ISSN 1022-4057

Português

English

Español

Economic Analysis of Law Review

abde
Associação Brasileira de Direito e Economia

Universidade Católica de Brasília

Editora Universa

www.ealr.com.br

EALR, V. 5, nº 1, p. 46-68, Jan-Jun, 2014

Economic Analysis of Law Review

Choice with Clouded Concepts

Escolha com Conceitos Obscuros

Antônio José Maristrello Porto[1]
FGV-RIO

Antônio F. Galvão[2]
University of Winsconsin

RESUMO

Pesquisadores têm feito muitas tentativas para investigar a interação entre a qualidade e eficiência das instituições de um país e seu desempenho econômico. Dentro deste quadro, a relação entre as instituições jurídicas de um país e o seu sistema financeiro são enfatizados como fatores essenciais na criação e fortalecimento do crescimento econômico global. No entanto, a ligação entre as instituições jurídicas e os sistemas financeiros permanece controversa. Este artigo relata sobre uma pesquisa promovida com 1.362 participantes, que se inclinam para diferentes preferências de investimento conforme as instituições jurídicas e financeiras. Nossos resultados sugerem que o desempenho das instituições jurídicas de um país afeta a forma como os investidores estão dispostos a investir dinheiro no país e que pessoas de diferentes gêneros, idades, tradições políticas e experiências profissionais reagem de forma diferente a essas instituições.

Palavras-chave: Instituições Jurídicas, Sistemas Financeiros, Preferências de Investimento.
JEL: C83, G20, K10, O43

ABSTRACT

Researchers have made many attempts to investigate the interaction between the quality and efficiency of a country's institutions and its economic performance. Within this framework, the relationship between a country's legal institutions and its financial system are emphasized as essential factors in creating and enhancing overall economic growth. However, the link between the legal institutions and financial systems remains controversial. This paper reports on a survey administered to 1,362 participants, which targeted investment preferences under different legal and financial institutions. Our results suggest that the performance of a country's legal institutions affects how willing investors are to invest money in the country and that people of different gender, age, political tradition, and professional experience react differently to these institutions.

Keywords: Legal Institutions, Financial Systems, Investment Preferences.
R: 2/11/13 **A**: 9/6/14 **P**: 3/8/14

[1]E-mail: antonio.maristrello@fgv.br.
[2] E-mail: agalvao@uwm.edu.

1. Introduction

Over the past century, there has been an extensive debate surrounding the determinants of economic growth. Geography, international trade, and institutions are commonly attributed as the main determinants of economic growth. Although an intricate net of causality ties these determinants together, institutional quality has been widely accepted as an essential factor in creating and enhancing economic growth.[3] This article builds upon the theory of institutions, particularly to the link between legal institutions[4] and individual's financial decision.

The literature related to the legal and financial systems attempts to solve three main problems. First, whether one of the different types of financial systems better explains economic growth[5] Secondly, whether legal origin matters for economic growth. Finally, whether legal origins affect the development of a financial system.[6] This article neither endeavors to provide final answers to these problems nor does it aim to demonstrate conclusively whether the relationship between a legal and financial system affects economic growth. Rather, this article aims to make the modest claim of adding evidence to the growing body of literature empirical evidence of a link between legal institutions and individual's financial decision. We call attention to variables that may influence an individual financial decision and are related with legal institutions. To achieve this aim, this article expands the following research questions: how do people of different political traditions, gender, age, education, professional experience, and legal tradition respond to changes in legal institutions?

To answer our own research question, we gathered data by conducting surveys in Brazilian and American universities to 1,362 participants. The data set resulting from this survey evidences the correlation, or lack thereof, between a country's legal institution and its financial system. This data set especially allowed us to explore how the performance of a country's legal institutions affects the degree of investor willingness to invest in a particular country. This data set also offers evidence of how people with different cultural backgrounds react to changes in legal institutions. Specifically, it sheds more light on the debate of how people of different political and legal traditions, gender, age, education, and professional experience respond to changes in legal institutions.

