme where the intercepts are allowed to differ across groups while all other coefficients and error variances are constrained to be the same. Lastly, we have the PMG that involves pooling and averaging and allows the intercepts, short-run coefficients, and error

variances to differ freely across groups, but constrains the long-run coefficients to be the same.

The papers of Pesaran and Smith (1995), Pesaran and Shin (1997) and Pesaran, et al. (1999) resulted in a STATA command denominated "xtpmg" for estimating non-stationary heterogeneous panels in which the number of groups and number of time-series are both large. A paper can be found about it in the STATA Journal by Blackburne and Frank in 2007. With this, we can study what is involved in the application of the model and the steps to formulating them well.

Further, Nkoro and Uko (2016) gave information about how to apply the ARDL cointegration technique and made some findings. For these authors, this technique can be used whether the underlying variables are stationary I(0), non-stationary I(1) or a combination, but cannot be applied when the underlying variables are integrated of order I(2). If the trace or maximal eigenvalue or the F-statistics establishes that a single long-run relationship exists among the variables, the method can be applied. If the F-statistics establishes that there is a single long-run relationship and the sample data size is small ($n \leq 30$) or finite, the method becomes more efficient. When there are multiple long-run relationships, the ARDL approach cannot be applied.

Now that we understand the foundations and origin of the ARDL model, we will describe some works that have used this technique.

Bahmani-Oskooee and Chi Wing Ng (2002) examine Hong Kong is long-run demand for money using the ARDL cointegration procedure on quarterly data over the period 1985Q1-1999Q4. With this technique, they identify a long-run relationship between real broad money, real income, nominal interest rates, foreign interest rates, and foreign exchange rates. In addition to these conclusions, the estimation results suggest that external sector considerations matter in explaining the variations in broad money for a highly open economy like Hong Kong. They also confirm that currency depreciation would reduce the demand for the domestic currency, which is very important for the formulation of monetary and exchange rate policy in Hong Kong.

Bildirici and Kayikci (2012) estimate the cointegration and causality relationship between energy consumption and economic growth with an ARDL model. They also present the income elasticities of total energy demand. For these, they use data at per capita and aggregate levels for some transition countries in Europe. They reach

different conclusions for the group of countries. For Bulgaria and Slovakia, it is better to support the growth hypothesis, that is, energy policies aimed at improving the energy infrastructure and increasing the energy supply because energy consumption increases the income level. On the other hand, there is evidence to support the conservation hypothesis for Albania in short- and long-run causality. These findings also suggest that economic growth may stimulate increased consumption of energy. In the case of Belarus, the Czech Republic and Romania, there is a bi-directional relationship between energy consumptions and economic growth for short- and long-run causality.

Tursoy and Faisal (2014) investigate the dynamic relationship between stock prices and GDP in Turkey using quarterly data from 1989Q2-2014Q2, studying the interrelationship through an ARDL framework and ECM. The results provide strong evidence that both are strongly cointegrated in the long run and have a significantly positive relationship. This means that if stock prices increase (fall) the GDP of Turkey will also rise (fall). When the elasticity of the stock prices in Turkey rises by 1%, then the GDP will also rise by 0.73%. The parameter of the error correction term (-0.0384) is smaller than unity in absolute term and negative, indicating the existence of a long-run relationship among the variables in the estimated model. This suggests that if the GDP is above or below the equilibrium level, it adjusts by 3.84% per quarter.

Okafor and Shaibu (2016) had the objective of identifying the significant variables that underlie economic growth in Nigeria, ascertaining the stability of the economic growth model in Nigeria over the sample period, and examining the forecasting performance of the linear dynamic model with the application of an ARDL. For this, they analyse the short-run and long-run dynamics of economic growth in Nigeria using quarterly data from 1986Q1-2013Q4. The results show that economic growth, population, and trade openness are expected in the short and long run in Nigeria . Moreover, it is suggested that in order to achieve sustainable economic growth, government policies need to improve the performance of the economy and should mainly consider the short-run and long-run behaviour of these variables and the policies should be pursued with a high degree of transparency.

In summary with this review of the literature, we have a brief description about most of the type of works about SWFs for us to formulate what to do in this work, and on the other hand to justify why our work will be a novelty in this field of study. In

addition, we read other papers about the econometric method in order to have better knowledge of it, which we will use to develop our study.

3. Data and methodology

We have divided this section into three parts. The first describes what the GPFG is because the main data that we use in the study is from this fund. In the second part, we will write about the practical part of the paper, the hypothesis formulated, characteristics of the data, formulated model, the econometric method used, and some of the preliminary tests made. In the third part, we will discuss the empirical results.

3.1. Government Pension Fund Global

As we write in the introduction, we will use the data about the AUM of GPFG in our econometric study. This is due to the fact that furthermore, this is a prominent and representative SWF in the world, and it is the only fund on which we found data available (on their site). This SWF was constituted in 1990 first with the name of Government Petroleum Fund, and in 2006 they changed the name to its present form. Their objective is to manage the petroleum wealth in a long-term perspective in the benefit of current and future Norwegian generations. The capital of the fund is invested in shielding Norway from the effects of oil price fluctuations. The principal investments are made in equity, fixed income, and real estate of diverse countries and currencies to have greater exposure to global economic growth and to achieve high long-term return with an acceptable level of risk through efficient organisation. To clarify, despite its name, the fund has no formal pension liabilities; no political decision was made that says that the fund may be used to cover future pension costs.

Since 1998 the Norges Bank Investment Management has managed the fund capital on behalf of the Ministry of Finance, which owns the fund on behalf of the Norwegian people and during the years they have made changes in the investments made by the

fund. In the first half of 1998, they converted more or less forty per cent of bonds portfolio into equities; in 2007 the Ministry of Finance decided to increase the fund is share of equity from forty to sixty per cent and in June 2009 this reached sixty per cent. During 2002, corporate and securitised bonds were added. In 2008 the Ministry of Finance included real estate with a maximum of five per cent of total assets and in 2010 they mandated in increase in this type of investment. Finally in 2011 they made the first investment in this area, and in 2017 they increased this area of investments to represent up to seven per cent of the investment portfolio. However, in 2012, they had the objective of reducing the share of European holdings to forty per cent and increasing the investment in emerging markets by ten per cent. Finally, for the first time in 2017, the fund value reached one trillion dollars. Below we can observe figure 4.1 "Total market value by type of investment (millions of USD)" that has a graph with the behaviour of the type of investments and the total market value over the years. Initially, the data was in billions of kroner (Norway currency – NOK) updated for 2017 to 30 September, but we decided to apply the exchange rate NOK/USD (United States dollar). Lastly, data on real estate only include unlisted real estate.

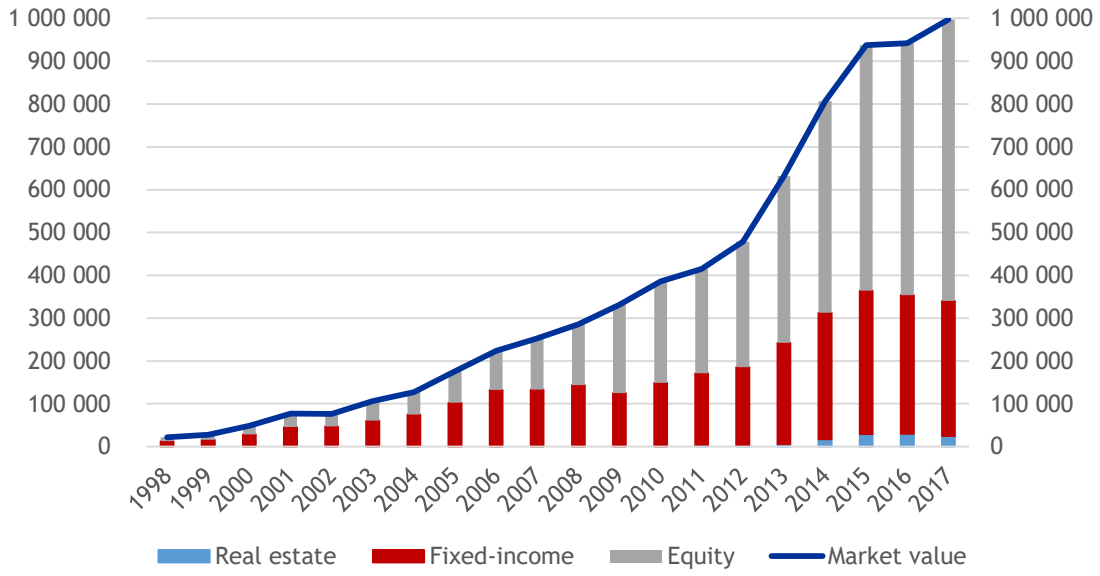

Figure 4.1 - Total market value by type of investment (millions of USD)

In the next section, we will do the following steps: formulate the hypothesis that we want to test, describe the characteristics of remaining data, formulate the model, and present the econometric model and some preliminary tests.

3.2. Hypothesis and model formulation

With all the literature read, we developed our ideas to decide what to do in our study. The most important steps are formulating the hypothesis, deciding which type of data to use to satisfy our hypothesis and formulating a model that brings us the main conclusions. Most of the literature was about works that explore the impacts of SWFs on firms and global financial markets. Because of these studies, we decided to investigate if the investments made by SWFs in various countries have an impact on their economies. In general, the literature is about their size, rapid growth, some specific aspects like governance structure, transparency, and their investments, which gives us a general idea about what the authors wrote mostly about SWFs and gave us the notion of how important they are and the potential impacts that they can have on world economies.

Other works also write about how SWFs protect economies in general and from two known phenomena called Dutch disease and the natural resource curse. All of this helps us to think about our hypothesis and what we would like to achieve in our study. As SWFs have impacts on firms and global financial markets due their big investments and rapid growth in the years 2000 and some of them have the purpose of protecting their economies, we thought that maybe their investments in different countries could improve these economies from various perspectives. To characterize the economies of the recipient countries of SWFs investments we will use GDP. As GDP is constituted by diverse variables as we can see in the equation (1) below from the book of Dornbusch et al. (1998), for us it is the best and most complete indicator that we can use to represent the behaviour of an economy.

$$GDP = C + G + I + NX \tag{1}$$

The variables have the following definitions:

C – Consumption

G - Government spending

I – Investment

NX - Net exports

With this idea, we formulate below the hypothesis that we want to test.

