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INSTITUTIONAL QUALITY: ANOTHER BRICK IN THE WALL OF THE DETERMINANTS OF DEBT INVESTMENT

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A mamma e papà con amore e gratitudine

M., also yours

Institutional Quality: Another Brick in the Wall of the Determinants of Debt Investment

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Abstract

Motivated by the negative yields in the market, we explore the possibility of a cross country payment of a premium for having money in an institutionally safer place. Using data on the portfolio investment from 78 countries in 208 countries during 10 years, and defining an innovative measure of institutional quality based on the World Governance Indicators, we study the statistical relationship between institutions and debt markets. Departing from a mean-variance allocation setting, we find that institutional quality matters when talking about attracting debt portfolio investment between countries, even though this allocation shows to be persistent over time.

Keywords: Debt Investment, Institutional Quality, Countries, Investor Behavior

1 Introduction

Political and institutional environment is one of the factors that determines country-specific risk. This environment contains a mix of the agents' cultural backgrounds, moral values, and motivations. Whether it is a government's duty to enforce a high institutional quality, or a responsibility that should be held by the society as a whole, is a matter of discussion we are not concerned to address in this work.

We rather focus our discussion on how the institutional quality that is perceived in each country relates with the investor's behavior towards investment opportunities in each country. The benefits from international diversification are known (Levy and Sarnat (1970), Heathcote and Perri (2007), Ang (2007)) but the prejudice of corruption and bad institutions appears as a fear factor for the investor to allocate her wealth in an unknown country. This is where our work fills a gap: do perceptions about institutions affect significantly cross-country portfolio investment allocation in debt securities?

1.1 Motivation

The object of study of this work arose naturally with the observation of negative nominal interest rates that have been taking place in Europe. When conjecturing about plausible causes, beyond monetary policy and exchange rate fluctuations there was a strong argument on institutional quality.

In an intertemporal consumption utility maximization setting the investment in a negative interest rate asset is not rational: no rational investor is deliberately willing to lose money for sure. In this case, the optimal outcome is the base case of not investing at all, and consuming at future time what is not consumed at current time.

What motivates us is our argument that, given the institutional quality that the investor observes around her in the home country, the outcome of non-investment may not be as safe as it seems. In other words, there is a *perceived value erosion* with time, in the non-invested

money that can motivate an investment in a negative interest rate asset abroad. Hence she will invest in a country with better institutional quality, and will pay a premium for this *value insurance.* In order to take a starting step to reach this conjecture, we study the bridge between institutional quality perception and investment allocation, at the aggregate level. This setting mimics what one would expect from the representative investor.

1.2 Literature Review

The topic of negative nominal interest rates has been debated in the literature, as a policy aspect. Buiter (2009) presents three ways for the nominal interest rate to be negative, as a result of policy decisions. The first one consists of abolishing currency and substituting it by a medium of payment, where positive or negative interest could be paid; the second one would be taxing currency by conferring it an interest due date or an expiration date, such that expired money would be worth less[1]; the third one is keeping the currency that is in use as a numéraire (for prices and wages), but creating another one as a medium of payment, such that negative nominal interest rate could be paid in numeráire currency terms, and the zero lower bound would only exist in the nominal interest rate of the medium of payment currency.

Under the same policy scope, Ilgmann and Menner (2011) review the literature on some theoretical explanations for the negative interest rate, focusing in the Silvio Gesell's[2] money taxing theory. Also, they argue that if applied moderately, it can even be efficiency enhancing. Hence, this theory is not only approached as a theoretical explanation, but also as a policy proposal, that has long been ignored in the negative interest rate debate.

However, no author was found challenging the behavior of an investor that chooses to lose money for sure, lending money at a negative interest rate. Despite this fact, there is a discussion in the literature around the time preferences and utility discounting that may explain a *perceived value erosion* that arises naturally with no investment taking place.

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[1]This way, keeping money as savings without investing would yield a negative interest rate.
[2]For more on Gesell's theory, see Gesell and Pye (1958)

Frederick (2006) provides a conceptual discussion on discounting, ranging from the basic financial framework to some intergenerational equity arguments, reporting from negative to thousands values for each personal discount rate. Also, Frederick et al. (2002) give account of three different empirical studies reporting negative values for a personal discount value, relative to money and health (Chapman (1996), Ganiats et al. (2000), Loewenstein (1987)). It is to note that money, health and intergenerational justice are societal matters that are strongly affected by the quality of institutions on the top of the decision pyramid.

There is literature focusing on the relationship between institutional quality and some kinds of financial issues. Weill (2011) discusses empirically the effects of perceived corruption and bribes involving the bank official in the chances of getting a loan in Russia, and Goel and Hasan (2010) study the impact on the bank ratios and on the interest rate spread caused by the variability of the *Corruption Perceptions Index*, showing that higher corruption perception increases spreads. However, Beck et al. (2006) show evidence for the *political/regulatory capture view*, described as the fact that politicians and supervisors do not maximize social welfare, leading to the fact that strengthening the regulatory power may actually reduce the integrity on banks' decisions.

Mathur and Singh (2013), using data on Foreign Domestic Investment, show that foreign investors give priority to economic freedoms when compared to political freedoms in their capital allocation decision. Of course, it is impossible to accurately observe and measure corruption in each place and time period. That is why most of the cited works use widely renowned scores of perceptions about corruption.[3]

As reported in Belasen and Peyton (2011), the development level is one of the factors that impacts corruption perceptions. Also, Maeda and Ziegfeld (2015) making use of three different surveys takes a twofold conclusion, (i) socially disadvantaged people perceive more corruption, or higher frequency and (ii) this only holds in economically advantaged countries, motivating access to information and press freedom as influences to be controlled over per-

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[3] Olken and Pande (2011) recognize the perception based measure as a flawed medium to attain a high accuracy while measuring absolute corruption.

ceived corruption. This information is relevant for our work, given that the richest countries are the ones whose portfolio investment is more significant worldwide.

The use of perceptions about the quality of institutions as a benchmark for the actual institutional environment is often a matter of discussion. However, when talking about portfolio investments that are undertaken from a trading desk, perception levels are probably stronger than actual values of institutional quality. This idea is even stronger when investors are to invest in a foreign and less known country, in order to obtain a reasonable degree of international diversification in their portfolio.

