

The Supervision and Regulation Strictness of Pensions Funds across countries

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Abstract

This study investigates the differences in the strictness in supervision and regulation of pension funds across countries. The aim of this study is to examine whether these differences can be explained by the economic development and by the legal system of the country. The sample includes countries in Europe, North America, South America and Australia. Two strictness indexes are developed to measure the differences in supervision and regulation of pension funds. The strictness in supervision is measured by the reporting requirements of pension funds and the strictness in regulation is measured by the investment limits that pension funds are subject to. After these strictness indexes are constructed I tested if the strictness in pension fund supervision and regulation is related to the GDP per capita, legal system and the capital market development of the country. Of the three independent variables tested, the GDP per capita and the legal system are found to be significantly related to the reporting strictness index and the investment index. No significant relationship is found between the capital market development and the reporting and investment strictness index.

Key words: pension funds, supervision, regulation, reporting requirements, investment limits

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1. Introduction

Much more attention has been given to pensions since the credit crisis. Pension systems are designed to provide individuals with an income after they retire so they are able to cover their basic needs. Mainly because of the credit crisis pension funds have suffered huge amounts of losses in the last few years. Funding ratios of pension funds have dropped significantly and even though they are trying to recover pension benefits, these individual benefits might have to be cut in the future. However not only did the credit crisis affect the performance of pension funds, another reason why pension funds have been performing badly is because of their excessive risk taking and the lack of supervision by their supervising authorities.

A pension system is divided into three pillars, a state pension, pension funds offering employee based pension plans and private pension products offered by insurance companies. In this thesis I will focus on the supervision and regulation of pension funds. According to Galer (2002, p.41) “the regulation and supervision of pension assets has two main goals: First, to assure the safety and security of those assets and second, to create an environment in which asset management can obtain the best returns at an acceptable level of risk”. The supervision and regulation of pension funds can be performed by different institutions such as national banks, financial market authorities or specialized pension authorities. To be able to secure and protect the rights of pension beneficiaries’ effective supervision and regulation is needed.

There are different factors that can influence the way pension funds are supervised and regulated across countries. My belief is that different approaches to pension fund supervision and regulation exist because of differences in the stage of a country’s economic development and legal systems. I think there is not an approach that is suitable for every country. In this study I will investigate the strictness in the supervision and regulation approach across countries. After these differences are found I will test if these differences can be explained by the economic and legal environment of the country.

2. Literature Review

There is not much literature available on the international supervision and regulation of pension funds. A lot of guidelines have been written by the International Organization of Pension Supervisors (IOPS) on the different elements of supervision of pension funds. Most of the literature on pension supervision describes the regulation and supervision in different countries.

The first two papers that I will discuss make a distinction between the two models of pension supervision and explain in which countries these models are most common.

The first research that describes these two models of pension supervision was done by Vittas (1998). He distinguishes two types of regulation styles: draconian regulation and the prudent person approach. Vittas believes that draconian regulations are more suitable for countries with mandatory pensions and less developed financial markets, while the prudent person approach is more appropriate for countries with voluntary pension funds and well developed financial markets. The draconian regulation is found to be most common in Latin American countries, whereas the prudent person approach is mostly used in Anglo-American countries and expected to be implemented by other OECD countries in the future.

One of the Latin American countries Vittas focused on is Chile, which uses the draconian regulation. The main reasons for the draconian regulation used in Chile according to Vittas is the presence of compulsory pensions, less developed and non-transparent capital markets, the lack of knowledge of workers with capital market instruments and the need to prevent asset managers from taking extreme risks. Vittas believes that all developing countries with dysfunctional financial systems should adopt a draconian regulation and change to a more relaxed system over time as their financial markets improve.

Vittas also investigated the investment limits of pension funds. He discovered that not only Latin American countries use strict investment rules, also many OECD countries, especially continental Europe and Japan impose investment restrictions. These low investment limits are mainly on overseas assets and equities.

Vittas mainly focused on the distinctions between the two supervision models and clearly states that over time all countries should adopt the prudent person approach when their financial markets become more developed. I do not agree that there is one supervision approach that is suitable for all countries and I also believe that there are countries operating somewhere in between these two models. In this thesis I will focus more on individual countries and see whether these differences in supervision approaches can be explained by the economic and legal environment of a country.

Another research on the two models of pension supervision was done by Rocha, Hinz, and Gutierrez (1999). They distinguished the two models of pension supervision as being either proactive or reactive. The first system is based on a small number of pension funds. Supervision of this system is applied to pension funds that are closely monitored through strict reporting requirements and found to be common in most Latin American countries. The second model includes a large number of pension funds which are not as intensively monitored and interventions only occur when problems are reported by third parties.

Rocha, Hinz, and Gutierrez discovered clear differences between these two models in the disclosure requirements and investment restrictions of funds. They found that most Latin American countries impose strict disclosure requirements to make sure workers make the right decisions based on accurate information and to make asset managers compete with each other to perform at their best. While disclosure requirements are extensive in Latin American countries, they are found to be less extensive in most OECD countries. According to Rocha, Hinz, and Gutierrez this is due to the different valuation rules allowed to be used by pension funds and the fact that individuals are not allowed to switch pension funds.

The second difference in the supervision of pension funds is the investment restrictions. They found that countries that don't impose any restrictions by asset class are mostly the Anglo - Saxon countries and the Netherlands which follow the prudent man rule. All Latin American countries and also some other OECD countries do impose restrictions by asset class.

Rocha, Hinz, and Gutierrez think that over time when emerging countries markets are more developed and their overall legal framework is improved, they could adopt the prudent person approach.

The two models of pension supervision take different approaches to monitoring and sanctioning. In a proactive approach, supervisors use reports to monitor the investment portfolio to secure the financial status of the pension fund and base their plan of action on this information. Supervisors that implement a reactive approach generally receive annual financial reports and review them more intensely when there are signs of pension funds having problems.

Rocha, Hinz, and Gutierrez found that countries with proactive systems also take a stricter approach to on-site inspections. Proactive systems perform on-site inspections annually and will have access to all information of the funds activities, while reactive systems are found to only conduct on-site inspections when there is a complaint or an indication of a problem.

Like Vittas, Rocha, Hinz, and Gutierrez believe that all countries should switch to the prudent person approach over time as capital markets become more developed. They also made clear distinctions between the two models, describing the differences in more detail of certain aspects of pension supervision. Again, I consider these models as being two extremes and I think there are countries that operate on a middle ground so will not be seen as either proactive or reactive.

The next few papers will focus more on the differences of pension supervision across countries and why these differences occur.

Hinz and Mataoanu (2005) were the first ones to measure the primary elements of private pension supervision in different countries. They made a comparative analysis of how the private pension systems of eight countries are supervised and whether this can be explained by the environment in which they operate. The countries that Hinz and Mataoanu used in their study were Australia, United States, Ireland, Hungary, Mexico, Chile, Argentina and Hong Kong. First, six categories of activities of pension supervision were analyzed including licensing, monitoring, analysis, intervention, correction and communication.

Hinz and Mataoanu found that the countries examined show consistent supervisory styles. The clear pattern found shows that the supervisory systems can be either defined as proactive or reactive. As a result the United States, Australia and Ireland are characterized as reactive systems while Chile, Mexico and Argentine are described as strongly proactive. Hong Kong and Hungary are in the middle, not being defined as either strongly proactive or reactive.

After Hinz and Mataoanu found these clear supervisory styles, they tested if these supervisory styles were related to the legal and economic environment of the country. The factors that they tested to see if this relationship exists were the level of economic development, capital market development, legal systems and the rule of law, the number of pension funds supervised, and whether the pension systems were mandatory or voluntary.

In their analysis Hinz and Mataoanu discovered that there is a strong relationship between economic development and the approach to private pension supervision. Pension funds in countries with the highest income levels like the United States and Ireland have easier access to the pension market and are not as intensively supervised as countries with the lowest income like Mexico and Chile. One of the explanations they give for this relationship is that wealthier countries have a better developed social security system so they are able to take more risk to achieve higher returns while lower income countries cannot afford to take these risks because they don't have this well-developed social security system to fall back on.

Even though Hinz and Mataoanu found a relationship between the depth of capital markets and pension supervision, they cannot provide a full explanation for this. They discovered that a country like Chile with a proactive approach expected to have a less well developed capital market actually has a high level of market depth while Ireland with a reactive approach is found to have a thinner capital market. Another relationship was found between pension supervision and the legal system. Countries with common law systems like Australia, Hong Kong, Ireland and the United States rely more on the prudent person rule and shift most of the monitoring and analysis to third parties. The opposite applies in countries with a civil code system as Argentina, Mexico and Chile.