The following three sections represent a diverse selection of the traditional literature on the politics of institutions and decisions and the empirical methods approach to analyzing the link between the legal institutions and the financial system. In Section I, we develop an empirical approach toward understanding the linkage of legal and financial institutions. In Section II, we debate our empirical findings. In Section III, we give some concluding remarks.

---

[3] These results indicate that an institution's quality is more important to economic growth than its geography and international trade. Dani Rodrik et al., "Institutions Rule: The Primacy of Institutions over Geography and Integration in Economic Development," *Journal of Economic Growth* 9 (2004): 135.

[4] In this paper, the "legal institutions" referenced signify a country's combined legal and judicial systems. These systems are referred to separately when appropriate.

[5] The two main types of financial systems are bank-based or market-based. In bank-based financial systems, such as those utilized in Germany and Japan, banks execute the majority of the country's financial functions. In a market-based financial system, such as those utilized in England and in the United States, securities markets perform the majority of the country's financial functions by acting to channel society's savings to firms, exert corporate control, and facilitate risk management. Asli Demiegüç-Kunt and Ross Levine, *Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development* (Cambridge: MIT Press, 2001), 81.

[6] Rafeal La Porta et al., "Law and Finance," *Journal of Political Economy* 106 (1998): 1113.
La Porta et al. developed the first and most discussed work related to whether legal origin matters for economic growth and whether it affects the development of the financial system.

2. Survey, Data, Method, Hypotheses, Results and Analysis

2.1.Survey

There are several definitions for the word "institutions" in the academic literature. The most common and accepted definition, formulated by North, is "[i]nstitutions are the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction".[7] Researchers have made different attempts to investigate the interaction between the quality and efficiency of various types of institutions in a country and its economic performance.[8] Institutions, like the legal and financial systems, have been incessantly investigated. Within this framework, emphasis has been placed on the relationship between the legal institutions and financial systems as essential factors in creating and enhancing overall economic growth in a particular country.[9] However, the link between the legal institutions and financial systems is still somewhat controversial. While some studies have shown a positive relationship between legal institutions and financial systems improvements, other studies have not demonstrated this association.

The following survey has two major goals. The first aims to offer more evidence to the relationship, if any, between a country's legal institutions and its financial system. Specifically, the data offered here shows that the performance of a country's legal institutions affects the willingness to invest money in that country. The second aim is to provide empirical evidence that people of different gender, age, political traditions, and professional experience react differently to legal institutions when making the decision to invest.

Subjects: This study surveys 1,362 participants, however, twenty-one additional subjects participated but were excluded because these participants did not provide their demographic information. Their average age was 22.30 years; the youngest was 17 years old and the oldest 62 years old. A total of 619 subjects were from the United States and 722 from Brazil.

Survey Design: The survey instrument collected the following demographic details from the subjects: their age and gender; the country where the survey was administered; the academic program in which the subject was enrolled; the year of the subject's school program; and any professional, legal, or business experience.

The survey instrument placed the participants in the position of an employee in a company that offers consumers credit through the credit card, housing rental, car loans and general lending markets. The subjects were informed that the company wanted to expand its operations in a new country (country A or country B) with the aim of maximizing profits. They were then asked to recommend which of the two countries the theoretical company should expand its retail operations. The subjects did not know the identity either country A or B. The survey instrument provided the participants with information regarding the bureaucracy, legal institutions, and the financial system of each of the countries.[10]

Three different versions of the survey were randomly distributed. Each subject answered only one version. The following are the three variations of the survey:

---

[7] Douglas C. North, *Institutions, Institutional Change and Economic Performance: The Political Economy of Institutions and Decisions* (Cambridge University Press, 1990), 3.

[8] Daron Acemoglu et al., "Institutions as the Fundamental Cause of Long-Run Growth," *National Bureau of Economic Research* NBER Working Paper 10481 (2004).

[9] La Porta, "Law and Finance".

[10] *See supra* Appendix 1.