The literature on *home bias*, the idea that equity investments allocations are biased towards the home location, emphasizes how significant is the information asymmetry when allocating capital internationally. French and Poterba (1991) find out that, at the time, around 82%-98% of the equity holdings of investors were in domestic markets, which were said as the *"result of the investors choices, rather than institutional constraints"*.

Chan et al. (2005) study the determinants of home bias and domestic bias with equity holdings from mutual funds, and find a strong importance of familiarity variables. Coval and Moskowitz (1999) find empirical evidence that remotely-located fund managers show to have greater ability to select equity securities, achieving a positive abnormal return in firms that are within a 100 kilometer range of the headquarters. The authors point out the superior information about local stocks as the main motive.

In a nutshell, a lot of work has been done about international investments, investor behavior and institutional quality. Also, the willingness to surely lose money is somehow explored in the literature on time preferences, but the negative interest rates question is explored only in the central bank's perspective, to the best of our knowledge. Motivated by the latter, we try in this work to reconcile the institutional quality role in the exercise of international diversification using portfolio investment in debt assets.

Outline   The remainder of this article is organized as follows. Section 2 defines the theoretical framework with the derived hypotheses. Section 3 describes the data and the methods used in this work. Estimation results are reported in Section 4, and discussed in Section 5. Finally, Section 6 provides our concluding remarks.

2   Theoretical Framework

In order to define the theoretical setting we will use, we need to introduce some key ideas. Motivated by the gain from diversification, the cross-country investment decision will occur in a three-step procedure, each one with a specific level of depth. First, the investor chooses how much she invests at home, and how much she invests abroad, in order to gain from international diversification[4]. Second, given the amount that the investor sets up to invest abroad, the choice is about which countries to choose to invest[5]. Finally, there is the choice on which assets she will pick inside each country, given the amount chosen to invest per country. This is a 3-degree diversification process: home/foreign diversification, cross-country diversification, and country portfolio diversification. In this work, we focus just in the second step of investment: having decided to invest abroad (a given amount of funds), how much an investor will invest in each country.

The framework we use to study the cross-country asset allocation problem is the risk-return space. As soon as we believe that investors have a quadratic utility function (or that returns are normally distributed), we are talking about mean-variance preferences, and mean-variance investors. The main representative measures of risk and return are expected return and volatility. It is known that the mean-variance allocation suffers from an estimation error that takes place when assuming that past performance mimics historic performance, making the portfolio allocation in this space highly vulnerable to the estimation method

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[4] Aoki (2010) uses a dynamic Markowitz portfolio selection model in a two-country open economy, where each country decides how much to keep as domestic investment and how much to invest abroad.

[5] Zaremba (2015) and Zaremba and Konieczka (2015) discuss country selection strategies to invest in equities.

used for risk and return.

This is where we will depart from, to our main assumption: the risk of investing in a given country highly depends and can be described by the institutional quality of this country.

2.1 Model

We use the usual optimal portfolio program, since under investor rationality is the one picked by all investors:

$$\underset{\{w_1,...,w_N\}}{\text{maximize}} \quad E[r_p] - \frac{g}{2}Var[r_p]$$

where $E[r_p]$ denotes the expected return of the portfolio, and $Var[r_p]$ stands for the variance of the portfolio returns, that penalizes the objective function as much as g grows, making g to be interpreted as the risk aversion coefficient.

Defining in matrix notation[6]:

$$E[r_p] = w'\bar{r} + w_f r_f \tag{1}$$

$$Var[r_p] = w'Vw \tag{2}$$

We can now use this notation to formulate and solve the problem[7]:

$$\underset{w}{\text{maximize}} \quad w'\bar{r} + w_f r_f - \frac{g}{2}w'Vw$$

$$s.t. \qquad 1 = w'\mathbf{1} + w_f$$

equivalent to:

$$\underset{w}{\text{maximize}} \quad w'\bar{r} + (1 - w'\mathbf{1})r_f - \frac{g}{2}w'Vw$$

The first order condition will then be:

$$\bar{r} - r_f\mathbf{1} - gVw = 0 \tag{3}$$

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[6]$\bar{r}$ is a vector of expected returns of each asset, and V is the matrix where $v_{ij} = \sigma_{ij}$, this is, the variance covariance matrix. w is a vector of weights invested in each asset, and w_f and r_f are the weight invested in and the return of the risk-free asset, respectively.

[7]$\mathbf{1}$ is a vector of ones.

The optimal vector of weights, w^*, is:

$$w^* = \frac{1}{g}V^{-1}(\bar{r} - r_f\mathbf{1}) \tag{4}$$

The first conjecture related to this result is that the risky portfolio exposure to each risky asset will decline with an increase of the variance of that asset, *ceteris paribus* (see Appendix 1). To link it with the Institutional Quality argument, we assume that the Institutional Quality of a given country will only negatively impact the diagonal term of V, keeping the cross covariance terms constant. As a result, it is expected that a higher level of Institutional Quality of the investment destination country increases the exposure a given investment source has within that country, via the variance decreasing effect. What remains to explain is how strong and determinant shall this impact be.

Countries have their history, culture, language and natural factors that strongly impact their relationships, be it short term contact, or long-term partnerships, and investment is not an exception (Grinblatt and Keloharju (2000)). Culture even shows to have a direct effect on international investment, beyond that through the channel of law and regulation (Anderson et al. (2011)). Hence, that makes us predict that being such a long term dimension when compared to institutional quality, if the investment exposure across countries is persistent over time, that may not depend on the quality of institutions as strongly as it would depend from cultural factors.

For the case of debt investment, since it is based on a claim over a future payment, involving trust between the two parties, both the quality of institutions and cultural factors matter. However, it is expected that given the renewed information about institutional quality in all the years, and the cultural constancy, institutions may not be relevant when controlling for the one year lagged exposure between any pair of countries.

We can summarize our hypotheses - one taken from the model (HA), and two derived from existing literature (HB):

- *HA:* The relative exposure in debt portfolio investment between any pair of countries

increases with the level of institutional quality of the investment destination country, in a cross sectional setting. Mathematically, given:

$$\frac{\partial |e_i|}{\partial \sigma_{ii}} < 0 \text{ and } \frac{\partial \sigma_{ii}}{\partial IQ_i} < 0 \tag{5}$$

where we define $|e_{ij}|$ as the relative exposure from country i to country j in the risky portfolio.