Hinz and Mataoanu draw several conclusions from their analysis of pension supervision. The supervisory styles range from a very strict and proactive approach used in Chile to a very reactive approach of the United States and is strongly influenced by the economic and legal environment. Despite their findings, there are certain limitations to their research such as the limited sample of countries and the subjective scoring method they used to determine the intensity of pension supervision. Even though they found possible relationships between pension supervision and the explanatory variables it is not certain whether these explanatory variables determine the structure of the pension system or influence the way pension funds are supervised.

In this thesis I will also investigate whether there is a relationship between the strictness of pension supervision and the legal and economic environment but I will use a larger sample of countries and use a regression to determine the correlation between these factors.

Another study that focused on the different approaches to pension fund regulation and supervision is done by Van der Lecq, Rivera-Rozo and Steenbeek (2010). Instead of looking at the economic and legal environment like Hinz and Mataoanu, they investigated whether and how national culture influences the differences in approaches to pension funds regulation and supervision. First they created a strictness index for each country including the scores on the intensity of activities of pension supervision of Hinz and Mataoanu and used these activities of pension supervision as a dependent variable. Then they used the four dimensions developed by Hofstede (1980,2001) to measure cross-country cultural differences: Power Distance, Individualism vs. Collectivism, Masculinity vs. Femininity, and Uncertainty Avoidance.

To measure the strictness in pension fund regulation a strictness index of pension funds investment limits was created. These investment limits consist of eight different asset categories and four quantitative restrictions. As a result Van der Lecq, Rivera-Rozo and Steenbeek discovered that Columbia, Russia, Mexico, Italy, Poland and Chile have very strict investment limits for pension funds. On the contrary, New Zealand, United States, United Kingdom, The Netherlands and Belgium were found to have the least strict investment limits.

Van der Lecq, Rivera-Rozo and Steenbeek found positive statistically significant correlations between scores on the Investment Strictness Index and scores on Power Distance and Uncertainty Avoidance, while they found a negative correlation on Individualism. However the correlation between scores on the Investment Strictness and Masculinity was found to be negative and statistically non-significant.

The correlations between the six supervisory activities are found to be mostly positive with the Power Distance Index and Uncertainty Avoidance, while the correlations with Individualism and Masculinity are all negative. Despite these findings, no solid conclusions can be drawn because the sample of countries is too small to determine levels of significance so therefore the dataset would need to be expanded to proof a clear relationship.

The third study that focused on the differences of pension supervision across countries was done by Brunner, Hinz and Rocha (2007). They made a comparative analysis of the risk-

based supervision of pension funds in Australia, Denmark, Mexico and The Netherlands and compared the four countries on seven main elements of risk-based pension supervision. These elements include among others the risk based solvency standards, the supervisory risk scoring systems, and market based discipline and third parties.

Brunner, Hinz and Rocha found that all countries have developed different risk models to base their intensity of supervision on. Denmark has developed a traffic light system, where a yellow light is treated as an early warning and leads to more intense supervision, and a red light indicates the need of a severe intervention. Australia introduced a fully developed risk model consisting of the Probability and Impact Rating System (PAIRS) and a supervisory response framework known as SOARS. The funds receive different scores and are put in the normal, oversight, mandated improvement or restructure category.

The Netherlands analyses risk through Financial Institutions Risk analysis Method (FIRM). The FIRM model looks at the risks pension funds are exposed to and the quality of the risk management model. As like Australia the results of this analysis determine the intensity of pension fund supervision, but the probability and impact is put into a single score unlike in Australia where these are separated. The Mexican supervisory authority has developed elements of a risk scoring model with three risk factors, low, medium and high, and is focused on the irregularities found during supervision activity. They are still in the process of integrating more elements of risk into the VaR and see how they can make greater use of the VaR results for risk scoring.

Brunner, Hinz and Rocha also found differences in disclosure requirements of funds. According to them Mexico imposes strict reporting requirements, consisting of monthly reports including individual portfolios, returns and the VaRs, which is calculated by the supervisor on a daily basis. In Denmark pension funds need to provide information on the performance and solvency of the pension fund annually to be able to compare the performance of different pension funds.

While Mexico imposes extensive disclosure requirements, The Netherlands and Australia are clearly found to impose less extensive requirements on fund performance. For the Netherlands this is mainly because individuals are not allowed to switch pension funds.

Brunner, Hinz and Rocha used Australia, Denmark, Mexico and The Netherlands in their study because they believe these countries are a representative sample of the different pension systems around the world. Even though this sample is a good representation of the different pension systems differences still exist across countries within those pension systems.

The last paper will focus on the investment limits that pension funds are subject to.

Srinivas, Whitehouse and Yermo (2000) studied the investment and performance regulation of pension funds in emerging economies and compared them with more developed OECD countries. They found that all the rules imposed in the new systems of Latin America and Eastern Europe seem to be more strict than in the OECD, but some OECD countries impose more investment limits than countries such as Argentina, Chile, Colombia, Peru and Poland.

Pension fund's investment is especially restricted in Latin America. The five types of limits that almost all countries impose are: by assets, by concentration of ownership, by issuer, by security and by risk. The reasons given for these investment limits are to keep the regulation and supervision simple and avoid dealing with complex financial instruments so it wouldn't be so hard for participants to understand.

Most countries are found to restrict investment in foreign securities. Especially developing countries have higher ceilings on foreign investment than countries in the OECD area. Not only do developing countries have limits on foreign securities, they also have restrictions on domestic investments. Srinivas, Whitehouse and Yermo state that these restrictions are made among others because workers do not have the experience yet to be able to deal with complex financial instruments and because their capital markets are not liquid and transparent enough to take on these risks.

All these papers describe the different approaches to pension supervision and the differences found between countries. Most of the papers use a relatively small sample of countries or make a comparison between Europe and Latin America. In this thesis I will use a larger sample of countries to find the differences in strictness of pension supervision and regulation and test if these differences are related to the economic and legal environment in which the countries operate.

3. Theoretical Framework and Hypotheses

As mentioned in the previous section, there is not much literature available on pension fund supervision and regulation across countries. However previous studies have shown that pension funds are supervised and regulated differently across countries. Effective regulation and supervision is necessary to safeguard the rights of pension funds members. There is a clear difference between regulation and supervision. Regulation can be defined as the formulating and issuing of specific rules and standards that pension funds need to follow¹. Supervision is implementing guidelines and reviewing the activities of the pension funds by the supervisory authority to ensure compliance with the law and regulations².

Previous studies Vittas (1998); Rocha, Hinz, and Gutierrez (1999) have made a distinction between two supervision styles. The first model is the draconian regulation which is seen as a proactive approach where pension funds are subject to close and direct monitoring and intervention by the supervisory authority is common. This model is found to be used in Latin American countries. The second model is the prudent person approach where pension funds supervision is not as intense and pension funds have more freedom to operate and intervention of the supervising authority is seen as rare. This model is defined as reactive and most common in Anglo-American countries.

Various studies have found differences between these two models on several aspects of pension supervision. Rocha, Hinz, and Gutierrez (1999) found differences between the proactive and reactive approach in the information disclosure of pension funds and the monitoring and sanctioning of the supervising authority. However, these two models can be seen as extremes and there are possibly countries that operate somewhere in the middle and would therefore not be defined as either proactive or reactive.

The aspect of pension supervision I will investigate is the reporting requirements of pension funds. The reporting requirements of pension funds represent the communication between pension funds and their supervising authorities and give an indication of how well the supervising authorities can monitor the status and activities of the pension fund. This aspect of pension supervision gives a good representation of the operation and design of pension funds

¹ Source: <http://newyorkfed.org/newsevents/speeches/1997/ep970303.html>

² Source: <http://newyorkfed.org/newsevents/speeches/1997/ep970303.html>

supervision. Due to the unavailability of further information on pension supervision I will only focus on this aspect.

The aspect of supervision includes the reports on the activities and financial status of pension funds that they are required to submit to the supervising authority. The first aim of this study is to find differences in the strictness of the reporting requirements across countries and to see if these differences are possibly related to the legal framework and economic development of the country.

Hinz and Mataoanu (2005) discovered a strong relationship between supervision strictness and GDP per capita. They believe that pension funds in wealthier countries are subject to less intensive supervision because they have better developed social security systems to fall back on and can therefore afford to take more risks. They also think that households in wealthier countries rely less on private pensions to be a part of their income and therefore supervision is less strict compared to lower income countries. The opposite applies in lower income countries where individuals need to depend more on their private pensions to provide for an income after retirement because they cannot just rely on social security.

Demarco et al (1998) also found a stricter supervision approach used in less-developed countries. They believe this is due to the historical development of the pension system. They state that in developed countries private pension schemes were already created before the supervising authority was even established, and therefore the supervision approach is adjusted to the pension system of the country. On the contrary, pension funds in lower income countries such as in Latin America have been developed at the same time or after the supervising authority had been created giving them more time to develop an appropriate supervision approach. Another reason given why the proactive model is used in less-developed countries is because these countries lack experience in regulatory enforcement and are known not to be a reliable counterparty in the financial sector. As for developed countries, they think reactive systems are more suitable because these countries already have well regulated financial institutions.