First version: All the information provided for countries A and B was statistically characteristic of by the bureaucratic, legal, and financial institutions of the United States and Brazil. Country A had the United States' statistical characteristics, while country B had the Brazilian statistical characteristics.

Second version: All the information provided for countries A and B was statistically characteristic of the bureaucratic, legal, and financial institutions of the United States and Brazil. However, the quantitative measures relating to the quality of the legal institutions of country B were improved by 50%. Thus, country A had the United States' statistical characteristics, while country B had the Brazilian statistical characteristics with a 50% improvement in the legal institutions.

Third version: All the information provided for countries A and B was statistically characteristic of the bureaucratic, legal, and financial institutions of both the United States and Brazil. However, the quantitative measures related to the quality of the legal institutions in country A were reduced by 50%. Thus, country A had the United States' statistical characteristic with a 50% reduction in the quality of the legal institutions, while country B had the Brazilian statistical characteristics.

The following are the categories and sources of each country's information, as provided to the study participants:

Bureaucratic and Technical information:

a) Time involved in launching a commercial or industrial firm with up to 50 employees. (World Bank, 2007)
b) Inflation rate. Brazil (Banco Central do Brasil). United States (The U.S. Misery Index, 2007)
c) Developed/Developing Country (United Nations, 2007)[11]
d) Legal System Origin: Common Law or Civil Law (NationMaster.com, 2005)[12]

Legal Institutions information

a) Time to contract enforcement by the evolution of a sale of goods from the moment the plaintiff files the lawsuit until actual payment. (World Bank, 2007).
b) Time spent by litigants and courts to collect a bounced check.[13]
c) Time spent by litigants and courts to evict a tenant for non-payment of rent.[14]
d) World Bank index of lending and bankruptcy laws, from 0 "least friendly" to lenders to 10 "most friendly to lenders". (World Bank, 2007).

Financial System information

a) Interest rates for Mortgage interest. Brazil (Banco Central do Brasil). United States (HSH Associates Financial Publishers, 2007).
b) Interest rates for Personal Credit. Brazil (Banco Central do Brasil, 2007). United States (The Federal Reserve Board, 2007).
c) Interest rates for Car loans. Brazil (Banco Central do Brasil, 2007). United States (The Federal Reserve Board, 2007).

[11] http://unstats.un.org/unsd/methods/m49/m49regin.htm - developed
[12] http://www.nationmaster.com/graph/gov_leg_ori-government-legal-origin
[13] La Porta, "Law and Finance".
[14] Ibid.

d) Interest rates for Credit Card. Brazil (Banco do Brasil, 2007). United States (The Federal Reserve Board, 2007).

Procedures: Subjects were recruited from six different universities, one in the United States of America and five in Brazil, respectively. These universities include:

a) The College of Law and Department of Economics of the University of Illinois in Champaign, Illinois;
b) The College of Law, Department of Economics, Accounting, and Business of the Universidade de São Paulo in Ribeirão Preto;
c) The College of Law of the Universidade de São Paulo in São Paulo;
d) The College of Law of the Fundação de Ensino Octávio Bastos;
e) The College of Law of the Fundação Getulio Vargas in São Paulo;
f) The College of Law, Department of Account and Business of the UNI-FACEF Centro Universitário de Franca.

Versions 1, 2, and 3 of the survey instrument were presented at random to study participants in classrooms at the end of a regularly scheduled class. All students in the selected classes were asked to participate in the survey and given the opportunity. Responding to the versions of the survey took approximately 12-17 minutes and each student answered only one version of the survey.