We can see that:

$$\frac{\partial |e_i|}{\partial IQ_i} = \frac{\partial |e_i|}{\partial \sigma_{ii}} \frac{\partial \sigma_{ii}}{\partial IQ_i} > 0 \tag{6}$$

- *HB1:* The relative exposure between countries is persistent over time, and over controls that are likely to change annually, such as economic and institutional quality.

- *HB2:* This persistence may reflect cultural, historical and language factors that are long term dimensions, making the contemporaneous shocks in institutional quality not relevant.

3 Methodology

3.1 Data

We use data on debt investment from 78 world countries (investment sources) on 208 other countries (investment destinations)[8], retrieved from the *Table 11: Geographic Breakdown of Total Portfolio Investment Assets: Total Debt Securities* of the Coordinated Portfolio Investment Survey (CPIS), which is publicly available in the IMF Data Warehouse, from 2005 to 2014. These source is the only publicly available information on debt portfolio composition.

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[8]See Appendix 2 for a full list of investment sources and investment destinations.

Data on Institutional Quality dimensions are used, taking the six World Bank's Worldwide Governance Indicators as a representative measure of perceptions about Institutional Quality. It comprises: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption. For each dimension, a score is calculated based on experts' perceptions about each of the countries in the database, in each year.

Alonso and Garcimartín (2013) defend that the World Bank Governance Indicators' averages are the best proxies for institutional quality. They point that their accuracy and their geographical coverage are the two main reasons. They develop four criteria for institutional quality: static efficiency, dynamic efficiency, predictability, and legitimacy, from which they derive potential institutional quality determinants.

3.2 Variables

The primary variable of analysis in this work is the relative exposure of all the debt investors from a given country to all the debt securities from another country. By relative, we understand how much the exposure value weights in the total invested amount from a given investment source, in a given year. By exposure we mean the absolute value of the investment, such that a short-position investment of 5 million out of the 500 million invested is taken as a relative exposure of 1%.

This approach becomes useful for two main reasons. (i) Using the relative exposure out of the debt investment portfolio, assuming this portfolio to be the *risky portfolio*, vanishes the effect of any risk aversion coefficient, suggested by the theory. (ii) The approach is consistent with the mean-variance portfolio choice problem, where an increasing risk for a given country, leads to a smaller exposure. Hence our dependent variable in this study is described as:

$$|e_{ij}| = \frac{|N_{ij}|}{\sum_{j=1}^{m} N_{ij}} \tag{7}$$

It denotes the relative exposure from a country i to a country j as being the weight of the absolute value invested by the investors of country i in the debt securities of country j in all the investments made by country i. N_{ij} denotes the value invested from country i to country j. We then allow this variable to vary over time, and compute it for every year.

To study how this variable is impacted by institutional quality, we have to measure institutional quality. We chose to use the World Governance Indicators as the measurement given their time and geographical coverage. However, institutional quality is a very delicate topic to solely pick six numbers per country per year and run them in a regression model. As an example, would we care about a country with a strong Control of Corruption when its Rule of Law is poor, or when there is no Voice & Accountability at all? This specificity of institutions and the need for harmony and balance between indicators made us develop a unique value for each country-year that could exactly capture that.

Leaving apart the conventional index-building methods, such as Principal Components Analysis[9], we went through a simple and intuitive reasoning. Having six values to describe the same reality in a given year, we could face it as a vector with 6 components and take the Euclidean Norm, making a score out of it. The problem arising here is that it favors extreme allocations[10].

Hence, instead of summing squares, we square a sum, where all the dimensions are meant to interact, and that favors a degree of harmony between them. The use of square roots is meant to retrieve some original magnitude to the final score (not to be inflated by the square).

The value for each dimension ranges between -2.5 and 2.5, and for the purpose of a correct analysis, we normalize it between 0 and 5, and we compute an overall Institutional Quality

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[9]PCA would not favor this principle of harmony between dimensions, since each variable is believed to act individually.

[10]$||(2,0)|| > ||(1,1)||$

score using the following formula:

$$IQ_{it} = \left(\sqrt{VA_{it}} + \sqrt{PSAV_{it}} + \sqrt{GE_{it}} + \sqrt{RQ_{it}} + \sqrt{RL_{it}} + \sqrt{CC_{it}} \right)^2 \tag{8}$$

where each variable (VA_{it}, $PSAV_{it}$, GE_{it}, RQ_{it}, RL_{it}, CC_{it}) denotes the normalized score for a given dimension, for country i, in year t. This way we penalize extremely different scores for each country-year between dimensions, and describe the institutional quality of each country-year with a single number. Clearly, there is space for discussion about this oversimplification, but as a first approach to the topic we don't find any major weakness.

In order to illustrate how this measure describes the institutional environment of a country, let us consider the evolution of the index for Sweden and Lybia in the period under study (2005-2014). For the swedish case, we see in our data that the score ranges between 186 and 191 in 2005 and 2012, respectively, which is representative of the high institutional standards that are perceived about Sweden. As a comparison, we consider the case of Lybia that experienced a Civil War in 2011. Perceptions about institutions are captured with this index that ranges from 90 in 2005 to 62 in 2014. It even captures the rapid decline in perceptions from 2009, when the population started to be unhappy with the political environment imposed by Khadafi's regime through the civil war, with a steady decrease of 20 points, leading to the most recent outcome of such a low level, given the transitory and unstable political situation that Lybia experiences in the recent years.

This comparison helps us illustrate that the Institutional Quality indicator developed in this work is capturing in a single number some of the main perceptions about the institutional reality in each country, in each year.

In Figure 1, we show how the two main variables under study interact and motivate our analysis. We plot for three different Institutional Quality bands of the investment destination (Low - from 50 to 100; Medium - from 100 to 150; High - from 150 to 200) the Kernel density estimates for the distribution of the relative exposures from all the countries.