H_1: The investments made by SWFs improve the economies of recipient economies.

Now that the hypothesis is formulated, we will describe the data that we collect to apply the econometric model that we will explore in our study. They can be observed in the appendix, section 6. We used annual data from 1998 to 2017, for a panel of 21 countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Italy, Japan, the Netherlands, New Zealand, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom and the United States. Then from the World Bank database, we collected the GDP which is our dependent variable. We did some preliminary tests to ascertain if it would be better to use this indicator in the constant local currency, constant 2010 United States (U.S.) dollars or current U.S. dollars and it was proven that would be better to use the GDP in constant local currency. Then we have seven independent variables. First, we set a parameter that represents the year greater than or equal to 2008 and smaller than or equal to 2012. Then we had the AUM of the GPFG that symbolises the investments made by SWFs in various countries; the data is available on their site,[16] as we described in the previous section. We also added the general government final consumption expenditure (constant LCU) from the World Bank database that includes all current government expenditures for the purchase of goods and services. The KOF Globalisation Index that measures the economic, social and political dimensions of globalisation and is available on their site.[17] From the BP Statistical Review of World Energy June 2018, we collected

[16] Source: Site of the Government Pension Fund Global https://www.nbim.no/en/.

[17] Source : https://www.kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html.

the primary energy consumption that characterises a million tonnes of oil equivalent consumption. Lastly, we added the exports of goods and services (% of GDP) and inflation at consumer prices (annual %), both also from the World Bank.

However, to control the disparity of population between countries, the majority of the variables were transformed into *per capita* using the total population of all countries that we have in our database. In addition, the utilisation of GDP in constant local currency is justifiable because it permits us to control the influence of exchange rates. In our econometric analyses, we use STATA 14.0 software. Below we have Figure 4.2 "AUM of GPFG by country and year" where we can observe that in some countries the investment made by GPFG SWF during the years is growing, which justifies the importance of studies about the impacts of these type of investments.

Figure 4.2 - AUM of GPFG by country and year

Note: The *xtline* command of STATA was used. The abbreviations for the name of countries are: Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Denmark (DNK), Finland (FIN), France (FRA), Germany (DEU), Hong Kong (HKG), Ireland (IRL), Italy (ITA), Japan (JPN), Netherlands (NLD), New Zealand (NZL), Portugal (PRT), Singapore (SGP), Spain (ESP), Sweden (SWE), Switzerland (CHE), United Kingdom (GBR) and United States (USA).

Now we will present the model that we formulated to test our hypothesis with the data that we collected. We will use the ARDL method developed by Pesaran and Shin (1999) to analyse if the investments made by SWFs improve the economies of the recipient countries. Below we can observe the OLS panel with fixed effects (FE) equation (2) that we will use in our empirical analyse and in addition, we describe the variables in Table 4.1 "Description of variables". The prefixes (D) and (L) denote the first differences and the natural logarithms of the variables.

$$DLY_{it} = \alpha_i + \beta_1 sd0812 + \beta_2 DLF_{it-1} + \beta_3 DLGov_{it-1} + \beta_4 DLGlob_{it-1} + \beta_5 DLE_{it-1} + \beta_6 DLX_{it-1} + \beta_7 DLInf_{it-1} + \mu_{it} \quad (2)$$

where α_i represents the intercepts, β_k, with k=1,…,7, denote the estimated parameters, while μ_{it} represents the error term.

Table 4.1 - Description of variables

Y	GDP in constant local currency
sd0812	Shift dummy to control for the "great recession" (binary variable with "1" if the year greater than or equal to 2008 and smaller than or equal to 2012, and "0" otherwise)
F	Total assets under management of GPFG
Gov	General government final consumption expenditure (constant LCU)
Glob	KOF Globalisation Index
E	Primary energy in million tonnes oil equivalent consumption
X	Exports of goods and services (% of GDP)
Inf	Inflation, consumer prices (annual %)

With our model formulated in the next section, we will write about the steps that we took to reach our conclusions.

3.3. Empirical results

First of all, we made the descriptive statistics of our data have better knowledge of it and to ascertain whether all is in order to be used in the econometric study. Table 4.2 "Variables summarised" below, shows the characteristics of the variables such as their mean, standard deviation, minimum and maximum. Although some variables do not have the same number of observations, the STATA still assumes our panel as a "strongly balanced".

Table 4.2 - Variables summarised

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
LY	399	11.02967	1.244659	9.63282	15.2467
$sd0812$	420	.25	.4335291	0	1
LF	398	6.050304	1.699257	2.180542	11.17188
$LGov$	399	9.362321	1.251189	7.977774	13.63589
$LGlob$	399	4.38652	.1481076	3.728563	4.510582
LE	399	-12.29022	.3896327	-13.0544	-11.1131
LX	399	10.13998	1.406781	8.330555	13.49831
$LInf$	399	1.658985	1.447827	-4.478103	6.627997
DLY	399	.0144304	.0256744	-.0910921	.2181435
DLF	397	.1838223	.3900864	-1.181957	2.191249
$DLGov$	399	.0114706	.0198585	-.0620461	.1721659
$DLGlob$	378	.0036513	.0094408	-.0538199	.0523758
DLE	399	-.0024041	.0376742	-.1005354	.2258024
DLX	396	.0270323	.0773745	-.3860121	.316391

Table 4.2 - Continued

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
$DLInf$	399	.008812	1.393187	-8.538408	4.523071

Note: The prefixes (D) and (L) denote natural logarithms. The command sum of STATA was used.

With this first step done, we started to do some tests to define what would be the best procedure to follow for our formulated model. For this, we need to understand other characteristics of our data with STATA commands. Initially, we looked at the cross-sectional dependence (CSD) tests shown in Table 4.3 "Cross-sectional dependence" below. As we can observe after carrying out an analysis of the results of Pesaran cross dependence (CD) test (Pesaran 2004), we concluded that they support the presence of CSD for both variables in natural logarithms, and first differences. This means that there is a correlation between our series across countries. The reason for this interdependency is associated with the common shocks that our crosses share.

Table 4.3 - Cross-sectional dependence

Variables	CD-test	Corr.	Abs (corr.)
LY	46.56***	0.745	0.800
$sd0812$	61.15***	1.000	1.000
LF	51.36***	0.821	0.821
$LGov$	43.92***	0.695	0.725
$LGlob$	53.39***	0.845	0.845
LE	24.22***	0.383	0.593
LX	43.05***	0.681	0.758
$LInf$	31.63***	0.501	0.547

Table 4.3 - Continued

Variables	CD-test	Corr.	Abs (corr.)
DLY	39.10***	0.640	0.641
DLF	11.78***	0.193	0.273
$DLGov$	12.37***	0.203	0.290
$DLGlob$	28.69***	0.470	0.479
DLE	17.79***	0.285	0.322
DLX	38.24***	0.612	0.653
$DLInf$	40.44***	0.646	0.646

Note: To achieve results about the presence of CSD we used the Stata command xtcd. The CD test has N (0,1) distribution under the H0: cross-section independence, *** denotes statistical significance at 1%.

Now we will check the presence of collinearity and multicollinearity; the results of both tests can be seen in Table 4.4 “Correlation matrices and VIF statistics” below. The correlation between the first differences variables is not a concern, although for the logarithm form, we have some cases to point out. They are the value between LGov and LY, then the value between LX and LY, and lastly the value of LX versus LGov. The lower VIF and mean VIF values which we achieve indicate that multicollinearity is not a concern.

Table 4.4 - Correlation matrices and VIF statistics

	LY	$sd0812$	LF	$LGov$	$LGlob$	LE	LX	$LInf$
LY	1.000							
$sd0812$	0.0180	1.000						
LF	0.7410	0.1727	1.000					
$LGov$	0.9777	0.0201	0.7260	1.000				
$LGlob$	-0.2245	0.0402	-0.1460	-0.0949	1.000			
LE	0.0308	0.0096	-0.0647	-0.0017	0.1602	1.000		
LX	0.8628	0.0289	0.6791	0.8013	0.2312	0.1067	1.000	
$LInf$	-0.2580	0.1724	-0.2308	-0.2462	0.2187	0.1062	-0.2323	1.000
VIF		1.11	2.44	3.57	1.17	1.11	3.37	1.17
Mean VIF		1.99						

Table 4.4 - Continued

	DY	DF	$DGov$	$DGlob$	DE	DX	$DInf$
DLY	1.000						
DLF	0.1382	1.000					
$DLGov$	0.2428	0.0874	1.000				
$DLGlob$	0.2126	0.0692	0.0707	1.000			
DLE	0.3586	0.0792	0.1784	0.1066	1.000		
DLX	0.6573	0.0902	-0.0356	0.3086	0.2645	1.000	
$DLInf$	0.3934	-0.0521	-0.0154	0.1634	0.2061	0.5342	1.000

Table 4.4 - Continued

	DY	DF	$DGov$	$DGlob$	DE	DX	$DInf$
VIF		1.04	1.05	1.12	1.13	1.59	1.43
Mean VIF		1.22					

In order to access the order of integration of the variables, we carried out the cross-sectionally augmented IPS (CIPS) test (Pesaran 2007). We used only the 2nd generation unit root test because of the presence of CSD in all variables; this implies that the 1st generation panel unit root test of LLC (Levin et al. 2002), ADF-Fisher (Maddala and Wu 2003), and ADF-Choi (Choi 2001) ceased to be efficient. The results of the CIPS test can be seen below in Table 4.5 "Panel unit root test (CIPS)". The CIPS test shows that none of our variables are I(2), although some of them are on the borderline between the orders of integration I(0)/I(1), thus confirming that the ARDL model is the best approach for our study. It is also essential to state that some of the variables denote a trending behaviour and, therefore, we will not be using a time trend variable in our models.