These findings of previous studies could imply that the GDP per capita of a country affects the intensity of pension supervision, which leads to the first hypothesis.

H1: There is a negative relationship between the reporting requirements of pension funds and GDP per capita of a country

The study done by Hinz and Mataoanu (2005) also found a relationship between supervision strictness and the legal system. They state that countries with a common law system can be associated with less intense supervision with supervising authorities relying more on market mechanisms and on third parties to perform parts of their supervising activities. Most of the compliance issues experienced by individuals can be resolved in courts and therefore supervisors can apply a more reactive approach. This leads to the second hypothesis tested.

H2: Countries with a civil law system have stricter reporting requirements than countries with a common law system

The development of capital markets could also have an influence on the strictness in pension funds supervision. Even though Hinz and Mataoanu (2005) did not find a strong relationship between these two elements I think that the development of the financial market of a country can still influence the way pension funds are supervised. The third hypothesis is therefore:

H3: There is a negative relationship between the capital market development of a country and the reporting requirements of pension funds

Not only does supervision affect the way pension funds operate, the regulations that pension funds are subject to also play an important role. Different regulations across countries can influence the performance of pension funds. The part of regulation that I will examine in this thesis is the investment limits on several asset categories of pension funds across countries.

The previous studies of Van der Lecq, Rivera-Rozo and Steenbeek (2010), Vittas (1998) and Srinivas, Whitehouse and Yermo (2000) found stricter investment limits imposed in less-developed countries.

Vittas (1998) gave numerous reasons why strict investment limits are imposed in Chile. The most important reasons are the presence of mandatory pension plans, the lack of strong and transparent financial markets, the inexperience of regulating and supervising private pension funds, the lack of knowledge and experience of workers to be able to deal with more complex financial instruments and the need to control the moral hazard problem that is caused by the government pension guarantees.

Srinivas, Whitehouse and Yermo (2000) state that the investment restrictions in Latin America and Eastern Europe are imposed to keep the regulation and supervision of pension funds simple and avoid having to deal with complex financial products. They say that the purpose of imposing strict investment limits in these countries is to safeguard the pension benefits and make sure they are not affected by the deficiencies that exist in other financial institutions. Most of these deficiencies are caused by agency risks and implementing investment limits will give these financial institutions less market power. Srinivas, Whitehouse and Yermo also give several reasons for the domestic portfolio limits. The first argument they give is the lack of experience in managing pension funds and the absence of accurate risk management models. The second argument given is the illiquid and nontransparent capital markets that exist in these countries which can affect the sustainability of the reformed pension system. Another reason why these strict limits are imposed is to control the risks that can be taken by pension funds and to control the moral hazard problem caused by the use of government pension guarantees.

The second aim of this study is to find differences in the strictness of the investment limits that are imposed on pension funds and to see whether this can be explained by the legal system and the economic and capital market development of the country. The next hypotheses are therefore formulated as follows:

H4: There is a negative relationship between the investment limits imposed on pension funds and the GDP per capita of the country

H5: Countries with a civil law system are subject to stricter investment limits than countries with a common law system

H6: There is a negative relationship between the investment limits imposed on pension funds and the capital market development of the country

4. Data & Methodology

To test the six hypotheses defined in the previous section I created two strictness indexes. The strictness in supervision of pension funds across countries is measured by the reporting strictness index and the strictness in regulation is measured by the investment strictness index. First, I will discuss the information and methodology used to create the strictness indexes and then I will describe the variables used to test my hypotheses.

4.1 Data on the reporting strictness index

The reporting strictness index consists of information of pension funds in 17 different countries. For creating the reporting strictness index I mainly used public information from the websites of the supervising authorities including annual reports, several cases done on pension funds in individual countries by The World Bank, the book *Complementary and Private Pensions throughout the World* (2008) by the IOPS, OECD and ISSA, and the book *Supervising Private Pensions, Institutions and Methods* (2004) by the OECD. The sample of countries is taken from Europe, North America, South America and Australia and therefore gives a good representation of the different supervision and regulation styles in the world.

The reporting strictness index consists of five different categories of information that pension funds are required to report to their supervising authority and the information the pension funds have to provide to its members. These categories are the basic fund information, financial information, governance information, conduct of business information and the investment information. The structure of the reporting strictness index is based on the paper *Guidelines for the Supervisory Assessment of Pension Funds* (2008) from the IOPS.

The first category is the basic fund information which consists of the basic information on the pension fund such as the type and status of the pension fund, numbers and movements of beneficiaries, benefit eligibility, vested rights, the merger and liquidation process of the pension fund and its redress mechanisms. As shown in table 1, all of these elements are given one point when pension funds are required to report this information to their supervising authority and zero points when they do not have to provide this information, except for the last element. The redress mechanism includes the handling and solving of complaints from members. The score given to this element is a score ranging from one to three. The score is based on whether pension funds are required to have guidelines on how to handle and solve complaints, if these complaints are reported to the supervising authority and what role the

supervising authority plays in handling complaints between the pension funds and its members. This information is mainly acquired from the websites of the supervising authorities and the two books Complementary and Private Pensions throughout the World (2008) by the IOPS, OECD and ISSA, and Supervising Private Pensions, Institutions and Methods (2004) by the OECD. For example, in Ireland pension funds are required to have guidelines for handling complaints but members should try to resolve complaints with their trustees. When members notify the Pensions Board (supervising authority in Ireland) they will tell the member to contact the person in charge of his pension scheme. Only when the problem cannot be resolved between these two parties, the Pension Board will start an investigation upon request of the member. In Argentina pension funds are required to have a procedure for handling complaints and have to provide this to their supervising authority. Members of pension funds can make complaints to the supervising authority providing documents to proof that the pension fund has made a mistake. The supervising authority will then investigate the complaint and then take action by either dismissing the complaint or correct the mistake and punish the person responsible for it. Based on this information I gave Argentina a higher score for this element than Ireland.

Table 1. Basic Fund Information

Basic Fund Information	Points
Type of fund	1 point
Status of fund	1 point
Number of active, deferred members and beneficiaries	1 point
Movements in numbers over the period	1 point
Benefit eligibility and plan access	1 point
Vested rights	1 point
Merger and liquidation process	1 point
Redress mechanisms	1-3 points
Total	10 points

The second category of the reporting strictness index shown in table 2 is the financial information that pension funds should include in their annual reports. This is information about the value of the fund, its liabilities, the amount of contributions received, transfer values, amount of investment income and benefits paid and whether this financial information is subject to audit either by an internal or external auditor or both. Again all these variables are given one point when they are required to be reported to the supervising authority and zero when this is not a requirement, except for the last element. Information about the

auditing of the financial statements is given zero points when these statements are not subject to audit, one point when they are required to be checked by either an internal or external auditor and two points when the financial statements have to be evaluated by both. Argentina and Mexico are the only two countries that require an internal and external auditor. All of the other countries only require an internal or external auditor.

Table 2. Financial Information

Financial Information	
Value of fund	1 point
Value of liabilities	1 point
Amount of contributions received	1 point
Transfer values	1 point
Amount of investment income	1 point
Amount of benefits paid	1 point
Subject to audit	2 points (1 point when internal or external, 2 points when internal and external)
Total	8 points

In table 3 the third category of the reporting strictness index is shown. This category contains the information pension funds need to provide to the supervising authority about the governance of the pension fund. This information includes the structure and mandate of the governing board, the appointment procedure and qualifications of the members of the board, the decision making procedures, the risk management procedures, plan sponsor details, the risk management system of the supervising authority, and the details of service providers and outsourced functions. All of the elements are given one point when reported to the supervising authority except for the risk management system of the supervising authority and the details of service providers. The risk management system of the supervising authority is given a score between one and three points. The better and more developed the risk management system is, the higher the score I will give. For example, Canada has a well-developed risk management system that is complemented by an intervention guide. The supervising authority has made 5 different stages based on the amount of risk pension funds are subject to. The 5 stages clearly state what interventions are needed to improve the financial situation of the pension fund. In Ireland the opposite applies, the supervising authority does not have a clear risk management system and shifts most of that responsibility to the trustees of the pension scheme. The supervising authority assumes trustees will have an adequate risk management model. Based on this information I gave Canada a higher score than Ireland on their risk

management system of pension funds. Other countries that also have well-developed risk management systems are The Netherlands and Australia. In The Netherlands, the DNB manages risk through the FIRM model. The DNB rates the risks and risk management procedures of pension funds and takes action based on these scores. The supervising authority in Australia (APRA) created the PAIRS and SOARS model. With the PAIRS (Probability and Impact Rating System) model the risks of superannuation entities are determined and then put in one of the four different supervision categories by the SOARS (Supervisory Oversight and Response System) model. Superannuation entities can be put in the normal, oversight, mandated improvement and restructure category. These categories determine the intensity of supervision.