Table 1: Variations of the Survey's Versions

	Version_1 (original data)		**Version_2 (Legal Ins. Country B 50% better)**		**Version_3 (Legal Ins. Country A 50% worse)**	
	Country		**Country**		**Country**	
Information	**A**	**B**	**A**	**B**	**A**	**B**
Time spent by litigants and courts to evict a tenant for non-payment of rent (in days).	49	120	49	60	74	120
Time to contract enforcement from the moment the plaintiff files the lawsuit until actual payment (in days).	300	616	300	308	450	616
Time spent by litigants and courts to collect a bounced check (in days).	54	180	54	90	81	180
Degree to which collateral and bankruptcy laws facilitate lending (index score).	7	2	7	3	3.5	2

Table 1 presents the variations in legal institutions presented in each survey version. Version 1 presents original statistics that are characteristic of legal institutions in the United States (A) and Brazil (B). Version 2 presents a 50% improvements in the original statistical characteristics of legal institutions in country B. Version 3 presents a 50% deterioration in the original statistical characteristic of legal institutions in country A.

2.2.Data

Table 2 provides an overview of the data resulting from this survey. The descriptive statistics describes each subject's gender, country of origin, professional experience, and school program.

Table 2: Descriptive Data

		United States		Brazil		
Gender		**Female**	**Male**	**Female**	**Male**	**Total**
		258	361	306	416	1341
School Program	**Law**	105	137	134	144	520
	Undergrad	152	222	112	199	685
	MBA	1	2	60	73	136
Professional Experience	**Legal**	66	85	39	65	255
	Business	71	129	87	148	435
	None	125	166	160	200	651
Versions	**1**	94	111	103	144	452
	2	77	124	114	137	452
	3	87	126	89	135	437

2.3.Method

The following methodologies were utilized to analyze the collected survey data.

Method 1: Table 3 shows some descriptive statistics and provides an overview of how people reacted differently to changes in the legal institutions of the different versions of the survey instrument. Table 3 basically tells us how many female and male subjects in the United States and Brazil chose country A or B.

Method 2: Next, empirical evidence is provided that establishes that the performance of a country's legal institutions affects people's willingness to invest their money in that country. We use the data set developed from the survey described in the previous sections to estimate two logit type models to analyze the data:[15]

Equation (1):

$$P(y=1|x)=\alpha_1+\alpha_2 YofE+\alpha_3 LExp+\alpha_4 BExp+\alpha_5 Age+\alpha_6 Country+\alpha_7 Gender+\alpha_8 D\_Q2+\alpha_9 D\_Q3+u$$

[15] Jeffrey M. Wooldridge explains that a linear probability model "is simply an application of the multiple regression model to a binary dependent variable. A binary dependent variable is an example of a limited dependent variable (LDV). An LDV is broadly defined as a dependent variable whose range of values is substantively restricted. A binary variable takes on only two values, zero and one." Jeffrey M. Wooldridge, *Introductory Econometrics, a Modern Approach* (Independence, KY: South-Western Cengage Learning, 2009), 454. R. Lyman Ott and Michael Longnecker extend this explanation by stating that "[i]n may research studies, the response variable may be represented as one of two possible values. Thus, the response variable is a binary random variable taking on the values) and 1. For example . . . a bank wants to determine which customers are most likely to repay their loan. Thus, they want to record a number of independent variables that describe that customers are more likely to repay their loan. Thus, they want to record a number of independent variables that describe the customer's reliability and then determine whether these variables are related to the binary variable, y = 1 if the customer repays the loan and y = 0 if the customer fails to repay the loan." R. Lyman Ott and Michael Longnecker, *An Introduction to Statistical Methods and Data Analysis* (Independence, KY: Cengage Learning, 2010).

Equation (2):

$$P(y=1|x)=\alpha_1+\alpha_2 YofE+\alpha_3 LExp+\alpha_4 BExp+\alpha_5 Age+\alpha_6 Country+\alpha_7 Gender+u$$

Where the dependent variable *y* is *Invest* (Invest in country 1 = Brazil or investing in country 0 = U.S.) there are only two possible values: to invest money in country B or not invest money in country B. The independent variable *YofE* represents the subject's years of education. The independent variable *LExp* is Legal Experience and indicates how many months of legal experience a subject has had. The independent variable *BExp* is Business Experience and indicates the subject's months of business experience**.** The independent variable *Age* indicates the subject's age. The independent variable *Country* is a binary indicator where 1 indicates that the Country of the subject was the United States and 0 indicates that the Country of the subject was Brazil. The independent variable *Gender* is also a binary indicator where 1 indicates that the subject was a male and 0 indicates that the subject was a female. The independent variable *D_Q2* is a dummy variable created to control for the differences between version 2 and version 1. The independent variable *D_Q3* is also a dummy variable created to control for the differences between version 3 and version 1. The last term *u* is simply an independent and identically distributed error.