Table 4.5 - Panel unit root test (CIPS)

	CIPS (Zt-bar)	
	Without trend	**With trend**
LY	0.677	1.015
LF	-0.411	-0.497
$LGov$	2.374	1.893
$LGlob$	-1.267	-0.369
LE	-0.668	-3.114***
LX	1.644	3.127

Table 4.5 - Continued

$LInf$	-1.775**	-2.916***
DLY	-5.732***	-2.612***
DLF	-11.525***	-9.116***
$DLGov$	-5.881***	-3.789***
$DLGlob$	-9.404***	-7.495***
	CIPS (Zt-bar)	
	Without trend	**With trend**
DLE	-12.946***	-10.613***
DLX	-5.944***	-4.825***
$DLInf$	-11.751	-8.861***

Note: ***, **, * denote statistical significance at 1%, 5%, 10% level, respectively; Pesaran (2007) panel unit root test (CIPS) assumes that CSD is in the form of a single unobserved common factor and H0: series is I(1); to compute this test, the Stata command multipurt was used.

When working with panel data, we need to test for the presence of individual effects. The Hausman test, which compares random effects (RE) and FE, allows us to choose the most adequate estimator, depending on the results. The null hypothesis of the Hausman test is that the difference in coefficients is not systematic or that the RE is the best model; in our case the null hypothesis is rejected as we can observe in Table 4.6 "Hausman test". Therefore, the conclusion is that the countries' individual effects are significant and must be taken into account and that the FE model is the most suitable to be adopted. The sigmamore option (of Stata command Hausman) was used to correct the situations where the covariance matrix was not positively defined, a practice that has already been used in previous studies (e.g. Fuinhas et al. 2015; Levie and Autio 2008).

Table 4.6 - Hausman test

FE versus RE
$X^2(7) = 102.09^{***}$

Note: *** Denotes significance at 1% level; in both models, the Hausman test was performed with the *sigmamore* option.

Then in order to test the group-wise heteroscedasticity of the FE, we computed the modified Wald test. This test showed that heteroscedasticity was present in our model. The Pesaran test was computed to check for the presence of contemporaneous correlation, with its results confirming the presence of contemporaneous correlation in our model. The Breusch-Pagan Lagrangian multiplier tests whether the correlation matrix of residuals was singular; this test could not be applied to our case. This problem seems to occur because the number of countries under study is higher than the number of years, and therefore the vectors for our crosses cannot be linearly independent. Lastly, we performed the Wooldridge test for autocorrelation to assess the presence of serial correlation in our model. The results arising from this test pointed out the existence of the first-order autocorrelation in the model. These tests had to be conducted to select an estimator capable of producing a valid statistical inference. The modified Wald test, the Pesaran test and Wooldridge test outputs, as well as their respective null hypotheses, can be seen in Table 4.7 “Specification test”.

Table 4.7 - Specification test

Statistics	
Modified Wald test	885.75***
Pesaran is test	1.227***
Wooldridge test	304.524***

Note: H0 of Modified Wald test: σ(i)2 = σ2 for all I; H0 of Pesaran test: residuals are not correlated; H0 of Wooldridge test: no first-order autocorrelation; *** denotes statistical significance at 1% level.

Given these results, with the purpose of dealing with the presence of CSD, heteroscedasticity, contemporaneous correlation, and first-order autocorrelation, we conclude that the most suitable estimator to use in both models is the Driscoll and Kraay (1998). This estimator is capable of producing standard errors which are robust to the disturbances being CSD, heteroskedastic and autocorrelated up to some lag.

We conclude that we should use the ARDL model as it adapts to panel data that is our type of data and it has great advantages such as breaking down the effects of the short and long term and handling almost all kinds of empirical research, which means that it is a versatile model. We decided to use the PMG model developed by Pesaran et al. (1997) because our data fits better with this ARDL methodology. This model is related to the ARDL technique but constrains the long-run coefficients to be identical, and allows the short-run coefficients and error variances to differ across groups. It can be used with panel data that have relatively large time series observation, and with non-stationary heterogeneous panels as ours. As Pesaran et al. (1999) add, the PMG involves pooling and averaging and they made a comparison between three techniques, the MG, PMG, and DFE, which we also did in our work to see the differences in the results obtained.

As described, they are used with dynamic panel data models, where the number of time series observations is relatively large and with several groups of the same order of magnitude. As Pesaran and Smith (1995) state, the MG will produce consistent estimates of the average of the parameters; however, it does not take into account the fact that specific parameters may be the same across groups. Then the DFE is the other extreme and allows intercepts to differ across groups while all other coefficients and error variances are constrained to be the same. The PMG is the intermediate model between these two; it involves pooling and averaging and allows the intercepts, short-run coefficients, and error variances to differ freely across groups, but constrains the long-run coefficients to be the same.

In Table 4.8 “Model estimation”, we can see the results that we obtain with the application of this methodology. As described in the literature review, the works of Pesaran and Smith (1995), Pesaran, et al. (1997) and Pesaran et al. (1999) resulted in a new STATA command, the *xtpmg* formulated, which is explained in Blackburne and Frank (2007), and was the one which we used to produce our model. In terms of the logarithm variables, the PMG performs better results, with all the variables

demonstrating that they are statistically significant at 1% and 5%. As concerns the first differences variables, the PMG demonstrates that fewer variables are statistically significant.

Table 4.8 – Model estimation

	Dependent variable: DLY_{it}		
Variables	**MG**	**PMG**	**DFE**
Ecm			
LF_{it-1}	0.3099	0.0334***	0.0007
$LGov_{it-1}$	-3.3487	0.3527***	-0.1803
$LGlob_{it-1}$	46.9209	-1.5943***	0.1420
LE_{it-1}	31.2881	0.1308***	0.5404***
LX_{it-1}	-9.2873	0.2037***	0.6203***
$LInf_{it-1}$	0.1256	0.0042**	-0.0339**
SR			
Ecm	-0.3227***	-0.1024**	-0.0753***
$sd0812$	-0.0131**	-0.0155***	-0.0139***
DLF_{it}	-0.0069	0.0006	0.0020
$DLGov_{it}$	0.3899**	0.1614	0.2398***
$DLGlob_{it}$	-0.3746*	-0.1969	-0.1326
DLE_{it}	0.0151	0.0065	0.0639***
DLX_{it}	0.2239***	0.2016***	0.1971***
$DLInf_{it}$	-0.0002	0.0020*	0.0003
_cons	2.9873	1.4111*	0.9516**

Notes: ***, ** and * denote statistically significant at 1%, 5% and 10% level, respectively.

We then did the robustness checks using these variables but converted into USD, as can be seen in Table 4.9 "Robustness checks model". As can be verified, the results for logarithm variables of PMG do not differ much; only $LInf_{it-1}$ becomes not statistically significant. In terms of first differences variables, $DLGovusd_{it}$ becomes statistically significant to our study.

Table 4.9 - Robustness checks model

	Dependent variable: DLY_{it}		
Variables	**MG**	**PMG**	**DFE**
Ecm			
$LFusd_{it-1}$	0.3098	0.0120***	0.0007
$LGovusd_{it-1}$	-3.6178	0.5128***	-0.1803
$LGlob_{it-1}$	46.9776	-0.7178***	0.1421
LE_{it-1}	31.1824	0.1851***	0.5404***
$LXusd_{it-1}$	-9.2607	0.2013***	0.6203***
$LInf_{it-1}$	0.1209	-0.0030	-0.0339**
SR			
Ecm	-0.3227***	-0.1884***	-0.0753***
$sd0812$	-0.0131**	-0.0163***	-0.0139***
$DLFusd_{it}$	-0.0069	-0.0015	0.0020
$DLGovusd_{it}$	0.3898**	0.2065*	0.2398***
$DLGlob_{it}$	-0.3746*	-0.2173	-0.1326
DLE_{it}	0.0151	0.0427	0.0639***
$DLXusd_{it}$	0.2239***	0.1884***	0.1971***

Table 4.9 - Continued

	Dependent variable: DLY_{it}		
Variables	**MG**	**PMG**	**DFE**
$DLInf_{it}$	-0.0002	0.0020*	0.0003
_cons	3.0000	1.8048***	0.9516**

Notes: ***, ** and * denote statistically significant at 1%, 5% and 10% level, respectively.

With this path done we obtained our results and as we thought, and our intuition told us, investments done by the GPFG SWF (LF_{it-1}) are positive and statistically significant at 1% to improve the recipient countries' economies. In our model the GDP (DLY_{it}) represents the economies of the countries where the GPFG SWF made their investments. As the GPFG is one of the biggest SWFs in the world, representing a large part of this type of investments, we can extend our results to all the other SWFs in the world.

With all this path done in the next section, we write the conclusion of our work with the application of this econometric model.

4. Conclusion

In this third work, we wanted to understand if the SWF investments somehow improve the economies of the recipient countries, which we believe to be true. We hope that this work changes the general idea about SWFs; nowadays we encounter many works that state that they can be harmful to the international financial market. Our econometric model had different variables that characterise the countries where the GPFG made investments. To represent the investments made by SWFs, we use the data about AUM from the Norwegian SWF GPFG. This is considered one of the biggest SWFs in the world, and they made investments in equities, bonds and real estate in many

countries in the world. Thus, we believe that it is suitable to represent this type of investments and funds.

To represent the economies of the countries where the GPFG made investments and has a dependent variable, we have the GDP in local currency of each country. Therefore, as independent variables we have the AUM by GPFG, the general government final consumption expenditure constant in local currency, the KOF Globalisation Index, primary energy in a million tonnes oil equivalent consumption, the exports of goods and services (% of GDP) and lastly inflation at consumer prices. Our panel data is between the years 1998 and 2017 and has twenty-one countries.

With our hypothesis formulated, we started to investigate which type of regression to use in order to achieve the precise results, and after carrying out some tests we decided to apply an ARDL model with a technique formulated by Pesaran, et al. in 1997, the PMG model, because our data allows us to use this technique. It can be used with panel data that have relatively large time series observations, and with non-stationary heterogeneous panels such as ours. Therefore, we conclude that the investments made by SWFs improve the economies of the recipient countries. This in some way contradicts the general idea in the literature that SWFs are not good for world economies. As their investments can improve the economies of recipient countries, this means that we will have synergies between countries that will improve the economies globally.