Figure 1: Distribution of Relative Exposure by Institutional Quality levels
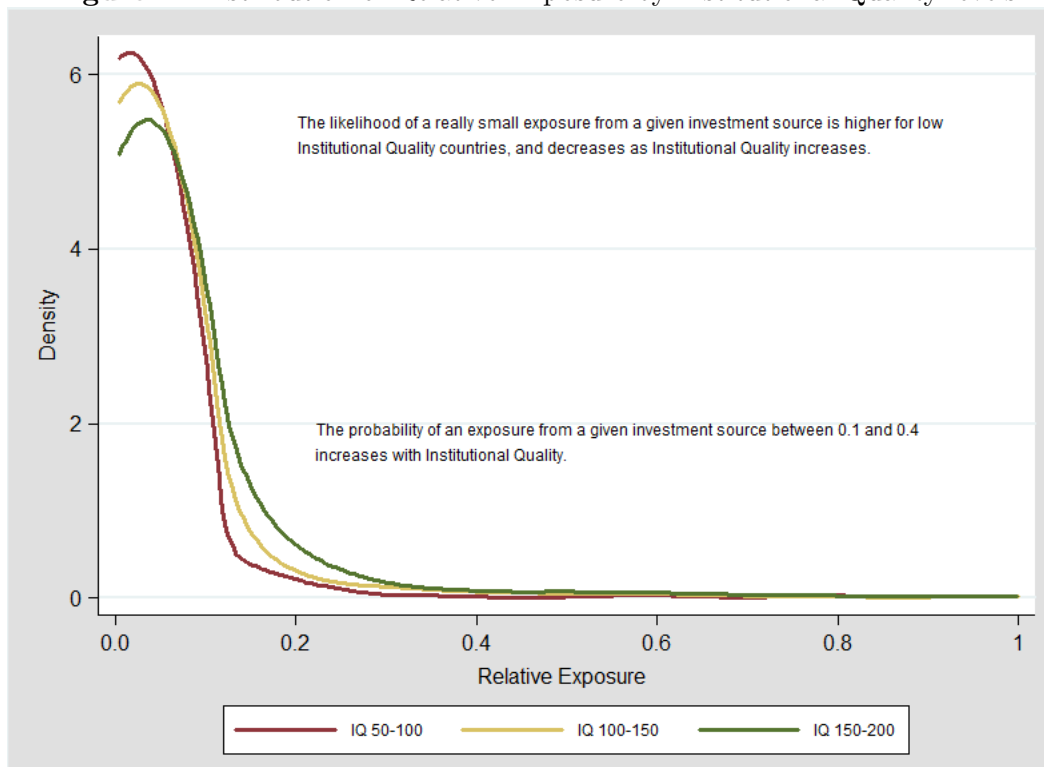
It is clear in the graph the main message of this work: there is a higher likelihood of a big exposure (10%-40% of the portfolio investment in debt assets from a given country in a given year) to take place in High Institutional Quality countries than there is the Medium Institutional Quality countries, and so it happens relative to Low Institutional Quality countries. Consistently, the probability that a small allocation is taken is higher for Low Institutional Quality countries than for High Institutional Quality Countries.

This graph also supports that the Institutional Quality measure that we define, correctly assumes an ordinal pattern regarding the different types of countries. The Medium Institutional Quality level assumes an intermediate position between the two bounds: High and Low.

Hence, we have the motivation to perform a statistical analysis in order to infer about the effect of Institutional Quality on the aggregate allocation of portfolio debt investment between countries.

3.3 Model

To assess the first hypothesis we estimate the following baseline linear model:

$$|\hat{e}_{ijt}| = \beta_0 + \beta_1 IQ_{jt} + F'\beta_F + T'\beta_T + Y'\beta_Y + \varepsilon_{ijt} \tag{9}$$

In this equation F denotes a vector of dummy variables that controls for the investment sources and analogously T controls for the investment destinations, denoting two different types of country fixed effects. We call them *investment origin country-specific characteristics*, and *investment destination country-specific characteristics*, respectively. Y is the vector with dummy variables per year, to control for time fixed-effects. Also, β_F, β_T and β_Y denote the coefficient vectors for each type of fixed effects dummies.

This approach allows us to control for country and time specific varying characteristics beyond institutional quality that may bias the estimate for β_1.

For robustness purposes, we use Pooled OLS and Tobit (truncated with a zero lower bound) specifications. This way we account for possible estimation biases that may occur given the zeros we have in the database, in terms of investments between pairs of countries. This situation accounts for approximately 75% of the sample. It is, in fact, normal that a given country does not invest in other one with no pre-specified reason, and what we seek to observe is that if it changes our results when taken into account. Hence, in a cross-sectional setting, if we maintain that $\beta_1 > 0$, we confirm our hypothesis that the institutional quality of the investment destination matters for country selection in debt portfolio investments, increasing the exposure in that country. For the second and third hypothesis we need to formulate a different model, even though we use the same estimation procedures:

$$|\hat{e}_{ijt}| = \beta_0 + \beta_1 IQ_{jt} + \beta_2|e_{ijt-1}| + F'\beta_F + T'\beta_T + Y'\beta_Y + \varepsilon_{ijt} \tag{10}$$

For the second hypothesis to hold, we need the relationship $0 < \beta_2 < 1$ to hold and to be statistically significant. For the third conjecture to hold, in the same model, we have to be unable to reject that $\beta_1 = 0$. We then try different specifications of both models, such as the whole sample compared to specific years of data to assess how robust are our results or

which differences arise in different settings.

4 Results

4.1 Descriptive Statistics

The descriptive statistics of the two main variables can be summarized in Table 1 presented below.

Table 1: Descriptive Statistics per Year

Years	$|\hat{e}_{ijt}|$ Mean	Min	Max	IQ_{jt} Mean	Min	Max	No. Obs.
2005	0.4578%	0%	94.0032%	125.16	48.30	194.51	15,081
2006	0.4601%	0%	94.4182%	125.04	40.96	193.63	15,216
2007	0.4511%	0%	94.2099%	125.13	35.45	194.22	15,296
2008	0.4526%	0%	100%	125.16	33.57	192.80	15,244
2009	0.4528%	0%	99.8670%	125.24	36.24	193.39	15,682
2010	0.4556%	0%	99.8667%	125.35	40.43	193.08	15,682
2011	0.4633%	0%	98.0672%	125.84	42.04	192.93	15,757
2012	0.4606%	0%	96.2675%	125.72	43.35	193.05	15,633
2013	0.4695%	0%	96.3400%	125.06	44.42	192.29	15,549
2014	0.5147%	0%	96.4747%	125.35	45.73	193.14	14,378
Full Sample	0.4632%	0%	100%	125.35	33.57	194.51	153,518

From this table, one can note how the inflation around zero on the exposure between countries may cause some biases to results that do not take it into account. The mean exposure for all the years is very constant, given the constant strength of all the zero observations in pulling this mean down. The maximum exposure, that is not affected by the zeros shows to vary more. Also, the score for institutional quality seem to be quite stable, at least in average terms. It accounts for more time variation in the minima than in the maxima, but given the last period of ten years, we would not expect the world institutional quality average to exhibit any major evolution.