The details of service providers and outsourced functions is given a score between one and four points. One point is given when pension funds provide the details of their service providers and outsourced functions and another three points is given when they also report how these specialists are appointed, monitored and dismissed. Mexico, Australia and Austria require pension funds to submit all this information on service providers and therefore receive a score of 4 on this element. The countries with a trust based pension system only require trustees to report the details of their service providers and outsourced functions and how they are dismissed, and therefore will receive a score of 2.

Table 3. Governance Information

Governance Information	
Structure and mandate of governing board	1 point
Appointment procedure and qualifications of members	1 point
Decision making procedures	1 point
Risk management procedures	1 point
Risk management system of the supervising authority	1-3 points
Details of service providers and outsourced functions including how appointed, monitored and dismissed	1-4 points
Plan sponsor details	1 point
Total	12 points

The fourth category as shown in table 4 is the conduct of business information and includes only three elements. The first element is the transparency and disclosure policies towards members of the pension fund. The score given ranges from one to five points, and is given based on the frequency, type of information required to be provided to members and the type of information that is available to members based on request. When pension funds provide information about the scheme to members on a regular basis and update them on any changes made to the scheme, they will receive a higher score than when this information is only available on request. In Chile and Argentina pension funds are required to provide members with updates on their pensions every four months, including among others information about their individual accounts, returns earned on their investments, annual return of their fund and fees charged. In The Netherlands pension funds provide members with a basic summary of their pension benefits only once a year.

Another element in this category is the requirement of whistleblowers reports, this is done when auditors, actuaries and other third parties detect the information provided is inaccurate. They will then be required to inform the supervising authority of the pension fund. One point is given when they are required to inform the supervising authority and zero points when this is not a requirement. All of the countries require whistleblower reports except for Argentina and Chile.

The last element is the on-site inspections that are performed by the supervising authority. A score of zero is given when the supervising authority does not perform any on-site inspections on a regular basis; a score of 1 is given when these on-site inspections are performed regularly, another point is given when on-site inspections are not just performed when pension funds are not performing well or are having other problems that need to be resolved. The third point that is given is based on how the supervising authority performs on-site inspections and if they have access to all data, documents, computers to be able to perform their task. In Mexico the supervising authority performs on-site inspections according to the Annual On-Site Inspection Program, where these visits are performed at least once a year with every pension fund. The supervising authority will have access to all the information and documentation of the pension fund. Countries that do not perform regular on-site inspections are Ireland, New Zealand, United Kingdom and the United States.

Table 4. Conduct of Business Information

Conduct of Business Information	
Transparency and disclosure policies, including what information is transmitted to members and beneficiaries of the pension fund and in what form	1-5 points
Whistleblowers reports	1 point
On-site Inspections	0-3 points
Total	9 points

The investment information shown in table 5 is the last category of the reporting strictness index, where most of these elements are already included in the annual report of the pension funds. This category consists of the reporting of the investment strategy, asset allocation, transaction details, investment performance, costs and fees charged and the use of portfolio stress tests. The first five elements are given zero points when they are not required to be reported and one point when they do need to be reported to the supervising authority. When pension funds use portfolio stress tests a score of 1 will be given. Canada is the only country where pension funds do not need to submit the investment strategy to its supervising authority. However they do need to have a written investment strategy but only have to submit it on request.

Table 5. Investment Information

Investment Information	
Investment strategy	1 point
Asset allocation	1 point
Transaction details	1 point
Investment performance	1 point
Costs and fees charged	1 point
Portfolio stress tests	1 point
Total	6 points

The last five points of the index are based on the frequency of information provided by the pension funds to the supervising authority. The information can be required to be reported daily, weekly, monthly, quarterly, semi-annually and annually. When pension funds report only annually I will give a score of 1 and when pension funds report daily I will give a score

of 6. This means that the more frequent pension funds are required to report the more points they will receive. The maximum score that pension funds can obtain is 51 points. The results of the reporting strictness index of the 17 countries are shown below in table 6.

Table 6. Reporting Strictness Index

Country	Basic Fund Information	Financial Information	Governance Information	Conduct of business information	Investment Information	Frequency of reporting	Reporting Strictness Index
Argentina ^{a b}	10	8	10	7	5	6	46
Australia ^{a b c}	9	7	12	6	6	3	43
Austria ^{a b}	9	7	11	6	5	3	41
Canada ^{a b}	8	7	6	7	4	1	33
Chile ^{a b}	9	7	10	7	5	6	44
Denmark ^{a b}	10	7	10	5	6	2	40
Finland ^{a b}	9	7	10	3	5	3	37
Germany ^{a b}	9	7	11	5	5	2	39
Ireland ^{a b c}	8	7	6	3	5	1	30
Italy ^{a b}	9	7	10	7	5	3	41
Mexico ^{a b c}	9	8	12	9	6	6	50
Netherlands ^{a b}	10	7	10	4	5	4	40
New Zealand	8	7	7	4	5	1	32
Norway ^{a b}	9	7	9	5	6	2	38
Spain ^{a b}	10	7	10	8	5	3	43
United Kingdom	8	7	6	3	5	1	30
United States ^{a b c}	8	7	6	4	5	1	31

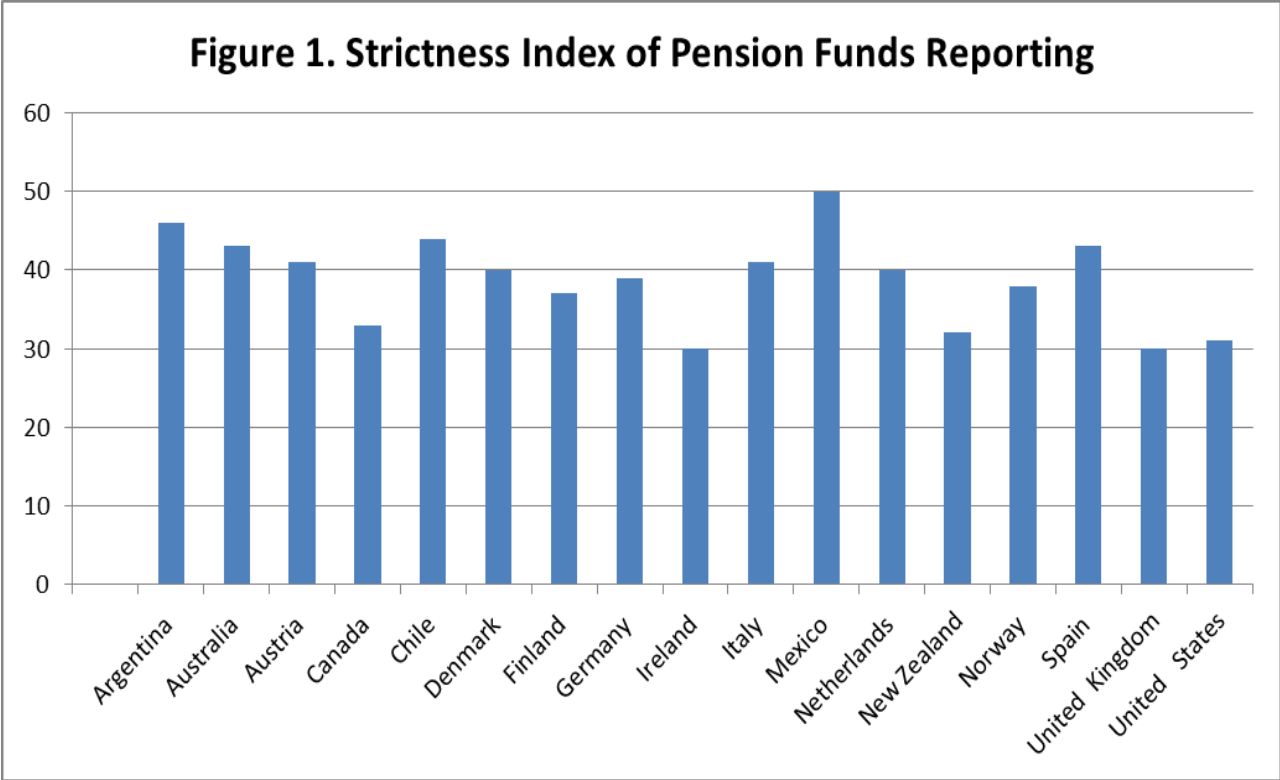
Main sources: a. websites supervising authority

b. Complementary and Private Pensions throughout the World (2008)

c. Supervising Private Pensions, Institutions and Methods (2004)

As we can see from table 6 and figure 1, Mexico, Argentina and Chile have the strictest reporting requirements for pension funds. Australia, Spain, Austria and Italy also score high on the index while the United States, United Kingdom and Ireland have the lowest scores. We can see that scores for the category basic fund information, financial information and investment information are very similar for all countries investigated. However the scores on governance information and conduct of business information substantially differ across countries. The governance information varies from a low score of 6 to a high score of 12, while the scores of conduct of business information differ from 3 to 9. We can say that the

differences across countries in the reporting index are primarily caused by the scores on these two categories.