It was also demonstrated that variables like general government final consumption expenditure constant in local currency, primary energy in million tonnes oil equivalent consumption, the exports of goods and services (% of GDP) in logarithm form are positive and statistically significant at 1% for the economy of the countries in the study represented by the GDP in local currency. Only the KOF Globalisation Index is negative and statistically significant at 1%. Also, in first differences form, we have the exports of goods and services (% of GDP) positive and statistically significant at 1%. With a 5% statistically significance and positive influence, we have inflation at consumer prices in the form of logarithm and first difference.

By way of conclusion, with our work, we would like to encourage countries to attract SWF investments and not to have a wrong perception of them. On the one hand, it would be good for the economies in the world to continue with the constitution of this

powerful instrument that can protect their economies from shocks that they are sometimes not aware of and not prepared for. We describe some of them in this work. On the other hand, we have proved that SWFs investments can improve the economies in the world. Furthermore, they can be an excellent way to improve the well-being of future generations and to improve living conditions and stability of countries globally.

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6. Appendix

Table A4.1 - Value of Assets Under Management

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	360.265	433.757	647.656	1 143.118	800.163	1 259.398	1 587.944	1 902.774	2 728.532	1 885.720
Austria	253.257	400.556	438.150	679.529	1 287.890	2 249.296	2 702.981	1 900.197	4 056.723	4 974.336
Belgium	349.628	243.809	542.538	650.252	-254.523	1 025.323	977.633	527.860	638.074	6 399.894
Canada	355.101	527.563	1 134.490	742.352	4 858.530	2 380.377	4 323.227	3 436.875	6 346.540	6 207.459
Denmark	233.703	219.505	376.133	642.686	2 336.260	2 378.167	2 407.745	3 484.822	4 008.971	4 746.235
Finland	372.811	468.429	463.184	737.672	840.780	772.353	878.543	832.438	1 550.728	3 510.392
France	1 568.763	1 858.480	3 025.315	3 229.264	5 593.776	8 391.174	14 067.828	13 610.507	22 375.157	29 071.053
Germany	2 776.486	3 539.912	3 719.725	6 405.718	15 853.133	20 483.865	29 632.474	31 902.178	56 673.661	54 108.802
Hong Kong	127.936	176.104	295.063	427.830	422.990	598.044	613.500	870.941	1 747.643	2 867.049
Ireland	150.250	122.732	215.295	366.609	469.268	571.343	636.654	628.936	2 006.744	3 358.525
Italy	1 286.522	1 601.584	4 963.849	5 474.593	5 368.520	6 387.620	7 411.669	10 484.071	17 025.723	16 969.574
Japan	4 025.402	5 166.963	7 591.953	9 310.988	7 873.331	10 531.744	13 052.301	18 220.186	19 616.290	23 785.917
Netherlands	685.045	915.754	1 157.034	2 046.942	3 252.879	4 162.124	5 317.682	5 212.853	6 840.905	12 152.899
New Zealand	33.887	28.320	11.584	23.369	151.316	233.630	251.723	205.378	110.154	304.885
Portugal	130.360	130.838	146.959	320.027	576.606	623.695	633.071	1 434.254	2 983.842	3 895.130
Singapore	21.659	59.734	92.537	151.575	374.386	501.621	635.688	1 013.823	1 290.779	1 356.648
Spain	717.407	687.473	1 967.574	2 496.887	2 025.209	5 987.772	7 543.008	7 684.818	12 647.033	24 485.408
Sweden	307.139	529.590	731.235	1 018.265	1 121.411	1 474.308	1 061.045	3 104.321	5 778.048	9 878.170
Switzerland	608.321	629.916	1 195.991	1 860.205	2 098.868	3 478.235	4 461.276	5 113.600	7 191.094	11 381.074
United Kingdom	1 850.312	2 631.965	4 930.802	8 504.369	9 377.715	14 070.369	15 204.089	11 877.936	27 717.396	34 469.046
United States	5 412.412	6 713.191	10 843.475	18 048.897	22 358.568	32 601.270	45 890.411	47 406.600	73 731.785	88 043.095

Table A4.1 - Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australia	4 173.608	7 297.921	8 283.885	7 223.962	14 941.975	17 498.582	18 622.405	17 623.368	18 982.571	23 891.934
Austria	4 367.280	3 678.370	3 989.327	4 486.641	4 412.447	3 956.209	4 101.501	4 143.719	4 966.642	4 433.155
Belgium	5 174.803	4 090.143	5 442.029	5 514.008	4 896.380	6 796.734	6 731.900	6 445.069	7 421.719	8 975.462
Canada	8 652.041	12 320.654	15 107.083	15 465.168	21 032.442	24 621.501	25 345.547	21 490.820	24 594.508	31 065.790
Denmark	3 509.317	3 656.291	5 398.028	5 716.401	5 356.062	6 291.612	6 354.161	7 598.770	7 657.626	9 776.565
Finland	3 168.296	3 391.480	4 163.518	4 384.295	5 360.729	7 337.970	6 807.228	6 168.957	5 513.930	6 983.218
France	28 814.157	38 078.108	41 468.970	113 040.253	67 665.931	72 352.068	74 577.809	160 676.222	208 398.498	351 761.156
Germany	42 215.817	39 128.142	41 631.761	37 910.882	50 562.396	65 765.502	60 597.223	71 683.302	71 408.868	84 477.480
Hong Kong	2 134.381	2 844.918	3 639.252	4 523.697	7 464.726	7 147.189	7 087.573	7 248.159	8 021.786	10 240.690
Ireland	4 272.001	3 602.518	3 538.505	2 979.272	2 774.119	2 522.658	1 756.223	1 697.676	953.115	1 716.179
Italy	18 397.076	15 517.768	19 076.523	13 731.307	13 649.485	15 852.337	16 926.000	13 858.919	13 806.803	17 332.812
Japan	23 440.669	24 006.485	27 928.084	29 866.404	41 378.462	59 655.011	67 332.296	75 481.752	72 934.621	92 786.086
Netherlands	10 250.303	12 009.975	14 096.936	15 177.265	17 135.273	20 805.591	16 536.186	13 966.015	14 591.526	16 418.350
New Zealand	230.732	301.385	395.077	136.628	816.927	1 082.126	1 088.907	1 477.260	1 747.426	2 165.488
Portugal	3 569.370	2 720.740	2 780.876	2 193.562	1 241.875	1 448.430	1 196.392	1 176.927	1 208.763	1 804.866
Singapore	1 095.415	1 711.217	1 881.975	1 309.822	3 248.233	3 882.635	4 678.005	4 319.462	4 162.139	5 279.479
Spain	23 149.731	25 330.102	24 862.173	22 355.925	19 799.502	23 721.211	22 076.589	17 143.755	14 540.683	19 477.471
Sweden	7 188.144	8 037.724	11 188.287	13 990.778	15 625.757	20 251.016	18 175.424	17 431.948	16 422.528	17 952.659
Switzerland	11 167.769	16 913.023	20 503.316	22 683.864	32 891.980	36 891.337	36 345.321	32 986.941	31 408.671	37 203.810
United Kingdom	51 938.443	71 749.309	79 439.374	522 316.890	231 216.284	290 153.889	624 259.227	1 139 215.753	1 022 505.305	1 308 218.548
United States	102 894.268	131 303.073	155 438.873	159 944.582	196 539.482	257 094.065	687 111.022	4 597 387.966	4 672 716.543	4 729 885.389

Source: https://www.nbim.no/en/the-fund/holdings/holdings-as-at-31.12.2018/. Value: 10^6 USD.

Table A4.2 – GDP Local Currency

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	956 325	1 004 314	1 043 916	1 064 096	1 106 692	1 139 735	1 185 337	1 223 153	1 257 820	1 305 332
Austria	237 332	245 773	254 069	257 289	261 538	264 000	271 221	277 307	286 886	297 579
Belgium	289 701	300 023	310 925	313 449	319 030	321 501	333 186	340 164	348 689	360 715
Canada	1 250 514	1 315 081	1 383 238	1 407 732	1 450 105	1 476 240	1 521 796	1 570 515	1 611 716	1 644 961
Denmark	1 570 349	1 616 643	1 677 217	1 691 023	1 698 909	1 705 536	1 751 043	1 791 959	1 862 078	1 879 009
Finland	143 290	149 658	158 091	162 171	164 896	168 184	174 787	179 646	186 931	196 623
France	1 646 775	1 702 882	1 768 871	1 803 443	1 823 614	1 838 559	1 889 789	1 920 171	1 965 774	2 012 196
Germany	2 246 200	2 290 835	2 358 691	2 398 682	2 398 682	2 381 653	2 409 518	2 426 546	2 516 333	2 598 378
Hong Kong	1 281 766	1 313 896	1 414 586	1 422 520	1 446 086	1 490 283	1 619 938	1 739 623	1 861 966	1 982 339
Ireland	101 809	112 619	123 385	130 546	138 782	143 112	152 673	161 843	170 780	179 675
Italy	1 476 866	1 499 903	1 555 551	1 583 118	1 587 053	1 589 455	1 614 599	1 629 932	1 662 638	1 687 143
Japan	457 984 584	456 830 672	469 528 888	471 436 752	471 993 013	479 206 106	489 771 105	497 914 384	504 984 801	513 338 178
Netherlands	506 579	532 170	554 727	566 511	567 098	568 708	580 257	592 793	613 651	636 347
New Zealand	144 158	151 645	155 117	161 008	169 156	176 836	182 618	188 679	193 533	200 811
Portugal	155 018	161 046	167 145	170 393	171 703	170 099	173 181	174 509	177 219	181 635
Singapore	158 722	168 396	183 379	181 633	189 283	197 678	216 554	232 773	253 397	276 485
Spain	788 936	824 318	867 917	902 643	928 638	958 239	988 584	1 025 389	1 068 190	1 108 450
Sweden	2 610 508	2 728 768	2 857 983	2 902 665	2 962 854	3 033 540	3 164 605	3 253 794	3 406 336	3 522 320
Switzerland	480 661	488 807	508 051	514 718	515 555	515 759	530 078	546 591	568 393	591 764
United Kingdom	1 267 280	1 308 045	1 355 974	1 390 471	1 424 647	1 472 030	1 506 835	1 553 488	1 591 642	1 629 152
United States	11 666 663	12 213 270	12 713 058	12 837 135	13 066 423	13 433 168	13 941 713	14 408 094	14 792 304	15 055 395