4.2 Estimation Results

In the baseline specification we assess what is the overall effect of institutional quality. We use the institutional quality score already presented and explained as a potential determinant of the debt portfolio investment decision, between countries.

We do five different combinations with the control variables mentioned above. In the first one, we capture the effect of institutional quality without any control; in the second we control for country-specific characteristics of the investment origin country; in the third we add destination country-specific characteristics; the fourth model only controls for year-specific effects; and the fifth, we control for all the control variables. The results are in the Table 2 presented below.

Table 2: OLS Estimates for Full Sample

	(1)	(2)	(3)	(4)	(5)
	OLS	OLS	OLS	OLS	OLS
Variables	$|\hat{e}_{ijt}|$	$|\hat{e}_{ijt}|$	$|\hat{e}_{ijt}|$	$|\hat{e}_{ijt}|$	$|\hat{e}_{ijt}|$
IQ_{jt}	0.0170***	0.0170***	0.0001	0.0170***	-0.0000
	(0.0003)	(0.0003)	(0.0011)	(0.0003)	(0.0011)
β_0	-1.6675***	-1.6470***	0.0441	-1.6699***	0.0587
	(0.0348)	(0.0995)	(0.1893)	(0.0430)	(0.1940)
Controls					
Years (Y)	✗	✗	✗	✓	✓
From (F)	✗	✓	✓	✗	✓
To (T)	✗	✗	✓	✗	✓
Observations	153,518	153,518	153,518	153,518	153,518
R^2	0.027787	0.029146	0.362198	0.027817	0.362210

Robust standard errors in parentheses

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

Reported coefficients are in percentage (%)

At a first glance, institutional quality seems to positively impact the relative exposure

found in the debt portfolio investment survey conducted in the above mentioned countries, during the 10 year sample period. However, when controlled for country-specific characteristics of the investment destinations, institutional quality alone seems to lose significance.

Actually, the institutional environment by itself, apart from political, economical and even cultural events can be irrelevant for the investor when choosing where to allocate money. In such a zero inflated sample, that explores a dependent variable that we expect to be persistent, this result does not arise as a drawback. We can also see that the positive effect of the institutional quality score still exists when controlling for year specific events.

The variability of the specified institutional quality score can explain around 3% of the variability in the relative exposures in debt portfolio investments, by itself. The characteristics of the investment sources seem not to add goodness of fit to the model nor the time does, whilst the investment destination characteristics largely increase the R^2. Even though adding variables to a model always increase this measure, the increment magnitude shows to be severe.

This basic specification allows us to take some important ideas. (i) Institutional quality matters for debt portfolio investment, but the socio-cultural environment analysis (that can even be done intuitively by the trader in the desk, with all the pre-conceived ideas about the world) is a fundamental piece of the wealth allocation in this type of assets; (ii) destination countries characteristics is what matters most, when choosing where to invest, dominating the investment origin country characteristics or the investment timings; (iii) the institutional quality indicator developed describes the time variation of institutional quality per country.

Using exactly the same model specification and controls, we estimate a Tobit model truncated at zero. This will allow us to get a new piece of evidence not about the overall effect of institutional quality, but a more accurate one. When investment is done, is institutional quality positively related with the relative exposure that the investors from a given country decide to gain over another country? Answers for this question can be taken from Table 3.

Table 3: Tobit Estimates for Full Sample

Variables	(1) Tobit $\|\hat{e}_{ijt}\|$	(2) Tobit $\|\hat{e}_{ijt}\|$	(3) Tobit $\|\hat{e}_{ijt}\|$	(4) Tobit $\|\hat{e}_{ijt}\|$	(5) Tobit $\|\hat{e}_{ijt}\|$
IQ_{jt}	0.1036***	0.1115***	0.0405***	0.1038***	0.0340***
	(0.0022)	(0.0024)	(0.0063)	(0.0022)	(0.0063)
β_0	-19.8640***	-22.8896***	-14.4976***	-20.5003***	-14.0359***
	(0.4331)	(0.5801)	(1.1368)	(0.4547)	(1.1490)
σ	7.2496***	7.2643***	5.5766***	7.2493***	5.5757***
	(0.1608)	(0.1651)	(0.1302)	(0.1609)	(0.1302)
Controls					
Years (Y)	✗	✗	✗	✓	✓
From (F)	✗	✓	✓	✗	✓
To (T)	✗	✗	✓	✗	✓
Observations	153,518	153,518	153,518	153,518	153,518

Robust standard errors in parentheses

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

Reported coefficients are in percentage (%)

The Tobit results show to be as expected, and even stronger, when we control for the zeros in the sample. Also, this specification tells us, given that the investment took place, what is the impact of institutional quality in the weight of debt portfolio investment assigned to assets of a given country. First, institutional quality keeps assuming a determinant role, but here, even when controlling for all the investment destination country specific characteristics.

From the fifth model, we can say that on average, *ceteris paribus*, an increase of one point in the institutional quality score of the destination country, leads to an increase of the relative exposure of 0.034%, between the same pair of countries in the same year. It is significant at the 1% confidence level.

The main message to take here is that even though there is no evidence that institutional quality, if all the socio-cultural environment remains the same, determines the decision of

cross-country debt portfolio investment, when the decision is made, it is positively related with the exposure magnitude, when we look onto the whole sample.

In order to perform a pure cross sectional analysis, we chose the years 2007, 2010 and 2014, in order to have a pre-2008 crisis, a post-crisis and the most recent record, and compare the impact of institutional quality, and we run the uncontrolled and the fully controlled specification for the three different years. The results are reported in Table 4.