Below in table 7 the descriptive statistics are presented. As we can see from table 7 the average score on the reporting strictness index is 38.7059. As table 6 and figure 1 show, Chile, Argentina, Mexico have scores well above average while the United States, United Kingdom, Ireland and New Zealand score well below average. The countries that score around average are Finland, Germany and Norway.

Table 7. Descriptive Statistics

	Mean	Std. Deviation	N
Reporting Strictness Index	38.7059	5.87117	17
GDP per capita	34470.59	10975.585	17
Legal System	.6471	.49259	17
Market Capitalization	71.4706	48.86975	17

4.2 Investment strictness Index

The investment strictness index represents the strictness in pension fund regulation across 24 countries. The data to develop this index is acquired from The Survey of Investment Regulations of Pension Funds (2011) from the OECD. The data from the countries that are not included in this survey are taken from the documents of the countries supervising authority websites.

The investment strictness index consists of limits on 8 different asset categories. These asset categories are equity, real estate, bonds, retail investment funds, private investment funds, loans, bank deposits and foreign assets. The scores for every asset category are determined by the maximum percentages pension funds are allowed to invest in every asset category. For every asset category I gave a score between 0 and 10, where 10 is the strictest and 0 the least strict. When pension funds are not allowed to invest in the asset category a score of 10 will be given as where a score of 0 is given when there are no investment restrictions in that asset category. The percentages and scores on investment limits are provided below in table 8.

Table 8. Scores attributed to investment limits

Maximum Limits in Percentages	Score
0%	10
10%	9
20%	8
30%	7
40%	6
50%	5
60%	4
70%	3
80%	2
90%	1
100%	0

For certain countries there are several limits per asset category; in this case I will take the average score in this asset category. For example, when there are two limits for bonds such as a 30% limit on corporate bonds and a 60% limit on government bonds I will take the average of these two limits and give a score of 5.5 $((7+4)/2=5.5)$ to this asset category.

All the asset categories are given an equal weight for the investment strictness index. A maximum score of 80 points can be reached and the total score obtained by the country will be divided by the maximum score of 80 and then multiplied by a 100. The score obtained will be a score between 0 and 100. The results of the investment strictness index across countries are provided below in table 9 and figure 2.

Table 9. Investment Strictness Index

Country	Equity	Real Estate	Bonds	Retail Investment funds	Private Investment Funds	Loans	Bank Deposits	Foreign Assets	Index Score
Argentina	8	6	6	9	9	7	0	9	67.5
Australia	0	0	0	0	0	0	0	0	0
Austria	4	0	4	0	0	0	0	7	18.75
Belgium	0	0	0	0	0	0	0	0	0
Brazil	7.45	9.2	1	9	9	8.5	2	9.8	69.94
Canada	0	0	0	0	0	0	0	0	0
Chile	6.35	10	6.62	9.07	10	4.4	0	3.5	62.43
Colombia	7.75	10	7.5	9.5	9.5	10	6.17	6	83.03
Czech Republic	6.25	9	4.17	6.25	6.25	10	0	0	52.4
Denmark	3	0	1.5	3	9	4.9	0	0	26.75
Finland	4.25	0	4.25	4.25	4.25	1.9	0	4	28.63
Germany	0	0	0	0	0	0	0	0	0
Hungary	4.75	9	6.38	0	9.5	10	0	4	54.54
Ireland	0	0	0	0	0	0	0	0	0
Italy	0	10	0	8	8	10	8	4.88	61.1
Mexico	7.7	10	4.01	0	8.9	10	0	8	60.76
Netherlands	0	0	0	0	0	0	0	0	0
New Zealand	0	0	0	0	0	0	0	0	0
Norway	6.5	0	3.5	7	0	4.95	0	0	27.44
Slovak Republic	5.67	2.5	0	0	10	10	0	0	35.21
Spain	3.5	7	3.5	0	7	7	0	0	35
Sweden (OP)	4.5	0	9	0	0	9	0	0	28.13
United Kingdom	0	0	0	0	0	0	0	0	0
United States	0	0	0	0	0	0	0	0	0

The data for the investment strictness index is collected from the Survey of Investment Regulations of Pension Funds (2011) from the OECD. The only country not included in this paper is Argentina, the investment restrictions for this country are taken from the website of the supervising authority.

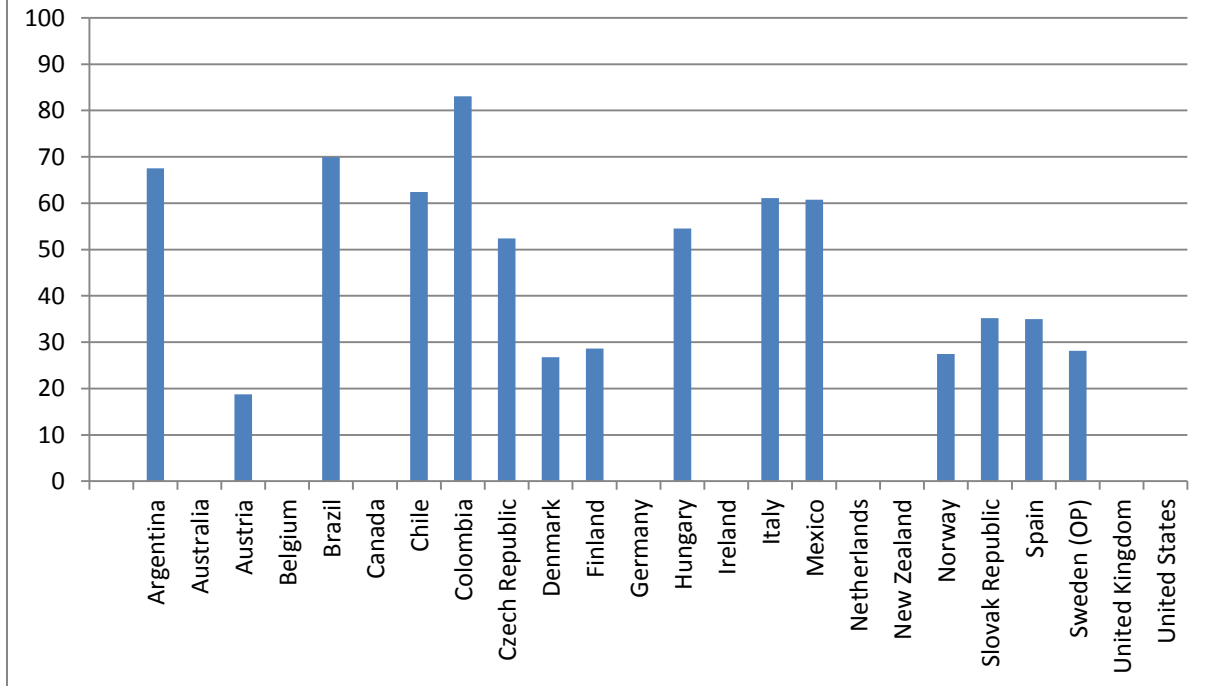
The table above shows the different scores on the investment strictness index of the 24 countries investigated. We can see that Colombia, Brazil and Argentina have very strict investment regulations. The countries with no investment limits at all are Australia, Belgium, Canada, Germany, Ireland, The Netherlands, New Zealand, United Kingdom and the United States. The highest investment limits are on the asset categories loans and real estate.

Below in table 10 the descriptive statistics are presented. The mean of the investment index is 29.64931. As shown in table 9 and figure 2, Colombia, Brazil, Argentina, Chile, Italy and Mexico have scores far above the mean. Australia, Belgium, Canada, Germany, Ireland, The Netherlands, New Zealand, United Kingdom and the United States score far below average because these countries do not impose any investment restrictions at all. The countries that score around average are Denmark, Finland, Norway and Sweden.

Table 10. Descriptive Statistics

	Mean	Std. Deviation	N
Investment Strictness Index	29.64931	28.114521	24
GDP per capita	31258.33	11992.168	24
Legal System	.7500	.44233	24
Market Capitalization	66.2875	46.68056	24

Figure 2. Strictness Index of Pension Funds Investment Limits



4.3 Methodology

The method that I will use to test the six hypotheses is a multiple regression. I will use the multiple regression to see whether there is a significant relationship between the two strictness indexes and the predictor variables. For both strictness indexes I will use GDP per capita, the legal system and market capitalization as independent variables.

The first independent variable is GDP per Capita. The data of the country's GDP per capita is taken from the CIA World Factbook from the year 2010.

The second independent variable is the legal system. All the countries included in this study either have a civil or common law system. Common law is based on previous law cases, where decisions made are guided by past controversies rather than codes or texts³. On the other hand countries with civil law systems have continuously updated legal codes that

³ Source: <http://legal-dictionary.thefreedictionary.com/Common+law>

include all the possible cases that can be brought before a court with the punishment that should be given⁴. The data of the legal systems is taken from the CIA World Factbook.