Table A4.2 – Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australia	1 353 078.00	1 379 094.00	1 407 406.00	1 441 903.00	1 498 021.00	1 537 561.00	1 576 897.00	1 613 972.00	1 659 604.00	1 692 092.00
Austria	301 925.01	290 558.80	295 896.64	304 545.10	306 617.36	306 695.56	309 237.25	312 613.67	317 149.43	326 775.78
Belgium	363 540.16	355 348.97	365 100.50	371 666.11	372 538.77	373 286.27	378 113.85	383 509.38	388 925.65	395 653.16
Canada	1 661 417.00	1 612 412.05	1 662 131.00	1 714 342.17	1 744 265.54	1 787 436.15	1 838 480.66	1 856 881.69	1 883 139.91	1 940 525.78
Denmark	1 869 388.00	1 777 666.00	1 810 926.00	1 835 134.00	1 839 290.00	1 856 457.00	1 886 520.00	1 916 829.00	1 954 477.00	1 998 260.00
Finland	198 040.00	181 664.00	187 100.00	191 910.00	189 173.00	187 739.00	186 553.00	186 805.00	190 794.00	195 820.00
France	2 016 125.67	1 956 824.53	1 995 289.00	2 036 775.63	2 040 496.68	2 052 254.87	2 071 701.76	2 093 816.38	2 118 683.60	2 157 230.93
Germany	2 626 501.08	2 478 921.65	2 580 060.00	2 674 490.20	2 687 648.50	2 700 806.81	2 752 924.02	2 800 913.14	2 855 352.40	2 918 821.88
Hong Kong	2 024 522.00	1 974 738.00	2 108 382.00	2 209 894.00	2 247 469.00	2 317 174.00	2 381 184.00	2 438 043.00	2 490 776.00	2 585 210.00
Ireland	172 603.34	164 617.37	167 583.25	172 585.46	172 649.58	175 479.04	190 093.60	238 676.33	250 947.78	270 527.68
Italy	1 669 421.40	1 577 902.80	1 604 514.50	1 613 766.50	1 568 274.20	1 541 171.90	1 542 923.80	1 557 611.80	1 570 980.20	1 594 580.90
Japan	507 724 616.65	480 224 155.54	500 353 900.00	499 776 384.83	507 248 489.51	517 394 817.92	519 333 597.07	526 364 455.35	531 302 774.49	540 401 765.55
Netherlands	647 158.80	622 776.55	631 512.00	642 018.00	635 231.63	634 022.53	643 023.69	657 560.89	672 092.61	693 345.60
New Zealand	197 707.10	201 495.30	203 434.00	208 918.17	214 139.91	218 461.27	226 205.70	236 236.33	244 437.17	251 840.34
Portugal	181 997.23	176 577.16	179 929.81	176 642.76	169 527.14	167 611.22	169 108.30	172 189.56	174 978.03	179 667.14
Singapore	281 427.40	279 729.30	322 361.10	342 833.20	356 832.10	375 070.10	389 637.40	398 369.40	407 918.40	422 679.10
Spain	1 120 839.00	1 080 783.00	1 080 935.00	1 070 139.00	1 038 808.00	1 021 089.00	1 035 180.00	1 070 710.00	1 105 770.00	1 139 515.00
Sweden	3 502 699.00	3 321 096.00	3 519 994.00	3 613 781.00	3 603 434.00	3 648 160.00	3 743 170.00	3 912 435.00	4 039 000.00	4 131 417.00
Switzerland	604 515.12	591 082.15	608 830.56	619 136.90	625 365.57	636 947.58	652 547.82	660 550.56	669 638.98	676 916.56
United Kingdom	1 621 453.93	1 553 551.34	1 579 877.00	1 602 826.67	1 626 569.82	1 659 953.35	1 710 652.50	1 750 783.37	1 784 674.87	1 816 569.71
United States	15 011 490.54	14 594 842.18	14 964 372.00	15 204 019.63	15 542 161.72	15 802 855.30	16 208 861.25	16 672 691.92	16 920 327.94	17 304 984.28

Source: https://data.worldbank.org/.

Table A4.3 – General Government Final Consumption Expenditure

Country Name	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	182 751	190 452	196 417	199 760	205 920	212 010	221 387	228 509	235 698	243 220
Austria	49 989	51 619	51 739	51 559	51 970	52 500	53 307	54 512	56 294	57 080
Belgium	70 015	71 890	74 036	74 779	76 772	77 844	79 085	79 596	80 353	81 897
Canada	263 732	269 441	278 701	288 190	294 711	303 196	308 883	312 168	320 757	328 377
Switzerland	60 086	61 248	62 164	62 216	63 356	64 604	65 226	66 375	66 544	67 037
Germany	426 982	431 916	437 786	440 056	445 334	447 752	444 200	446 370	450 662	457 273
Denmark	387 763	400 446	412 188	420 034	428 984	430 025	436 581	441 847	453 065	458 504
Spain	128 912	133 902	139 763	145 081	150 732	158 155	168 184	177 657	186 486	198 010
Finland	37 458	38 096	38 579	39 452	40 416	40 941	41 536	42 342	42 816	43 373
France	393 826	399 919	407 234	411 623	419 107	427 232	436 646	442 207	448 174	456 290
United Kingdom	246 049	254 779	263 074	273 784	285 245	297 119	309 660	317 011	322 573	325 944
Hong Kong	156 721	162 171	166 140	176 660	181 730	186 050	188 628	183 783	185 422	191 285
Ireland	23 791	24 896	26 612	28 839	30 230	30 726	30 727	31 594	32 773	34 464
Italy	283 074	287 226	296 139	308 667	312 262	316 456	319 502	321 548	320 339	321 472
Japan	78 217 969	80 933 828	84 074 572	86 941 144	89 247 950	90 898 389	91 967 617	92 698 139	92 760 369	93 830 999
Netherlands	112 941	115 474	119 547	124 788	130 291	134 188	133 651	135 816	148 504	153 114
New Zealand	27 003	27 482	27 829	28 968	29 455	30 839	32 310	34 622	35 985	37 707
Portugal	29 621	30 632	31 981	33 126	33 995	34 533	35 541	36 497	36 414	36 645
Singapore	15 924	17 063	20 623	21 536	22 689	22 773	23 109	24 272	26 164	26 877
Sweden	795 291	809 200	801 860	803 238	820 100	825 601	823 703	826 766	840 090	844 303
United States	1 976 177	2 030 421	2 061 655	2 134 599	2 217 159	2 257 047	2 291 981	2 310 315	2 335 755	2 368 362

Table A4.3 – Continued

Country Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Australia	250 570	261 063	265 604	274 685	284 663	285 624	289 960	296 807	309 325	321 907	-
Austria	59 175	60 628	60 637	60 679	60 710	61 171	61 684	62 181	63 296	64 225	-
Belgium	84 240	85 182	85 999	87 060	88 288	88 565	89 059	89 554	89 370	89 880	-
Canada	340 726	349 913	357 791	362 480	365 007	362 440	364 328	370 118	378 414	387 294	-
Switzerland	67 854	69 899	70 637	71 838	72 940	74 640	76 245	77 114	78 032	78 716	-
Germany	472 764	487 021	493 336	497 973	503 203	510 011	517 953	533 148	554 214	562 946	-
Denmark	473 421	487 752	495 575	492 464	496 195	495 701	505 299	513 801	514 584	518 315	-
Spain	209 764	218 434	221 737	221 108	210 733	206 293	205 573	209 766	211 881	215 908	-
Finland	44 064	44 752	44 700	44 644	44 867	45 364	45 137	45 211	46 033	45 855	-
France	461 508	472 639	478 655	483 692	491 425	498 668	505 177	510 261	517 267	524 070	-
United Kingdom	332 271	335 814	337 275	337 644	341 836	341 220	348 757	353 670	356 334	355 650	-
Hong Kong	195 159	199 692	206 386	211 451	218 978	224 901	231 791	239 726	247 615	255 952	-
Ireland	34 600	33 349	31 514	30 944	30 144	29 896	31 071	31 658	32 759	33 985	-
Italy	324 582	325 793	327 648	321 694	317 259	316 281	314 022	312 257	313 204	312 960	-
Japan	93 756 945	95 671 634	97 527 000	99 411 627	101 079 602	102 595 961	103 152 421	104 742 333	106 115 394	106 553 106	-
Netherlands	158 175	165 541	167 744	167 047	165 114	165 145	166 065	165 936	168 175	170 026	-
New Zealand	39 212	39 027	39 768	40 464	40 386	41 194	42 500	43 568	44 454	46 584	-
Portugal	36 800	37 765	37 270	35 847	34 671	33 983	33 829	34 266	34 540	34 608	-
Singapore	28 467	29 654	32 838	32 255	31 781	35 398	35 479	38 260	39 612	41 230	-
Sweden	855 582	874 876	886 372	893 695	903 597	915 258	929 093	951 479	985 747	985 909	-
United States	2 428 354	2 519 321	2 510 143	2 434 378	2 398 873	2 353 381	2 334 071	2 373 130	2 407 981	2 405 743	-

Source: https://data.worldbank.org/.