Table 4: OLS Estimates - Cross Sectional Analysis

	(1)	(2)	(3)	(4)	(5)	(6)
	2007	2010	2014	2007	2010	2014
<u>Variables</u>	$|\hat{e}_{ijt}|$	$|\hat{e}_{ijt}|$	$|\hat{e}_{ijt}|$	$|\hat{e}_{ijt}|$	$|\hat{e}_{ijt}|$	$|\hat{e}_{ijt}|$
IQ_{jt}	0.0176***	0.0170***	0.0182***	0.0003	0.0011	-0.0001
	(0.0011)	(0.0011)	(0.0011)	(0.0004)	(0.0011)	(0.0002)
β_0	-1.7510***	-1.6789***	-1.7589***	0.0180	-0.0436	0.0238
	(0.1137)	(0.1101)	(0.1131)	(0.2033)	(0.2013)	(0.1801)
From (F)	✗	✗	✗	✓	✓	✓
To (T)	✗	✗	✗	✓	✓	✓
Observations	15,296	15,682	14,378	15,296	15,682	14,378
R^2	0.031510	0.026607	0.031479	0.388667	0.346424	0.356679

Robust standard errors in parentheses

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

Reported coefficients are in percentage (%)

Regarding the OLS estimation, the conclusions are the same we took with the whole sample: (i) institutional quality effect gets dominated by the effect of the country environment as a whole, (ii) the explanatory power of the model with solely the institutional quality score is 3% and increases severely when controlling for the destination country specific characteristics, which reinforce the robustness of the results taken before. There are also no significant changes in magnitude, significance or explanatory power between years. Tobit cross section

robustness is assessed in Table 5.

Table 5: Tobit Estimates - Cross Sectional Analysis

Variables	(1) 2007 $\|\hat{e}_{ijt}\|$	(2) 2010 $\|\hat{e}_{ijt}\|$	(3) 2014 $\|\hat{e}_{ijt}\|$	(4) 2007 $\|\hat{e}_{ijt}\|$	(5) 2010 $\|\hat{e}_{ijt}\|$	(6) 2014 $\|\hat{e}_{ijt}\|$
IQ_{jt}	0.1081***	0.1078***	0.0925***	0.0634***	0.0412***	0.0299**
	(0.0076)	(0.0076)	(0.0059)	(0.0175)	(0.0143)	(0.0136)
β_0	-20.6059***	-20.7969***	-16.8073***	-18.8091***	-16.0457***	-10.2229***
	(1.4699)	(1.4932)	(1.0847)	(3.2189)	(2.6730)	(2.1494)
σ	7.1752***	7.4757***	6.4971***	5.2390***	5.7128***	5.0778***
	(0.5157)	(0.5498)	(0.4304)	(0.3963)	(0.4696)	(0.3278)
Controls						
From (F)	✗	✗	✗	✓	✓	✓
To (T)	✗	✗	✗	✓	✓	✓
Observations	15,296	15,682	14,378	15,296	15,682	14,378

Robust standard errors in parentheses

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

Reported coefficients are in percentage (%)

The cross sectional analysis of the table above provides robust evidence of the results previously reported in Table 3. All the coefficients are statistically significantly positive, suggesting a positive impact of institutional quality on the relative exposure on debt portfolio investment. Institutional quality shows to play a role, even when fully controlled for countries specific characteristics, even though it is decreasing in magnitude with time.

The decrease in magnitude from 0.06% to 0.03% from 2007 to 2014 can be due to a higher degree of diversification in which idiosyncratic dimensions of each country get less representative, but one cannot prove it with the available information. Regarding the time variation of the relative exposure, and the impact of a contemporaneous institutional shock, we ran the specification in equation (10) and applied the same controls than in the previous analysis. The OLS estimation results are reported in Table 6.

Table 6: OLS Estimates for Full Sample with 1 Lag

Variables	(1) OLS $|\hat{e}_{ijt}|$	(2) OLS $|\hat{e}_{ijt}|$	(3) OLS $|\hat{e}_{ijt}|$	(4) OLS $|\hat{e}_{ijt}|$	(5) OLS $|\hat{e}_{ijt}|$
$|\hat{e}_{ijt-1}|$	88.9809***	88.9745***	83.9288***	88.9802***	83.9285***
	(1.6103)	(1.6134)	(2.1717)	(1.6104)	(2.1718)
IQ_{jt}	0.0019***	0.0019***	0.0007	0.0019***	0.0006
	(0.0003)	(0.0003)	(0.0007)	(0.0003)	(0.0007)
β_0	-0.1835***	-0.1850***	-0.1109	-0.1812***	-0.0952
	(0.0268)	(0.0479)	(0.1243)	(0.0288)	(0.1243)
Controls					
Years (Y)	✗	✗	✗	✓	✓
From (F)	✗	✓	✓	✗	✓
To (T)	✗	✗	✓	✗	✓
Observations	136,773	136,773	136,773	136,773	136,773
R^2	0.800779	0.800811	0.805713	0.800785	0.805717

Robust standard errors in parentheses

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

Reported coefficients are in percentage (%)

The results presented on the table above show a high persistence of the relative exposure between every pair of countries, through time in all the specifications, under all types of controls, even accounting with the zeros in the sample. The institutional quality positive effect is not totally vanished by this persistence even though its magnitude decreases substantially. Institutional quality significance vanishes in the same conditions than before, when controlling for country specific characteristics.

Adding the lagged value for the relative exposure also increases the explanatory power of the regression, to really high levels around 80%, making now irrelevant any controls for goodness of fit purposes.

Contemporaneous shocks in the specified institutional quality score will still yield a pos-

itive effect, on average. Past investment relationship and tradition between countries seem to highly determine and explain a lot of the exposure taken, regardless of the investment origin, destination or year.

With regards to the effect of institutional quality, conditioned on the fact that some exposure happened, we can see the result of the Tobit estimation for the same specification in Table 7.