According to our hypotheses, factors such as years of education, legal and business experience, age, political tradition and gender may affect whether people decide to invest their money in country B. Because our outcome variable is binary (participants chose to either invest money in country B or not), we used a logit model to analyze the data.[16]

We use the first logit model represented by equation (1) to analyze whether the treatment (i.e. the different versions of the survey) had a statistically meaningful effect on the likelihood that a subject would choose country A or country B. Thus, the results from equation (1) may offer evidence of the correlation, or lack thereof, between a country's legal institutions and its financial system. [17] We expected *D_Q2* and *D_Q3* to be significant, indicating that subjects were sensible to the quality of a country's legal institutions.

Method 3: In addition to exploring whether changes in a country's legal institutions are related to the decision to invest in a particular country, method 3 also provides empirical evidence that people of different gender, age, political traditions, and professional experience make different choice regarding their investment decisions. Using only survey subjects' responses from Version 1, we ran a logit regression with equation (2). We compared the predicted probabilities of people of different gender, age, political traditions, and professional experience to invest money in country B

[16] Another important made is the choice between logit and probit. We ran exercises using both models and they are not qualitatively different for our analysis. "Neither the logit model nor the probit model are linear, which makes things difficult. To make the model linear, a transformation is done on the dependent variable. In logit regression, the transformation is the logit function which is the natural log of the odds. In probit models, the function used is the inverse of the standard normal cumulative distribution (a.k.a. a z-score). In reality, this difference isn't important: both transformations are equally good at linearizing the model; which one you use is a matter of personal preference. Both models need to have diagnostics done afterwards to check that the assumptions of the model have not been violated. Both methods use maximum likelihood, and so require more cases than a similar OLS model. Unlike logit models, you don't get odds ratios with probit models. In general, the logit coefficients are larger than the probit coefficients by a factor of 1.7. However, this rule often does not apply when an independent variable has a high standard error (lots of variability)." UCLA, *Stata Data Analysis Examples: Probit Regression*, UCLA Academic Technology Services (2007).

[17] STATA 10 was the statistical package used for managing, analyzing, and graphing data.

(B = Brazil = 1) or not invest money in country B.[18] Results from our comparing predicted probabilities show how these personal characteristics influence investment decision.

2.4.Survey's Results and Analysis

2.4.1. Results and Analysis of Method 1

The survey instrument asked each subject to decide whether to invest money either in country A or country B. Subjects did not know the identity of either country. The survey instrument, however, used the actual statistical characteristics of bureaucratic, legal, and financial United States' institutions for country A and Brazil's actual institutions for country B. Based on the participants' responses, we created the variable Invest. Table 3 presents the results of how people in the United States and Brazil decided to invest in the different versions (1, 2, and 3) of the instrument survey. It describes how people of different gender and different country decided to invest.

Table 3: Decision to Invest, Gender, Country and Versions of Survey Cross Tabulation

		Investment (frequency)				Total
		Country A		Country B		
		Female	Male	Female	Male	
Versions of survey Instrument applied in the USA	**1**	69	63	25	48	205
	2	39	47	38	77	201
	3	47	48	40	78	213
Versions of survey Instrument applied in Brazil	**1**	52	57	51	87	247
	2	42	29	72	108	251
	3	42	42	47	93	224
Total		291	286	273	491	1.341

		Investment (percent)		Total
		Country A	Country B	
Versions of survey Instrument applied in the USA	**1**	64	36	100
	2	43	57	100
	3	45	55	100
Versions of survey Instrument applied in Brazil	**1**	44	56	100
	2	28	72	100
	3	37	63	100

[18] All the information provided in Version 1 for country A and B constitutes real data for the United States and Brazil collected from different institutions (World Bank, Federal Reserve Board, Central Bank of Brazil, etc.), where A represents the United States' data and B the data for Brazil.