The last independent variable is the capital market development which is measured by the market capitalization of listed companies to GDP. It is calculated by multiplying the share price by the number of shares outstanding divided by the GDP. The market capitalization to GDP measures the depth of financial markets and how well developed the financial markets are in the countries. The data of the market capitalization of listed companies to GDP is obtained from The World Bank of the year 2010.

In the multiple regression I will see if the correlations between the strictness indexes and the independent variables are negative or positive and how strongly they are related and if this relationship is significant. I will also find the R^2 of the regression model to determine how well the independent variables can predict the outcome on the strictness indexes and how much variation in these scores can be explained. My expectations are that countries with high income levels, a civil law system and well developed capital markets are expected to have less strict reporting requirements and less investment restrictions.

⁴ Source: <http://www.law.berkeley.edu/library/robbins/CommonLawCivilLawTraditions.html>

5. Results

As we have seen in figure 1 and 2 clear differences can be found in the reporting strictness and investment strictness of pension funds across countries. The next paragraph will present the results of the multiple regression.

5.1 Regression results reporting strictness index

Below in table 11 the correlations between the independent variables and the reporting strictness index are shown. We can see that GDP per capita has a correlation of $-.577$ with the reporting index. The correlation is negative, which means that countries with a lower GDP per capita have a higher score on the reporting index. We can say that lower income countries can be associated with stricter reporting requirements. The legal system shows a large positive correlation of $.718$ with the reporting index. We can expect from this high correlation that countries with a civil law system have stricter reporting requirements. The correlation between the market capitalization and the reporting strictness index is negative as we expected but very small.

From table 11 we can also see the coefficients which indicate the relationship between the predictor variables and the reporting index. The adjusted R^2 shows that the independent variables explain 60.8% of the variation in the reporting strictness index. We can see that the independent variables GDP per capita and the legal system are significant at the 5% level. The results show that the legal system has a stronger relationship with the reporting index than GDP per capita. The legal system has a significance of $.003$ while GDP per capita has a significance of $.027$ which is still significant at the 5% level. The results in table 11 show that there is a significant relationship between the reporting strictness index and GDP per capita and the legal system. This means we can reject the null hypothesis and say that the reporting requirements of pension funds are stricter in lower income countries and countries with a civil legal system. However we cannot reject the null hypothesis for the third hypothesis. There is no significant relationship between the market capitalization and the reporting strictness index.

Table 11.

Independent Variables		Model 1 (Reporting strictness index)	Model 2 (Investment strictness index)
Intercept		40.161 (4.132)	58.043 (13.043)
GDP per capita	Correlation	-.577 .000** (.000)	-.803 -.002*** (.000)
Legal System	Correlation	.718 7.707*** (2.067)	.622 25.239*** (7.591)
Market capitalization	Correlation	-.146 .015 (.020)	-.235 .026 (.069)
Sample Size		17	24
Adjusted R ²		.608	.740

Standard errors in parentheses

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

5.2 Regression results investment strictness index

In table 11 the correlations between the independent variables and the investment strictness index are shown. As we can see GDP per capita has a correlation of -.803 with the investment strictness index which is the highest of the 3 variables tested. Again the correlation is negative as well as with the reporting strictness index. This means that the lower the GDP per capita of the country, the stricter investment limits the country will have. The law system is also strongly correlated with the investment strictness index with a positive correlation of .622. However the capital market development only has a small negative correlation of -.235.

Table 11 also shows how well the investment strictness index can be predicted by the 3 independent variables. The adjusted R² is .740 which means that 74% of the variation in the investment strictness index can be explained by the three independent variables. The two variables that have a significant relationship with the investment strictness index are GDP per capita and the legal system. Both variables are significant at the 1% level with GDP per capita having a significance of .000 and the legal system having a significance of .003. We can reject the null hypotheses and conclude from these results that lower income countries and countries with a civil law system have stricter investment limits.

However, capital market development has a significance of .709 which means this variable is not significant at the 10% level. This result shows that there is no significant relationship between capital market development and the investment strictness index. We can therefore not reject the null hypothesis. In the next section I will discuss the reasons behind the results found from the multiple regressions.

6. Interpretation of results

In the previous chapter the outcome of the multiple regressions were presented, now I will give the interpretation of the results. I will first start explaining the results of the relationship between the reporting strictness index and the predictor variables. After these results are explained I will give the interpretation of the investment strictness index results.

6.1 The reporting strictness index and GDP per capita

The first hypothesis I tested was the relationship between the reporting strictness index and GDP per capita. Based on previous studies we would expect Latin American countries which are considered lower income countries to have stricter reporting requirements than wealthier countries.

The results of the multiple regression show that there is a significant relationship between the reporting strictness index and GDP per capita with a significance of .027 (being significant at the 5% level). There is a negative correlation between these two variables which indicates that countries with lower GDP per capita require pension funds to have stricter reporting requirements than countries with a high GDP per capita. The three countries with the strictest reporting requirements are Mexico, Argentina and Chile. These countries also have the lowest GDP per capita from the sample of countries included for the reporting strictness index. The three countries with the least strict reporting requirements are the United States, United Kingdom and Ireland which all fall in the higher income countries category. Countries that have reporting requirements that fall in between the most strict and least strict category are Finland, Norway, The Netherlands and Germany.

Previous studies have made a distinction between the proactive and reactive supervision approach. From the multiple regression results we can say that the lower income countries can be associated with the proactive approach since they have stricter reporting requirements while wealthier countries can be associated with a more reactive approach.

The main reasons given in previous studies for the negative relationship found is the fact that private pension systems in lower income countries are relatively new and so the supervising authority doesn't have much experience in supervising pension funds. A stricter supervision approach could be needed to make sure the new system will be successful. As Hinz and Mataoanu stated, wealthier countries have better developed social security systems to fall back on and can therefore take more risk, while lower income countries should avoid the

exposure to large risks. By enforcing pension funds in lower income countries to have extensive and frequent reporting requirements the supervising authorities can control the risks that pension funds are exposed to. This gives the supervising authorities the ability to quickly intervene and take the corrective action that is needed to protect the rights of pension beneficiaries.

6.2 The reporting strictness index and the legal system

The second hypothesis tested is the relationship between the reporting requirements of pension funds and the legal system of the country. The results of the multiple regression show that there is a highly significant relationship between the reporting strictness index and the legal system of the country. The relationship has a significance of 0.003 which is even significant at the 1% level. This means that pension funds in countries with a civil law system have stricter reporting requirements than countries with a common law system. The countries with a common law system are the United States, Ireland, United Kingdom, New Zealand and Canada which have the least strict reporting requirements of the sample of countries. The results also show that pension funds in countries with a civil law system have the strictest reporting requirements.

The countries investigated with the least strict reporting requirements and common law systems all have a trust/foundation based pension system. Most of these countries score low on the two categories conduct of business information and governance information and are not required to report to their supervising authority frequently. The supervision in these countries is not that strict and most of the responsibilities are shifted to third parties. In the United Kingdom and Ireland the supervising authorities provide trustees with guidelines on what their expected duties and responsibilities are and the best way to fulfill these duties. These trustees are expected to act in the best interest of the beneficiaries and if these trustees do not have the proper knowledge or experience to perform their job they are expected to outsource these functions. The pension funds in countries with common law systems are only required to report on an annual basis and heavily rely on whistleblowers from third parties like auditors, actuaries, trustees and others that are involved in helping the trustee to perform its job to report breaches of the law. When breaches of the law are reported the supervising authority will then start an investigation. This means that the supervising authorities of the

countries with a common law system will only intervene when a problem is reported by a third party since the reporting requirements are not strict they are less likely to find any abnormalities if there is no notification given by a third party.

The countries with a civil law system and the strictest reporting requirements are Mexico, Argentina and Chile. As supervising authorities in countries with a common law system rely more on compliance issues to be resolved in court and the corrective actions being taken after the court has made a decision, countries with a civil law system take another approach. In a civil law system reporting requirements are stricter because the supervising authorities want to prevent problems to have to be resolved in court.

6.3 The reporting strictness index and capital market development

The results of the multiple regression show that no significant relationship exists between the reporting strictness index and the capital market development. The significance between these two variables is .471, which is not significant at the 5% level. The relationship between the reporting strictness index and capital market development was expected to be negative assuming that pension funds in countries with less developed capital markets would have stricter reporting requirements. However as we can see from the regression results this is not the case. Countries with well-developed financial markets are Chile, United Kingdom, Australia and Canada. The countries with the least developed financial markets are Italy, Ireland, Austria and Argentina.

We expected lower income countries to also have less developed capital markets and for wealthier countries to have well regulated financial markets and therefore a less intensive supervision approach. However, Ireland, Italy and Austria are considered higher income countries but have a low market capital development.