Table 7: Tobit Estimates for Full Sample with 1 Lag

Variables	(1) Tobit $|\hat{e}_{ijt}|$	(2) Tobit $|\hat{e}_{ijt}|$	(3) Tobit $|\hat{e}_{ijt}|$	(4) Tobit $|\hat{e}_{ijt}|$	(5) Tobit $|\hat{e}_{ijt}|$
$|\hat{e}_{ijt-1}|$	96.3134***	96.8506***	87.2492***	96.3147***	87.2420***
	(1.4319)	(1.3787)	(1.3202)	(1.4315)	(1.3182)
IQ_{jt}	0.0346***	0.0374***	0.0238***	0.0347***	0.0193***
	(0.0004)	(0.0005)	(0.0040)	(0.0004)	(0.0040)
β_0	-7.5163***	-8.7344***	-8.2377***	-7.7162***	-7.7256***
	(0.0969)	(0.1905)	(0.6953)	(0.1069)	(0.6885)
σ	3.1250***	3.1347***	3.0561***	3.1247***	3.0559***
	(0.0470)	(0.0569)	(0.0599)	(0.0473)	(0.0603)
Controls					
Years (Y)	✗	✗	✗	✓	✓
From (F)	✗	✓	✓	✗	✓
To (T)	✗	✗	✓	✗	✓
Observations	136,773	136,773	136,773	136,773	136,773

Robust standard errors in parentheses

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

Reported coefficients are in percentage (%)

The Tobit estimation provides evidence of robustness of both the results attained in the OLS estimation in Table 6, and the conclusions taken before it. Institutional quality, namely, contemporaneous shocks have a role in the debt portfolio investment allocation, and relate

positively with it, with a significance level of 1%.

In all the cases that the investment occured, we see that even though past exposure is highly determinant, one more point of the developed institutional quality score in a given year, leads to an additional exposure from the investors in another country of 0.02% of the its invested wealth in debt assets abroad, on average *ceteris paribus.*

5   Discussion

Our focus in this section is to derive potential implications on our understanding of the aggregate portfolio investment market for debt assets, in a cross country setting, where institutional quality differs. We have departed from the mean-variance portfolio choice theoretical setting, and applied all the procedures with which we could get empirical results.

With the described empirical results, we now try to address the relevance that institutional quality already shows to have, and to motivate that further research and policy is developed. The main result of this work is that institutional quality matters, and it matters across countries and time, even when considering portfolio investment, as opposed to Foreign Direct Investment. We split our discussion on the obtained results in three parts: (i) uniqueness of institutional quality as a measurement dimension, (ii) cross-country relationships and their effects in investment allocation, and (iii) cross-country debt investor behavior.

Starting by the uniqueness of institutional quality, there are many factors that make it unique. First, the fact that it is composed by many dimensions such as the six dimensions form the World Governance Indicators, that have to evolve together such that we can observe institutional improvements. Second, even though Shleifer and Vishny (1993) define corruption[11] as *"the sale by government officials of government property for personal gain"*, the perceptions about each institutional quality dimension differ geographically and are not

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[11]Using a theoretical mode and the simple and this concise definition for corruption, Shleifer and Vishny state that (i) government institutions and the political process strongly determine the level of corruption and (ii) the illegality of corruption and the consequent need for secrecy make it have higher distortion and costs for development.

so objective. They depend on different cultures, literacy levels, development, economic and political factors, and abundance or scarcity of resources.

The investment history between countries have also shown to be determinant on the allocation. Specially in debt investments, where trusting the entity to whom we lend money has a value, the past relationship between any pair of countries dictates the investment that occurs between them. However, we have seen that it is still worth investing in institutional quality improvements, if a country wants to capture a larger share of debt investment from other countries. Debt investment history also seems to prevail versus country specific characteristics, meaning that if in some previous period, there were investment opportunities, most likely this investment link will prevail.

Lastly, the investor behavior regarding this facts, seems to be puzzling. On one hand, investment history matters a lot, meaning that investors still base their decisions in past information, and still replicate what have been done before. On the other hand, be it as an intuition exercise, or as a set of ideas about each country that lie on the financial markets' minds, there is a significant impact from contemporaneous institutional quality and country specific characteristics, even when controlled for investment history. In any of the estimations, we have seen a negative and significant influence of institutional quality on the exposure that assets from a country can get from investors abroad, and it has to be taken into account, when taking policy decisions.

Each work has its limitations and this one is not an exception. First, there are data constraints at the micro level, that could bring much more accurate information (we would rather use portfolio allocations from the 10 biggest investment firms, than this level of aggregation to explain investor behavior facing institutional quality). Second, there are missing data because of confidentiality or lack of disclosure and even, not really the whole world is represented in this sample, with investment from solely 78 countries. Also, there is more econometrics to do than the simple approach we used here, but to follow the principle of parsimony, we have decided to keep it at the simplest way possible.

Another point of this work is the dimension of institutional quality, that can be addressed as being a limitation. The *ad-hoc* way of defining this indicator can be object of discussion. However it matches all the criteria we previously stipulated that it would have to, and we find evidence that it serves its purpose.

As well, the use of perceptions is usually a matter of disagreement. When sitting at a trading desk, an investor measures institutional quality by her perceptions and judgements about what she reads and knows, bound by her set of values and culture, more than objectively measuring anything, so this should not be a problem.

If Finance is about joining together money and ideas, in order to create value, and making the best choices possible, taking into account risks and potential returns, playing with the agents' expectations and beliefs, then institutional quality cannot be out of the financial debate. Governments, decision centers, firms and households have to be, and evidence of this work somehow suggest that investors implicitly are, aware of the importance of institutions, transparency and a serious and respectful way of doing business and trading in the markets.

If countries with financing needs want to increase other countries' exposure to their debt assets, then they have first to create a good investment relationship, and then invest in the quality of their institutions. Countries that already have a good investment inflow, have reasons to be more optimistic about the future, however they can always increase it via an institutional quality improvement. Financial institutions and investment firms that undertake this kind of international diversification of their portfolio, can also start to take this ideas into account and ending up financing those who want to improve institutions, making investing a safer decision, and helping to improve well being around the globe.

6 Conclusions

We started this work by stating our motivation, and seeing in the literature that investors who have the conditions to better know the place where they allocate their money tend to take advantage from it. Using a 3-step cross-country asset allocation theoretical framework, we depart from the mean-variance investor portfolio choice joint with the ideas we address in the discussion to formulate three hypothesis.

The first is that under the assumption that a higher institutional quality lowers the country specific risk of investing in a given country, an increase of institutional quality, also increases the relative exposure of international investors to debt assets in that country. The second one states that this relative exposure is persistent over time and over controls for country specific characteristics, and year specific events. The third hypothesis is that this persistence reflects cultural, historical and language factors that undermine the long-term relationship between countries making contemporaneous shocks on institutional quality not relevant *per se*.