The descriptive statistics in Table 3 evidence a shift in the amount of subjects that chose to invest in country A or B in the different versions of the survey instrument.[19] The number of subjects that chose to invest in country B is proportionality larger in versions 2 and 3 than in version 1. This shift indicates that the treatment effectively altered the subject's decision to invest and was therefore a valid experimental design. The significance of the treatment in the decision of the subjects is mathematically tested in method 2.

2.4.2. Results and Analysis of Method 2

Table 4 compiles all of the survey data to describe the results of Equation (1) and presents logistic regression results. All the data used to construct the variables is compiled from the survey described above. The dependable variable is Investment that is the probability of investment in Brazil. The independent variables are Years of Education, Legal Experience, Business Experience, Age, Country, Gender, Dummy Questionnaire version 2 and Dummy Questionnaire version 3.

Table 4: Treatment Effects

Independent Variable	Dependent Variable
	Probability of Investment in Brazil
YofEdu	1.11
Legal_Experience	-0.75
Business_Experience	0.42
Age	1.51
Country	5.00**
Gender	5.35**
D_Q2	5.66**
D_Q3	3.95**
Constant	-3.28**
Model Statistics	
Observations	1326
Pseudo R^2	0.0528

*significant at 5%; ** significant at 1%

The coefficient of Dummy Questionnaire version 2 (D_Q2) and Dummy Questionnaire version 3 (D_Q3) that are statistically significant and positives tell us that the treatments are "meaningful interventions" and that people invest more in country 1 (Brazil) after the changes in the legal institutions. The dummy coefficients also evidence that improvements in the Brazilian legal institutions had a stronger effect on subjects' decisions to invest than that of the deterioration of the United States' legal institutions did. One explanation for the difference in the effects of the survey's versions 2 and 3 may be that the difference in the quantitative measures related to the quality of the legal institutions of county A and B is smaller in version 2 than in version 3. For example, the information on the time spent by litigants and courts to evict a tenant for non-payment of rent (in days), in the survey's version 1 the difference between country A and B is 71, in version 2 is 11, and in version 3 is 46.

[19] *See supra* Part III, B.

The coefficient of a Country variable that is statistically significant tells us that the survey's subjects from different countries (Brazil and United States) make different decisions when deciding how to invest.

The coefficient of the Gender variable, which is statistically significant, tells us that the survey's subjects of different genders made different decisions when deciding how to invest. Table 4 does not provide information for how individual variables interact with the institutional climate represented by the treatment (i.e. it does not show how years of education affects participant investment decisions).

To analyze the effect of changes in the legal institutions more carefully, we use a model that explicitly quantifies the differences between the survey instrument versions. This model shows how individual variables moderate the decision to invest as we move from one treatment to another (or as we compare one treatment to another). We begin by showing and analyzing the effect of treatment 2 (Version 2) and treatment 3 (Version 3) on the likelihood that a subject would choose country A or B., in the following described steps.

Step A: The logistic regressions were run for the survey versions 1, 2 and 3. Table 5 presents the logistic regression results.

Table 5: Logistic Regression Results of Versions 1, 2 and 3

	Dependent Variable		
	Version 1 Invest	**Version 2 Invest**	**Version 3 Invest**
Years of Education	1.27	0.74	-0.14
Legal Experience	-0.36	0.57	-1.38
Business Experience	-0.31	0.6	-0.18
Age	0.04	2.32*	0.01
Country	4.13**	2.92**	1.58
Gender	3.01**	2.92**	3.40**
Constant	-2.04*	-2.19*	-0.04
Model Statistics			
Observations	447	447	432
Pseudo R^{220}	0.0460	0.0558	0.0270

* significant at 5%; ** significant at 1%

All the data used to construct the variables in Table 5 is from the survey described above. The dependable variable is Investment, which is the probability of investment in Brazil. The independent variables are Years of Education, Legal Experience, Business Experience, Age, Country and Gender.