Table A4.4 – KOF Globalisation Index

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	76.19	77.46	78.60	79.26	78.66	79.58	79.50	79.55	80.44	81.14
Austria	85.39	85.86	87.23	87.27	86.84	87.32	88.01	88.27	88.51	88.76
Belgium	86.10	86.76	87.88	88.10	87.73	88.33	88.41	88.54	89.27	90.07
Canada	81.56	82.25	83.18	82.89	81.31	82.05	82.12	82.33	82.43	82.86
Switzerland	86.10	87.08	88.71	88.90	87.78	88.08	87.63	88.64	88.31	88.76
Germany	82.14	83.20	85.29	85.42	85.26	86.07	86.42	86.91	87.63	87.94
Denmark	84.89	85.33	87.32	87.92	87.18	87.37	87.30	88.35	88.48	88.96
Spain	77.77	78.86	80.94	81.38	80.88	81.37	81.58	81.98	82.49	83.02
Finland	82.86	83.29	85.14	85.51	84.37	84.87	85.93	85.05	85.86	86.66
France	81.98	82.53	84.20	84.56	84.26	84.21	84.59	84.83	85.38	86.12
United Kingdom	84.80	85.75	87.11	87.26	87.63	88.17	88.06	88.23	88.54	88.33
Hong Kong	64.04	64.60	64.95	65.34	65.51	67.31	67.60	67.96	68.30	68.59
Ireland	81.26	81.60	82.91	83.25	83.18	83.07	83.37	83.63	83.24	83.90
Italy	77.57	79.11	80.90	80.97	79.57	79.15	79.51	79.78	80.58	81.31
Japan	66.96	67.71	68.68	69.20	69.84	71.00	71.31	71.73	73.18	74.25
Netherlands	85.38	86.47	87.62	87.82	86.37	87.41	87.97	87.99	88.28	89.17
New Zealand	74.57	76.19	78.03	78.28	77.60	76.92	77.23	76.85	77.74	78.11
Portugal	76.75	77.25	79.49	80.42	78.76	79.68	80.45	80.42	81.36	82.16
Singapore	77.66	78.94	79.82	81.43	81.40	82.40	81.80	79.09	83.34	84.77
Sweden	86.45	86.84	88.23	88.61	88.27	88.56	88.54	89.03	89.15	89.54
United States	77.58	77.94	78.19	78.64	78.42	78.74	79.18	79.48	80.99	81.34

Table A4.4 – Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australia	80.18	80.55	81.51	81.55	81.16	80.43	81.02	80.84	81.58	-
Austria	88.92	88.46	88.04	88.39	88.57	88.07	89.24	88.78	88.95	-
Belgium	89.98	90.05	90.02	90.04	89.92	89.89	90.97	90.46	90.50	-
Canada	82.82	82.94	83.04	83.11	83.21	83.26	84.25	84.12	84.38	-
Switzerland	88.78	88.63	89.23	88.50	90.31	90.40	90.87	90.82	91.17	-
Germany	87.50	86.95	86.90	87.18	87.29	87.30	87.64	87.57	88.17	-
Denmark	88.76	87.70	88.17	88.34	87.96	88.02	88.72	88.99	89.14	-
Spain	82.75	82.44	82.95	83.44	83.56	83.66	84.82	85.01	85.30	-
Finland	86.60	85.73	85.69	85.85	86.41	86.23	87.26	87.01	86.99	-
France	85.75	85.56	86.30	86.43	86.75	86.53	87.61	87.33	87.20	-
United Kingdom	88.17	88.38	88.62	89.04	88.97	89.06	88.89	89.08	89.35	-
Hong Kong	68.48	68.40	68.18	68.37	68.44	68.30	68.91	68.59	67.69	-
Ireland	83.24	84.37	84.68	84.45	84.82	84.77	85.17	85.30	84.64	-
Italy	80.68	80.35	80.87	81.07	81.01	81.09	82.10	82.40	82.59	-
Japan	73.97	73.92	74.51	74.68	75.47	76.26	76.56	78.31	78.37	-
Netherlands	88.71	88.56	88.96	89.24	89.54	89.84	90.69	90.97	90.97	-
New Zealand	78.66	78.47	78.54	78.61	78.16	77.70	78.24	77.90	77.91	-
Portugal	81.78	81.58	81.93	82.49	81.95	81.23	82.70	83.06	83.52	-
Singapore	85.00	85.26	85.51	85.22	85.39	85.30	83.00	82.91	83.38	-
Sweden	89.41	89.16	89.19	88.85	88.53	88.53	90.24	90.21	89.88	-
United States	80.80	80.03	80.18	80.90	80.73	81.07	81.59	81.66	82.10	-

Source: https://www.kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html.

Table A4.5 – Primary Energy

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	107.53	109.54	109.86	110.89	112.51	114.19	118.03	117.74	124.87	126.67
Austria	31.59	32.24	32.33	33.64	33.78	34.33	34.94	35.65	35.40	34.69
Belgium	63.27	62.60	64.20	63.09	63.25	65.85	66.02	65.62	65.71	66.34
Canada	282.91	291.89	300.41	293.89	303.55	305.68	309.85	313.14	309.80	321.36
Switzerland	21.68	21.01	20.15	20.21	20.15	21.70	20.50	19.74	21.80	20.67
Germany	30.32	29.78	30.00	30.78	31.18	33.53	33.24	30.25	32.48	32.46
Denmark	250.58	255.16	257.92	261.64	259.74	262.90	266.12	265.50	264.00	260.20
Spain	342.12	337.09	339.14	345.50	341.24	341.26	341.22	337.58	346.41	331.94
Finland	16.04	16.25	17.01	21.48	20.96	21.64	24.23	23.25	24.60	26.17
France	13.47	14.25	14.75	15.71	15.60	15.19	15.40	16.08	16.41	16.93
United Kingdom	170.52	175.85	178.35	179.33	177.97	183.95	187.31	187.60	186.79	183.37
Hong Kong	507.53	516.54	522.34	517.84	516.79	515.74	522.17	530.46	529.15	524.45
Ireland	85.87	84.95	86.17	89.50	89.50	90.11	93.14	95.13	93.19	94.75
Italy	17.96	18.19	18.94	18.87	19.56	19.03	19.63	19.03	19.31	19.29
Japan	23.73	24.35	25.00	25.35	25.36	25.92	25.49	25.55	25.24	25.37
Netherlands	35.98	35.62	38.09	43.24	42.48	40.14	44.93	47.20	51.94	55.77
New Zealand	118.30	122.35	129.18	135.13	137.14	145.26	151.29	152.88	154.56	158.59
Portugal	57.51	55.86	51.66	55.60	52.52	50.58	55.20	56.19	52.80	53.98
Singapore	29.31	30.28	29.57	31.67	29.60	29.37	29.03	27.96	29.20	28.89
Sweden	226.52	225.41	227.47	230.09	225.06	228.41	229.81	232.26	229.72	223.05
United States	2170.75	2208.76	2259.61	2208.36	2241.81	2251.39	2298.14	2301.34	2285.74	2320.83

Table A4.5 – Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australia	128.89	128.17	129.16	133.55	131.96	132.88	135.07	137.97	139.48	139.44
Austria	35.31	34.28	35.47	33.42	35.02	34.83	33.67	33.74	34.88	35.94
Belgium	67.49	62.52	66.65	61.88	59.55	60.87	56.78	57.98	62.36	62.27
Canada	320.66	303.69	310.55	323.18	319.91	331.53	335.37	331.13	338.96	348.69
Switzerland	19.94	18.74	19.71	18.70	17.28	18.07	17.50	16.94	17.44	17.32
Germany	31.41	29.22	31.85	29.34	28.37	28.00	26.95	27.59	28.28	27.56
Denmark	261.88	247.97	256.04	247.17	247.44	250.30	240.56	242.32	238.89	237.94
Spain	335.53	315.01	328.67	316.96	321.35	330.65	317.24	323.30	328.17	335.09
Finland	24.35	26.59	27.66	28.36	27.25	27.99	27.34	28.11	28.85	30.91
France	16.87	15.41	15.38	14.42	14.24	13.97	13.92	14.76	15.38	15.64
United Kingdom	181.51	169.62	174.91	170.99	164.60	158.00	149.08	152.16	153.76	156.03
Hong Kong	516.92	472.32	503.83	477.75	474.98	471.27	456.69	453.02	451.24	456.43
Ireland	93.59	91.93	96.95	92.86	89.41	87.27	82.22	83.29	85.23	86.11
Italy	19.45	19.41	19.99	19.85	19.98	20.17	21.15	21.29	21.68	22.09
Japan	24.31	24.52	25.79	24.62	22.51	24.62	24.82	24.72	26.81	26.37
Netherlands	59.33	63.81	68.58	71.30	71.60	73.60	75.81	80.60	83.64	86.48
New Zealand	154.50	143.45	146.58	143.75	143.03	135.66	133.29	135.30	136.67	138.80
Portugal	53.63	48.95	51.88	51.81	55.14	51.90	52.12	53.41	52.83	54.43
Singapore	29.94	29.96	29.21	27.67	29.30	30.18	28.90	28.31	27.27	26.39
Sweden	219.18	208.39	213.49	201.97	204.52	203.70	192.03	194.40	192.15	191.35
United States	2267.95	2159.29	2235.60	2216.71	2161.01	2221.07	2246.19	2226.97	2228.02	2234.85

Source: http://www.bp.com/statisticalreview

Table A4.6 - Exports of Goods and Services (% of GDP)

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	19.60	18.35	19.44	22.24	20.78	19.10	17.22	18.29	19.91	20.23
Austria	38.35	39.36	43.35	44.62	45.32	44.57	46.87	48.62	50.84	52.56
Belgium	63.40	63.90	71.86	71.02	70.31	68.60	70.37	73.52	75.71	77.49
Canada	40.04	41.88	44.24	42.04	40.03	36.83	37.29	36.80	35.33	34.15
Denmark	37.19	39.35	44.85	45.55	45.70	43.84	43.93	47.45	50.73	51.48
Finland	37.47	37.60	42.09	39.71	39.09	37.27	38.59	40.26	43.17	44.00
France	26.13	26.08	28.59	28.27	27.53	26.11	26.47	27.03	27.94	27.85
Germany	26.45	27.04	30.83	31.87	32.57	32.59	35.45	37.74	41.19	43.01
Hong Kong	110.83	112.72	126.03	122.77	132.08	150.78	167.78	177.45	185.19	186.41
Ireland	84.43	86.61	94.49	95.32	90.48	80.85	80.54	79.58	79.00	80.78
Italy	24.12	23.25	25.66	25.73	24.47	23.36	24.06	24.65	26.23	27.43
Japan	10.52	9.95	10.62	10.23	11.02	11.64	12.97	14.01	15.87	17.49
Netherlands	59.73	60.24	66.49	63.82	60.75	59.71	63.54	66.62	69.28	70.27
New Zealand	29.62	30.95	35.75	35.43	32.85	29.84	29.54	28.29	29.59	29.25
Portugal	27.32	26.47	28.19	27.42	26.95	26.75	27.25	26.73	29.92	31.01
Singapore	167.59	177.19	189.18	184.48	185.97	205.18	216.42	226.23	230.11	214.76
Spain	26.18	26.40	28.62	27.86	26.48	25.45	25.18	24.67	24.87	25.71
Sweden	41.03	41.04	44.10	43.75	42.09	41.24	43.45	45.87	48.19	48.26
Switzerland	46.70	47.41	52.12	50.89	48.94	48.11	51.47	53.79	56.49	61.30
United Kingdom	23.73	23.61	24.84	24.74	23.77	23.53	23.44	24.69	26.71	24.86
United States	10.48	10.27	10.66	9.67	9.13	9.04	9.63	10.00	10.65	11.50