To test these hypotheses we used annual data on the investment from 78 countries in 208, through a period 10 years (2005-2014), retrieved from the International Monetary Fund databank and built an institutional quality score that preserves harmony between six institutional dimensions retrieved from the World Governance Indicators.

We then used regression analysis to test our conjectures, applying OLS estimation and Tobit estimation that corrects for the fact that 75% of the observations in our sample are zero-investment observations. Looking at the sign and magnitude of the estimates we could confirm 2 out of the 3 hypotheses and prove the last one wrong.

Regarding the first hypothesis, indeed institutional quality has a positive impact on the aggregate cross country debt portfolio investment exposure. Not only it enhances the chance that a country gets investment (out of 75% of zeros, we still get a positive coefficient), but also when controlled for country specific characteristics, we find evidence, that given that the investment is undertaken, higher levels of institutional quality in the investment destination

lead to a higher relative exposure, regardless of time-invariant country features, or any year effects.

The second hypothesis is also strongly confirmed by our results. In all the specifications, for both estimation types, we find evidence at the highest significance level that debt portfolio investment is highly persistent over time. This is puzzling when using aggregate data, since we need that all representative agents (a minority can deviate) in all analyzed countries during 10 years to behave in a persistent way. The past relative exposures highly explain present portfolio allocations, regardless of institutional quality, or country specific factors.

The last hypothesis, however, is rejected. After controlling for past values of relative exposure that reflect previous investment relationship between the same pair of countries, despite its much weaker magnitude, institutional quality is still positively related with investment, both in the investment decision, and given that investment is undertaken on how much of the wealth of a given country is invested.

Given that we assessed the robustness of our results, we can now postulate some policy implications. First, the idea that institutional quality matters cannot be out of the policy debate. Second, past investment records between two countries are important and so is institutional quality improvement. Hence, whatever a government can do both by creating good investment links with other countries and by investing in the improvement of institutions will likely end up with a bigger share of debt investment from other countries as an investment inflow in its domestic debt assets.

Further research can be devoted to this relationship between financial markets and institutional quality, either by replicating this work with other asset classes, or using finer econometric techniques. Also, new scores and measurement of institutional quality can be used to verify these results. Finally, a model for the optimal level of institutional quality in order to capture the optimal amount of investment in a cost-effective way can be appealing to design.

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Appendix 1 - Optimal Portfolio's Comparative Statics: The Two-Asset Case

We use the 2 asset case to analytically derive the studied hypothesis in this work. When solving for the optimal portfolio we get:

$$w^* = \frac{1}{g}V^{-1}(\bar{r} - r_f\mathbf{1})$$

We can then write, for the two-asset case:

$$\begin{pmatrix} w_1 \\ w_2 \end{pmatrix} = \frac{1}{g}\begin{pmatrix} a & c \\ c & b \end{pmatrix}^{-1}\begin{pmatrix} r_1 \\ r_2 \end{pmatrix}$$

Inverting the covariance matrix:

$$\begin{pmatrix} w_1 \\ w_2 \end{pmatrix} = \frac{\frac{1}{g}}{ab - c^2}\begin{pmatrix} b & -c \\ -c & a \end{pmatrix}\begin{pmatrix} r_1 \\ r_2 \end{pmatrix}$$

Hence, each of the weights can be written as:

$$\begin{cases} w_1 = \dfrac{\frac{1}{g}}{ab - c^2}(br_1 - cr_2) \\ w_2 = \dfrac{\frac{1}{g}}{ab - c^2}(-cr_1 + ar_2) \end{cases}$$

As we solely care about the allocation between the risky assets, it does not depend on the level of risk aversion. Only looking into the risky portfolio, we invest the following effective weights in each asset:

$$\begin{cases} e_1 = \dfrac{w_1}{w_1 + w_2} = \dfrac{br_1 - cr_2}{br_1 - cr_2 - cr_1 + ar_2} \\ e_2 = \dfrac{w_1}{w_1 + w_2} = \dfrac{-cr_1 + ar_2}{br_1 - cr_2 - cr_1 + ar_2} \end{cases}$$

The effect of an increase in the variance of the nth asset on the effective weight we assign to that asset is ambiguous. However, we see that the relative exposure (to the amount invested abroad) to the nth asset, regardless if with a short or long position decreases when the corresponding variance, the nth element in the diagonal of the covariance matrix increases:

$$\frac{\partial |e_1|}{\partial a} < 0 \text{ and } \frac{\partial |e_2|}{\partial b} < 0$$

Appendix 2 - List of Countries in the sample

The countries in the sample of study are described below:

Investment Sources: Argentina, Aruba, Australia, Austria, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Bermuda, Bolivia, Brazil, Bulgaria, Canada, Cayman Islands, Chile, China, Hong Kong, Macao, Colombia, Costa Rica, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Honduras, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Jersey, Kazakhstan, Korea, Kuwait, Latvia, Lebanon, Lithuania, Luxembourg, Malaysia, Malta, Mauritius, Mexico, Mongolia, Netherlands, Netherlands Antilles, New Zealand, Norway, Pakistan, Panama, Philippines, Poland, Portugal, Romania, Russian Federation, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom, United States, Uruguay, Vanuatu, Venezuela.

Investment Destinations: Afghanistan, Albania, Algeria, American Samoa, Andorra, Angola, Anguilla, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cabo Verde, Cayman Islands, Central African Republic, Chad, Chile, China, Hong Kong, Macao, Colombia, Comoros, Congo, Cook Islands, Costa Rica, Cote d'Ivoire, Croatia, Cuba, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Greenland, Grenada, Guam, Guatemala, Guiana, French, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jersey, Jordan, Kazakhstan, Kenya, Kiribati, North Korea, South Korea, Kuwait, Kyrgyz Republic, Lao People's Democratic Republic, Latvia, Lebanon, Lesotho, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Netherlands, Netherlands Antilles, New Zealand, Nicaragua, Niger, Nigeria, Niue, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, Reunion, Romania, Russian Federation, Rwanda, Samoa, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Slovak Republic, Slovenia, Solomon Islands, Somalia, South Africa, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Sudan, Suriname, Swaziland, Sweden, Switzerland, Syrian Arab Republic, Taiwan Province of China, Tajikistan, Thailand, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, West Bank and Gaza, Yemen, Zambia, Zimbabwe.