Based on the results of the multiple regression we can state that Latin American countries use a proactive supervision approach, while the United States, Canada, Ireland, United Kingdom and New Zealand use a reactive supervision approach. Most countries in Europe operate somewhere in the middle of the proactive and reactive approach.

6.4 The investment strictness index and GDP per capita

The fourth hypothesis tested is the relationship between the investment strictness index and GDP per capita. As expected the relationship between these two variables is highly significant with a significance of .000. The investment strictness index and GDP per capita are negatively correlated meaning that the lower the GDP per capita of the country the stricter the investment limits applied to pension funds. The countries with the strictest investment limits are Colombia, Brazil, Chile, Mexico and Argentina. This result was expected as previous studies have found very strict investment limits in Latin America. Latin American countries impose most investment limits on foreign assets, loans, real estate and private investment funds. The least strict investment limits were found in Australia, Belgium, Canada, Germany, Ireland, Netherlands, New Zealand, United Kingdom and the United States. These countries all use the prudent person approach and do not impose any investment limits on pension funds.

There are several explanations given for these strict investment limits found in lower income countries in previous studies. Demarco et al (1998) think that investment limits were imposed in lower income countries to give the public more confidence in the reformed pension systems. These investment limits will prevent investors from being able to take extreme risks and will give beneficiaries a more secure feeling about their future pensions.

So far many studies have found stricter investment limits in lower income countries. These investment limits are the strictest in Latin America. This is mainly because the private pension systems are relatively new in these countries. The supervising authorities in these countries do not want to take the risk of this system to fail and therefore need to protect beneficiaries of private pensions. Workers lack the knowledge and experience of being able to use more complex financial products so therefore investment restrictions need to be set to protect workers from taking too much risk and suffering losses. With these limits the moral hazard problem can be controlled.

6.5 The investment strictness index and the legal system

The fifth hypothesis I tested is the relationship between the investment strictness index and the legal system. The results also show a highly significant relationship between these two variables with a significance of .003. This is even significant at the 1% level. The investment strictness index shows that all countries with a common law system do not impose any investment restrictions on pension funds. These countries are Australia, Canada, Ireland, New Zealand, United Kingdom and the United States. However there are also countries like Belgium, Germany and The Netherlands that have a civil law system and do not impose any investment restrictions. The countries with a common law system have all adopted the prudent person rule while most countries with a civil law system have set quantitative investment limits. The prudent person rule that is used in common law is described by Galer (2002, p.45) as follows: “A fiduciary must discharge his or her duties with the care, skill, prudence and diligence that a prudent person acting in a like capacity would use in the conduct of an enterprise of like character and aims”. Galer (2002) states that the prudent person rule was developed in common law through the decisions made by judges based on previous cases.

This indicates that countries with common law systems rely on the prudent person approach and assume trustees are acting in the best interest of pension beneficiaries. On the contrary, countries with a civil law system use quantitative limits to prevent pension funds from being able to take excessive risks that could potentially lead to huge losses.

6.6 The investment strictness index and capital market development

The last hypothesis I tested is the relationship between the investment strictness index and the capital market development. As the results of the multiple regression show, no significant relationship was found between these two variables. The significance of the relationship is .709 which is not significant at the 10% level. We expected countries with low market capitalization to have stricter investment limits than countries with high market capitalization. We would think that countries with high market capitalization would also have well regulated financial markets where pension funds would have more freedom to invest. However the results of the multiple regression show this is not the case. The countries with the highest market capitalization are Chile, United Kingdom, Sweden, Canada, Australia and the United

States. The countries with the lowest market capitalization are Slovak Republic, Italy, Ireland, Argentina and Austria.

Most of the countries with high market capitalization have common law systems. This means that common law systems have large financial markets with a lot of investors. La Porta et. al (1997) state that common law systems offer more investor protection than countries with civil law systems, which would explain the high market capitalization in common law systems.

The only countries with a common law system and low market capitalizations are New Zealand and Ireland. The low market capitalization in New Zealand could possibly be explained by low savings, tax treatment of savings, several acquisitions and mergers of firms with bi-national operations that are only listed in Australia and a weaker investment protection than in other countries with common law systems⁵. Even though Ireland and New Zealand have low market capitalizations the investment decisions of pension funds are based on a prudent person approach where trustees have the freedom to make investment decisions on their own.

Chile actually has the highest market capitalization of all the countries included in the sample and is also one of the countries with the strictest investment limits. Chile imposes strict investment limits despite its high market capitalization to prevent pension funds from taking extreme risks. The moral hazard problem and the relatively new pension system could be the main reasons why Chile sets maximum limits in most asset categories. Other Latin American countries that impose strict investment limits such as Brazil and Colombia have relatively high market capitalization compared to the other countries that impose investment limits. These strict investment limits could be imposed because of the same reasons as in Chile.

⁵ Source: <http://www.treasury.govt.nz/publications/research-policy/ppp/2007/07-02/tpp07-02.pdf>

7. Conclusion

7.1 Conclusion

The aim of this study was to find the differences in the strictness of pension supervision and regulation across countries and test if these differences are related to the economic and legal environment of the country. Significant relationships were found between the strictness indexes and the GDP per capita and the legal system of the country. This study shows that reporting requirements are very strict in Latin America and the least strict in North America, Australia, United Kingdom and Ireland. This is also true for the investment strictness index. Countries in North America, Australia, United Kingdom, and Ireland but also countries in Europe as The Netherlands and Germany do not impose any investment restrictions on pension funds.

We can say that countries in Latin America can still be associated with a proactive supervision approach while countries in North America and Australia can be associated with a reactive supervision approach. Most European countries operate in the middle of these two supervision approaches. This is similar to the regulation of pension funds. Pension funds in Latin America still follow the draconian regulation while pension funds in The United States, Canada, Australia, United Kingdom and Ireland follow the prudent person approach.

I believe that there is not a supervision and regulation approach that is suitable for every country and this study shows that there are clear differences between these approaches because of the economic development and legal system of the country.

Vittas (1998), Rocha, Hinz, and Gutierrez (1999) all believe that when less developed countries improve their legal framework and as their financial markets become more developed, they should adopt the prudent person approach. As described in the previous section, countries using a draconian regulation do not necessarily have bad financial markets. There are more factors that determine why a prudent person approach or a draconian regulation is adopted.

7.2 Limitations

Despite the significant relationships found between the strictness indexes and the GDP per capita and the legal system there are certain limitations to this study. The sample of countries used for both strictness indexes differs. Due to the lack of information and time I wasn't able to create a reporting index for all the same countries that are used for the investment strictness index. To get a more significant and robust result the sample of countries should be extended and control variables could be added for both indexes.

Another limit of this study is the subjective nature of giving scores on the reporting index. The scores on the redress mechanisms, the risk management system of the supervising authority and the transparency and disclosure policies to members are subjective. I made a comparison of these elements between countries and then based my score on the relative strictness of these elements.

For further research the sample of countries should be extended. It would also be interesting to develop a strictness index for the intervention and sanctioning of the supervising authority.

8. Appendix

A. Data of the independent variables

GDP per capita

Country	GDP per capita (in US\$)
Argentina	16200
Australia	40600
Austria	40600
Belgium	37000
Brazil	11300
Canada	39100
Chile	15300
Colombia	9800
Czech Republic	25400
Denmark	39400
Finland	36700
Germany	36800
Hungary	19200
Ireland	40300
Italy	30100
Mexico	14400
Netherlands	41800
New Zealand	27700
Norway	53000
Slovak Republic	22600
Spain	30400
Sweden (OP)	38900
United Kingdom	35800
United States	47800

Source: <https://www.cia.gov/library/publications/the-world-factbook/>

Legal System

Country	Legal System
Argentina	Civil Law
Australia	Common Law
Austria	Civil Law
Belgium	Civil Law
Brazil	Civil Law
Canada	Common Law
Chile	Civil Law
Colombia	Civil Law
Czech Republic	Civil Law
Denmark	Civil Law
Finland	Civil Law
Germany	Civil Law
Hungary	Civil Law
Ireland	Common Law
Italy	Civil Law
Mexico	Civil Law
Netherlands	Civil Law
New Zealand	Common Law
Norway	Civil Law
Slovak Republic	Civil Law
Spain	Civil Law
Sweden (OP)	Civil Law
United Kingdom	Common Law
United States	Common Law

Source: <https://www.cia.gov/library/publications/the-world-factbook/>

Market Capitalization

Country	Market Capitalization of listed companies to GDP (%)
Argentina	17.3
Australia	128.5
Austria	18
Belgium	57.7
Brazil	72.1
Canada	137.0
Chile	157.9
Colombia	72.2
Czech Republic	21.8
Denmark	74.2
Finland	50
Germany	43.9
Hungary	21.5
Ireland	16.4
Italy	15.6
Mexico	43.9
Netherlands	85.4
New Zealand	25.5
Norway	60.1
Slovak Republic	4.8
Spain	84.7
Sweden (OP)	125.8
United Kingdom	138
United States	118.6