Table A4.6 - Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australia	20.19	23.04	19.84	21.47	21.52	19.99	21.08	20.01	19.25	21.27
Austria	53.25	45.21	51.26	53.95	53.97	53.44	53.40	52.93	52.26	53.94
Belgium	79.70	69.31	76.45	81.64	82.31	81.73	82.67	80.79	82.94	85.05
Canada	34.32	28.44	29.07	30.56	30.21	30.16	31.54	31.53	30.97	30.89
Denmark	54.18	47.13	50.52	53.82	54.63	54.83	54.61	55.68	53.58	55.21
Finland	45.08	36.27	38.68	39.16	39.48	38.81	37.22	36.49	36.03	38.59
France	28.12	24.84	26.79	28.42	29.20	29.36	29.67	30.59	30.16	30.88
Germany	43.46	37.80	42.25	44.82	45.98	45.40	45.70	46.87	46.12	47.24
Hong Kong	193.42	178.14	205.32	212.85	215.85	221.61	213.09	195.90	187.00	188.00
Ireland	84.12	93.24	103.11	103.12	106.89	106.04	112.98	124.64	121.58	120.01
Italy	26.96	22.48	25.19	27.01	28.59	28.86	29.31	29.93	29.80	31.30
Japan	17.42	12.52	15.04	14.92	14.54	15.92	17.54	17.59	16.12	-
Netherlands	71.64	63.15	71.95	77.36	81.94	82.01	82.57	83.43	82.45	86.46
New Zealand	32.04	28.74	30.26	30.36	28.86	28.80	27.88	27.57	25.82	-
Portugal	31.13	27.08	29.87	34.29	37.71	39.52	40.07	40.40	40.13	43.11
Singapore	231.19	192.17	199.75	203.24	197.06	194.08	191.27	177.39	168.19	173.35
Spain	25.32	22.67	25.52	28.92	30.70	32.22	32.71	32.94	32.95	34.09
Sweden	49.81	44.45	46.19	46.68	46.32	43.80	45.03	45.55	44.27	45.32
Switzerland	62.66	57.23	63.97	65.47	67.03	71.92	64.27	62.14	65.81	64.98
United Kingdom	26.80	26.13	28.21	30.51	29.73	29.67	28.25	27.38	28.26	30.53
United States	12.51	11.01	12.38	13.57	13.61	13.64	13.62	12.50	11.89	-

Source: https://data.worldbank.org/.

Table A4.7 - Inflation, consumer prices (annual %)

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	0.86	1.48	4.46	4.41	2.98	2.73	2.34	2.69	3.56	2.33
Austria	0.92	0.57	2.34	2.65	1.81	1.36	2.06	2.30	1.44	2.17
Belgium	0.95	1.12	2.54	2.47	1.65	1.59	2.10	2.78	1.79	1.82
Canada	1.00	1.73	2.72	2.53	2.26	2.76	1.86	2.21	2.00	2.14
Denmark	1.85	2.50	2.90	2.34	2.42	2.08	1.15	1.82	1.92	1.69
Finland	1.40	1.16	3.04	2.58	1.57	0.88	0.19	0.62	1.57	2.51
France	0.65	0.54	1.68	1.63	1.92	2.10	2.14	1.75	1.68	1.49
Germany	0.91	0.59	1.44	1.98	1.42	1.03	1.67	1.55	1.58	2.30
Hong Kong	2.91	- 4.01	- 3.69	- 1.66	- 2.98	- 2.67	- 0.27	0.83	2.01	2.03
Ireland	2.42	1.63	5.59	4.87	4.61	3.49	2.20	2.43	3.93	4.90
Italy	1.96	1.66	2.54	2.79	2.47	2.67	2.21	1.99	2.09	1.83
Japan	0.66	- 0.34	- 0.68	- 0.74	- 0.92	- 0.26	- 0.01	- 0.28	0.25	0.06
Netherlands	1.96	2.16	2.36	4.16	3.29	2.09	1.26	1.69	1.10	1.61
New Zealand	1.27	- 0.11	2.62	2.63	2.68	1.75	2.29	3.04	3.37	2.38
Portugal	2.57	2.34	2.85	4.37	3.60	3.22	2.37	2.28	3.11	2.45
Singapore	- 0.27	0.02	1.36	1.00	- 0.39	0.51	1.66	0.43	0.96	2.10
Spain	1.83	2.31	3.43	3.59	3.07	3.04	3.04	3.37	3.52	2.79
Sweden	- 0.27	0.46	0.90	2.41	2.16	1.93	0.37	0.45	1.36	2.21
Switzerland	0.02	0.81	1.56	0.99	0.64	0.64	0.80	1.17	1.06	0.73
United Kingdom	1.56	1.35	0.80	1.24	1.23	1.38	1.35	2.04	2.35	2.31
United States	1.55	2.19	3.38	2.83	1.59	2.27	2.68	3.39	3.23	2.85

Table A4.7 – Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australia	4.35	1.77	2.92	3.30	1.76	2.45	2.49	1.51	1.28	1.95
Austria	3.22	0.51	1.81	3.29	2.49	2.00	1.61	0.90	0.89	2.08
Belgium	4.49	- 0.05	2.19	3.53	2.84	1.11	0.34	0.56	1.97	2.13
Canada	2.37	0.30	1.78	2.91	1.52	0.94	1.91	1.13	1.43	1.60
Denmark	3.42	1.30	2.31	2.76	2.40	0.79	0.56	0.45	0.25	1.15
Finland	4.07	- 0.00	1.18	3.42	2.81	1.48	1.04	- 0.21	0.36	0.75
France	2.81	0.09	1.53	2.11	1.95	0.86	0.51	0.04	0.18	1.03
Germany	2.63	0.31	1.10	2.08	2.01	1.50	0.91	0.23	0.48	1.74
Hong Kong	4.30	0.58	2.31	5.28	4.06	4.32	4.44	3.00	2.41	1.48
Ireland	4.06	- 4.48	- 0.92	2.56	1.70	0.51	0.18	- 0.29	0.01	0.34
Italy	3.35	0.77	1.53	2.78	3.04	1.22	0.24	0.04	- 0.09	1.23
Japan	1.38	- 1.35	- 0.72	- 0.27	- 0.05	0.35	2.76	0.79	- 0.12	0.47
Netherlands	2.49	1.19	1.28	2.34	2.46	2.51	0.98	0.60	0.32	1.38
New Zealand	3.96	2.12	2.30	4.03	1.06	1.13	1.23	0.29	0.65	1.85
Portugal	2.59	- 0.84	1.40	3.65	2.77	0.27	- 0.28	0.49	0.61	1.37
Singapore	6.63	0.60	2.82	5.25	4.58	2.36	1.02	- 0.52	- 0.53	0.58
Spain	4.08	- 0.29	1.80	3.20	2.45	1.41	- 0.15	- 0.50	- 0.20	1.96
Sweden	3.44	- 0.49	1.16	2.96	0.89	- 0.04	- 0.18	- 0.05	0.98	1.79
Switzerland	2.43	- 0.48	0.69	0.23	- 0.69	- 0.22	- 0.01	- 1.14	- 0.43	0.53
United Kingdom	3.60	2.18	3.30	4.46	2.80	2.57	1.47	0.05	0.64	2.69
United States	3.84	- 0.36	1.64	3.16	2.07	1.46	1.62	0.12	1.26	2.13

Source: https://data.worldbank.org/.

Table A4.7 – Population, total

Country	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Australia	18 711 000	18 926 000	19 153 000	19 413 000	19 651 400	19 895 400	20 127 400	20 394 800	20 697 900	20 827 600
Austria	7 976 789	7 992 324	8 011 566	8 042 293	8 081 957	8 121 423	8 171 966	8 227 829	8 268 641	8 295 487
Belgium	10 203 008	10 226 419	10 251 250	10 286 570	10 332 785	10 376 133	10 421 137	10 478 617	10 547 958	10 625 700
Canada	30 247 900	30 499 200	30 769 700	31 081 900	31 362 000	31 676 000	31 995 000	32 312 000	32 570 505	32 887 928
Denmark	5 304 219	5 321 799	5 339 616	5 358 783	5 375 931	5 390 574	5 404 523	5 419 432	5 437 272	5 461 438
Finland	5 153 498	5 165 474	5 176 209	5 188 008	5 200 598	5 213 014	5 228 172	5 246 096	5 266 268	5 288 720
France	60 186 288	60 496 718	60 912 500	61 357 430	61 805 267	62 244 886	62 704 895	63 179 351	63 621 381	64 016 227
Germany	82 047 195	82 100 243	82 211 508	82 349 925	82 488 495	82 534 176	82 516 260	82 469 422	82 376 451	82 266 372
Hong Kong	6 543 700	6 606 500	6 665 000	6 714 300	6 744 100	6 730 800	6 783 500	6 813 200	6 857 100	6 916 300
Ireland	3 712 696	3 754 786	3 805 174	3 866 243	3 931 947	3 996 521	4 070 262	4 159 914	4 273 591	4 398 942
Italy	56 906 744	56 916 317	56 942 108	56 974 100	57 059 007	57 313 203	57 685 327	57 969 484	58 143 979	58 438 310
Japan	126 400 000	126 631 000	126 843 000	127 149 000	127 445 000	127 718 000	127 761 000	127 773 000	127 854 000	128 001 000
Netherlands	15 707 209	15 812 088	15 925 513	16 046 180	16 148 929	16 225 302	16 281 779	16 319 868	16 346 101	16 381 696
New Zealand	3 815 000	3 835 100	3 857 700	3 880 500	3 948 500	4 027 200	4 087 500	4 133 900	4 184 600	4 223 800
Portugal	10 160 196	10 217 828	10 289 898	10 362 722	10 419 631	10 458 821	10 483 861	10 503 330	10 522 288	10 542 964
Singapore	3 927 213	3 958 723	4 027 887	4 138 012	4 175 950	4 114 826	4 166 664	4 265 762	4 401 365	4 588 599
Spain	40 223 509	40 386 875	40 567 864	40 850 412	41 431 558	42 187 645	42 921 895	43 653 155	44 397 319	45 226 803
Sweden	8 850 974	8 857 874	8 872 109	8 895 960	8 924 958	8 958 229	8 993 531	9 029 572	9 080 505	9 148 092
Switzerland	7 110 001	7 143 991	7 184 250	7 229 854	7 284 753	7 339 001	7 389 625	7 437 115	7 483 934	7 551 117
United Kingdom	58 487 141	58 682 466	58 892 514	59 119 673	59 370 479	59 647 577	59 987 905	60 401 206	60 846 820	61 322 463
United States	275 854 000	279 040 000	282 162 411	284 968 955	287 625 193	290 107 933	292 805 298	295 516 599	298 379 912	301 231 207

Table A4.7 – Continued

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Australia	21 249 200	21 691 700	22 031 750	22 340 024	22 742 475	23 145 901	23 504 138	23 850 784	24 210 809	24 598 933
Austria	8 321 496	8 343 323	8 363 404	8 391 643	8 429 991	8 479 823	8 546 356	8 642 699	8 736 668	8 809 212
Belgium	10 709 973	10 796 493	10 895 586	11 047 744	11 128 246	11 182 817	11 209 057	11 274 196	11 331 422	11 372 068
Canada	33 245 773	33 628 571	34 005 274	34 342 780	34 750 545	35 152 370	35 535 348	35 832 513	36 264 604	36 708 083
Denmark	5 493 621	5 523 095	5 547 683	5 570 572	5 591 572	5 614 932	5 643 475	5 683 483	5 728 010	5 769 603
Finland	5 313 399	5 338 871	5 363 352	5 388 272	5 413 971	5 438 972	5 461 512	5 479 531	5 495 303	5 511 303
France	64 374 989	64 707 044	65 027 507	65 342 775	65 659 789	65 998 660	66 316 092	66 593 366	66 859 768	67 118 648
Germany	82 110 097	81 902 307	81 776 930	80 274 983	80 425 823	80 645 605	80 982 500	81 686 611	82 348 669	82 695 000
Hong Kong	6 957 800	6 972 800	7 024 200	7 071 600	7 150 100	7 178 900	7 229 500	7 291 300	7 336 600	7 391 700
Ireland	4 489 544	4 535 375	4 560 155	4 580 084	4 599 533	4 623 816	4 657 740	4 701 957	4 755 335	4 813 608
Italy	58 826 731	59 095 365	59 277 417	59 379 449	59 539 717	60 233 948	60 789 140	60 730 582	60 627 498	60 551 416
Japan	128 063 000	128 047 000	128 070 000	127 833 000	127 629 000	127 445 000	127 276 000	127 141 000	126 994 511	126 785 797
Netherlands	16 445 593	16 530 388	16 615 394	16 693 074	16 754 962	16 804 432	16 865 008	16 939 923	17 030 314	17 132 854
New Zealand	4 259 800	4 302 600	4 350 700	4 384 000	4 408 100	4 442 100	4 509 700	4 595 700	4 693 200	4 793 900
Portugal	10 558 177	10 568 247	10 573 100	10 557 560	10 514 844	10 457 295	10 401 062	10 358 076	10 325 452	10 293 718
Singapore	4 839 396	4 987 573	5 076 732	5 183 688	5 312 437	5 399 162	5 469 724	5 535 002	5 607 283	5 612 253
Spain	45 954 106	46 362 946	46 576 897	46 742 697	46 773 055	46 620 045	46 480 882	46 444 832	46 484 062	46 572 028
Sweden	9 219 637	9 298 515	9 378 126	9 449 213	9 519 374	9 600 379	9 696 110	9 799 186	9 923 085	10 067 744
Switzerland	7 647 675	7 743 831	7 824 909	7 912 398	7 996 861	8 089 346	8 188 649	8 282 396	8 373 338	8 466 017
United Kingdom	61 806 995	62 276 270	62 766 365	63 258 918	63 700 300	64 128 226	64 613 160	65 128 861	65 595 565	66 022 273
United States	304 093 966	306 771 529	309 338 421	311 644 280	313 993 272	316 234 505	318 622 525	321 039 839	323 405 935	325 719 178

Source: https://data.worldbank.org/.

Chapter 5: Conclusion

We think that our studies and conclusions will be good for world is economies. We found that this type of funds can be useful for the improvement of the economies in the world. We hope that our studies encourage countries to constitute them and to attract their investments. As Blundell-Wignall et al. (2008) state, they can work like savings, which then are used to invest in some types of actives where they have financial returns. Our objectives were to have better knowledge of SWFs and to contribute with more information about them to the world is researchers.

In the first paper, we did a literature revision to know how to set up a SWF and clarify some different opinions concerning three dimensions. When was the first constitution of a SWF? Which name is used to refer to them? Lastly, but not less important, which is the best definition to adopt? We decided to begin with this work, because when we started to study them we found different perspectives about these topics, which caused us great doubts on how to treat them in our works and we felt that it was important for the econometric studies to define a border about which type of funds to consider a SWF.

Then, with the theoretical base stabilised, we began our econometric studies. In the second paper, we tested which country characteristics attract the investments of SWFs. We believe that SWFs studied the economies where they employ the savings of the funds to have higher return and smaller risk. This study can be useful for the world is economies to know which type of indicators has to be strong to attract investments.

In the third paper, we looked at the benefits which these funds can have for the economies where they invest, testing if their investments improve them in the recipient countries. In this path, our objective it was to prove that, contrary to what is reflected in the general literature that SWFs can be bad for the world economies due the lack of transparency and size of their investments, they can be positive for the economies of the world.

As we described above, the first steps of our works were to know when the first SWF was constituted, which name and definition to adopt because we found some different

perspectives in the literature and we believed that it would be best to do a work about it and reach conclusions.

For Rose (2011) and Aguilera, Capapé, and Santiso (2016), the history of these type of funds dates back to 1854, which was the year of the constitution of Texas Permanent School Fund. Beck and the SWFs GAPP (2008) considers that the history of SWFs started with the constitution of KIA in 1953. Regarding the name, Rozanov (2005) was the first who called them SWFs and, with a brief exploration we can conclude that before 2005 various authors, Arrau and Claessens (1992) and Davis et al. (2001) gave names like commodity stabilization funds, copper stabilization funds, non-renewable resource funds or oil funds. The last point is where we encounter a bigger difference of opinions, and, in the paper, we collect various definition that authors like Rozanov (2005), Jen (2007), SWFs GAPP(2008), Rose (2011) use to define them. After the reading various works, we conclude that concerning the emergence and definition of SWFs, the best guidelines to follow are those described by the International Monetary Fund (IMF) that are established in the Sovereign Wealth Funds Generally Accepted Principles and Practices (SWFs GAPP), "Santiago Principles" of 2008.

As stated, with the base literature stabilised, we began our first work with an econometric model. So, in the second paper, we wanted to test if economic, financial, political, social and geographic indicators have an impact on the investment decisions made by SWFs. With data about the AUM composed of equities, fixed income and real estate of the GPFG in 98 countries as a dependent variable, from 1998 to 2016, we applied a gravity model (GM). As independent variables, we have the real GDP and distance which are base variables in this type of model defined by Tinbergen in 1962. Anderson (1979) added a dummy to describe the existence of a shared border, and we also adopt the formulated model. Then Da Costa and Lagoa (2018) added the stock market capitalization of listed companies % of GDP (SMC). Beyond these variables, we have the Human Development Index (HDI), Corruption Perception Index (CPI), and political stability and absence of violence (PSAV).

Then we performed tests and regressions in STATA to obtain our conclusions. With the tests, we conclude that OLS is the model that best fits our study. The application of GM gives us the following conclusions: GDP, SMC, CPI, PSAV, and distance are country characteristics that attract investments of SWFs, as they are demonstrated to be statistically significant at 1%. The first ones have a positive effect, but distance has a

negative effect. Also, the existence of a shared border is statistically significant with 10% confidence. Lastly, only HDI are not significant for our dependent variable.

In the third paper, with an econometric work, we demonstrated that SWFs can be positive for the improvement of the economies where they invest. We again used the AUM of GPFG for 21 countries between 1998 to 2017. We also aggregated data about GDP in local currency of recipient countries as the dependent variable. As independent variables we have the AUM of GPFG, the general government final consumption expenditure, the KOF Globalisation Index, primary energy, the exports of goods and services and inflation in first differences and natural logarithm form.

With the application of an ARDL method of Pesaran and Shin (1999) using the PMG model technique formulated by Pesaran et al. (1997), we obtained the following conclusions. The AUM of GPFG in logarithm form is demonstrated to be positive and statistically significant at 1% for our dependent variable GDP, which here represents the economy of the recipient countries of SWFs investments. Besides this, general government final consumption expenditure, primary energy and exports of goods and services demonstrate the same behaviour. The KOF Globalisation Index demonstrates the same behaviour but with a negative effect on our dependent variable. In the first differences form, the exports of goods and services are demonstrated to be positive and statistically significant at 1%. Lastly, in the form of logarithm and first difference, inflation is positive and statistically significant at 5%.

With all this path done, we hope to encourage countries to attract SWF investments because, as we have proved, they can improve global economies. On one hand, we hope to improve the perception of SWF investments worldwide, because we believe that they are an excellent way for economies to protect themselves from shocks and instabilities which they are sometimes not prepared for. On the other hand, they can be an excellent way to improve the well-being of future generations and their living conditions and the stability of countries worldwide.

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