Source: <http://data.worldbank.org/indicator/CM.MKT.LCAP.GD.ZS/countries>

B. Data reporting strictness index

Attachment 1: Score Basic Fund Information

Country	Type of fund	Status of fund	Number of active, deferred members and beneficiaries	Movements in numbers over the period	Benefit eligibility and plan access	Vested rights	Merger and liquidation process	Redress mechanisms
Argentina ^{a b}	✓	✓	✓	✓	✓	✓	✓	3
Australia ^{a b c}	✓	✓	✓	✓	✓	✓	✓	2
Austria ^{a b}	✓	✓	✓	✓	✓	✓	✓	2
Canada ^{a b}	✓	✓	✓	✓	✓	✓	✓	1
Chile ^{a b}	✓	✓	✓	✓	✓	✓	✓	2
Denmark ^{a b}	✓	✓	✓	✓	✓	✓	✓	3
Finland ^{a b}	✓	✓	✓	✓	✓	✓	✓	2
Germany ^{a b}	✓	✓	✓	✓	✓	✓	✓	2
Ireland ^{a b c}	✓	✓	✓	✓	✓	✓	✓	1
Italy ^{a b}	✓	✓	✓	✓	✓	✓	✓	2
Mexico ^{a b c}	✓	✓	✓	✓	✓	✓	✓	2
Netherlands ^{a b}	✓	✓	✓	✓	✓	✓	✓	3
New ^{a b} Zealand	✓	✓	✓	✓	✓	✓	✓	1
Norway ^{a b}	✓	✓	✓	✓	✓	✓	✓	2
Spain ^{a b}	✓	✓	✓	✓	✓	✓	✓	3
United Kingdom ^{a b}	✓	✓	✓	✓	✓	✓	✓	1
United States ^{a b c}	✓	✓	✓	✓	✓	✓	✓	1

Main sources: a. websites supervising authority

b. Complementary and Private Pensions throughout the World (2008)

c. Supervising Private Pensions, Institutions and Methods (2004)

Attachment 2: Score Financial Information

Country	Value of fund	Value of liabilities	Amount of contributions received	Transfer values	Amount of investment income	Amount of benefits paid	Subject to audit
Argentina ^{a b}	✓	✓	✓	✓	✓	✓	2
Australia ^{a b c}	✓	✓	✓	✓	✓	✓	1
Austria ^{a b}	✓	✓	✓	✓	✓	✓	1
Canada ^{a b}	✓	✓	✓	✓	✓	✓	1
Chile ^{a b}	✓	✓	✓	✓	✓	✓	1
Denmark ^{a b}	✓	✓	✓	✓	✓	✓	1
Finland ^{a b}	✓	✓	✓	✓	✓	✓	1
Germany ^{a b}	✓	✓	✓	✓	✓	✓	1
Ireland ^{a b c}	✓	✓	✓	✓	✓	✓	1
Italy ^{a b}	✓	✓	✓	✓	✓	✓	1
Mexico ^{a b c}	✓	✓	✓	✓	✓	✓	2
Netherlands ^{a b}	✓	✓	✓	✓	✓	✓	1
New Zealand ^{a b}	✓	✓	✓	✓	✓	✓	1
Norway ^{a b}	✓	✓	✓	✓	✓	✓	1
Spain ^{a b}	✓	✓	✓	✓	✓	✓	1
United Kingdom ^{a b}	✓	✓	✓	✓	✓	✓	1
United States ^{a b c}	✓	✓	✓	✓	✓	✓	1

Main sources: a. websites supervising authority

b. Complementary and Private Pensions throughout the World (2008)

c. Supervising Private Pensions, Institutions and Methods (2004)

Attachment 3: Score Governance Information

Country	Structure and mandate of governing board	Appointment procedure and qualifications of members	Decision making procedures	Risk management procedures	Risk management system of the supervising authority	Details of service providers and outsourced functions including how appointed, monitored and dismissed	Plan sponsor details
Argentina ^{a b}	✓	✓	✓	✓	2	3	✓
Australia ^{a b c}	✓	✓	✓	✓	3	4	✓
Austria ^{a b}	✓	✓	✓	✓	2	4	✓
Canada ^{a b}	✓				3	1	✓
Chile ^{a b}	✓	✓	✓	✓	2	3	✓
Denmark ^{a b}	✓	✓	✓	✓	2	3	✓
Finland ^{a b}	✓	✓	✓	✓	2	3	✓
Germany ^{a b}	✓	✓	✓	✓	3	3	✓
Ireland ^{a b c}	✓	✓			1	2	✓
Italy ^{a b}	✓	✓	✓	✓	2	3	✓
Mexico ^{a b c}	✓	✓	✓	✓	3	4	✓
Netherlands ^{a b}	✓	✓	✓	✓	3	2	✓
New Zealand ^{a b}	✓	✓		✓	1	2	✓
Norway ^{a b}	✓	✓	✓	✓	1	3	✓
Spain ^{a b}	✓	✓	✓	✓	2	3	✓
United Kingdom ^{ab}	✓	✓			1	2	✓
United States ^{a b c}	✓	✓			1	2	✓

Main sources: a. websites supervising authority

b. Complementary and Private Pensions throughout the World (2008)

c. Supervising Private Pensions, Institutions and Methods (2004)

Attachment 4: Score Conduct of Business Information

Country	Transparency and disclosure policies , including what information is provided to members and beneficiaries of the pension fund and in what form	Whistleblowers reports	On-site Inspections
Argentina ^{a b}	5		2
Australia ^{a b c}	3	✓	2
Austria ^{a b}	3	✓	2
Canada ^{a b}	3	✓	3
Chile ^{a b}	5		2
Denmark ^{a b}	2	✓	2
Finland ^{a b}	1	✓	1
Germany ^{a b}	3	✓	1
Ireland ^{a b c}	2	✓	0
Italy ^{a b}	4	✓	2
Mexico ^{a b c}	5	✓	3
Netherlands ^{a b}	2	✓	1
New Zealand ^{a b}	3	✓	0
Norway ^{a b}	2	✓	2
Spain ^{a b}	5	✓	2
United Kingdom ^{a b}	2	✓	0
United States ^{a b c}	3	✓	0

Main sources: a. websites supervising authority

b. Complementary and Private Pensions throughout the World (2008)

c. Supervising Private Pensions, Institutions and Methods (2004)

Attachment 5: Score Investment Information

Country	Investment strategy	Asset allocation	Transaction details	Investment performance	Costs and fees charged	Portfolio stress tests
Argentina ^{a b}	✓	✓	✓	✓	✓	
Australia ^{a b c}	✓	✓	✓	✓	✓	✓
Austria ^{a b}	✓	✓	✓	✓	✓	
Canada ^{a b}		✓	✓	✓	✓	
Chile ^{a b}	✓	✓	✓	✓	✓	
Denmark ^{a b}	✓	✓	✓	✓	✓	✓
Finland ^{a b}	✓	✓	✓	✓	✓	
Germany ^{a b}	✓	✓	✓	✓	✓	
Ireland ^{a b c}	✓	✓	✓	✓	✓	
Italy ^{a b}	✓	✓	✓	✓	✓	
Mexico ^{a b c}	✓	✓	✓	✓	✓	✓
Netherlands ^{a b}	✓	✓	✓	✓	✓	
New Zealand ^{a b}	✓	✓	✓	✓	✓	
Norway ^{a b}	✓	✓	✓	✓	✓	✓
Spain ^{a b}	✓	✓	✓	✓	✓	
United Kingdom ^{a b}	✓	✓	✓	✓	✓	
United States ^{a b c}	✓	✓	✓	✓	✓	

Main sources: a. websites supervising authority

b. Complementary and Private Pensions throughout the World (2008)

c. Supervising Private Pensions, Institutions and Methods (2004)

Attachment 6: Frequency of Reporting

Country	Daily	Weekly	Monthly	Quarterly	Semi-Annually	Annually
Argentina ^{a b}	✓					
Australia ^{a b c}				✓		
Austria ^{a b}				✓		
Canada ^{a b}						✓
Chile ^{a b}	✓					
Denmark ^{a b}					✓	
Finland ^{a b}				✓		
Germany ^{a b}					✓	
Ireland ^{a b c}						✓
Italy ^{a b}				✓		
Mexico ^{a b c}	✓					
Netherlands ^{a b}			✓			
New Zealand ^{a b}						✓
Norway ^{a b}					✓	
Spain ^{a b}				✓		
United Kingdom ^{a b}						✓
United States ^{a b c}						✓

Main sources: a. websites supervising authority

b. Complementary and Private Pensions throughout the World (2008)

c. Supervising Private Pensions, Institutions and Methods (2004)

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