The results must be interpreted as it follows. In version one, one more year in education raises 1.27 percentage points the probability of a person to invest in Brazil rather than US, while the gender of the subject raises in 3 percentage points the probability of the occurrence of the same variation. On the opposite side, legal experience decreases the probability to invest in Brazil in 0.36 percentage points in version one of the survey, The variable constant must be read as the value we would predict if all others parameters were equal to zero.

[20] As one may notice, R^2 is not robust in this case, which means that we may not precisely estimate the dependable variable with the parameters we have. However, that fact does not invalidate the results. Small R-square means that the error variance is bigger than the one from the dependable variable. It creates heteroscedasticity, which does not influence the quality of the analysis of the parameters in logistic models.

It is interesting to notice the differences between the different versions of the survey. The effect of Legal and Business experience, for instance, turn from negative to positive values when the new version tells legal country parameters were boost in 50%. On the other hand, when legal institutions of country A get 50% worse, from version 1 to version 3, one may notice that despite gender and business, all effects were reduced – more negative.

Step B: Using the results of the logistic regression of version 1 and version 2, we quantified the differences between the versions of the survey instrument. The survey's subject variables – Years of Education, Legal Experience, Business Experience, and Age – moderate the decision to invest as we compare one treatment to another.

Step C: In this step we calculated the difference between questionnaire version 2 and version 1 $P_{Q2}(I=1|x)-P_{Q1}(I=1|x)$ of the predicted probabilities of investment in country B for some specific given values of Years of Education, Legal Experience, Business Experience, and Age. In other words, for the given values, all others remaining constant, we compare the results from versions 1 and 2 of the questionnaire. This method is called in literature *difference in probabilities*.

The following figures visually demonstrate the difference in probabilities in function of a specific variable when all other variables are constant, for both male and female respondents. The results enabled us to infer the following conclusions.

Figure 1: Treatment Q_2 and Q_1/ Years of Education

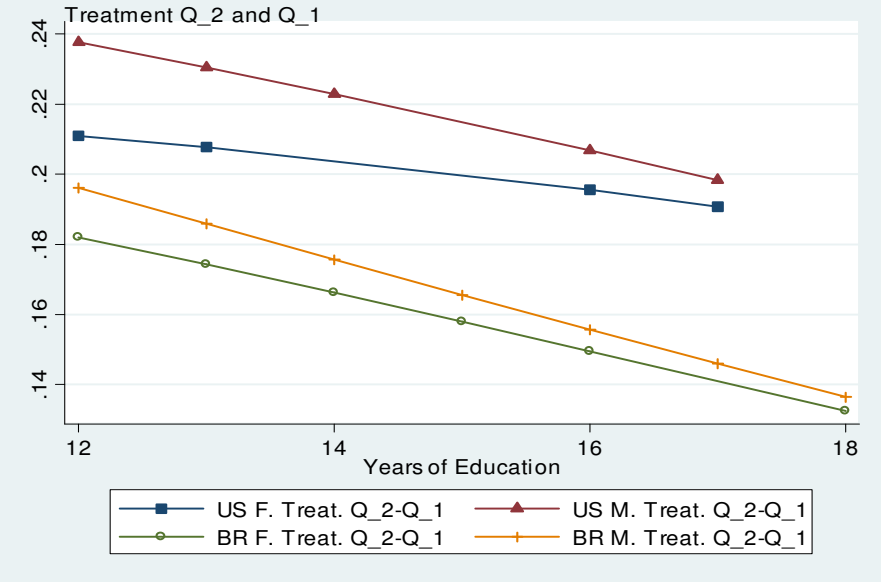


Figure 1 illustrates the difference in probabilities $P_{Q2}(I=1|x)-P_{Q1}(I=1|x)$ for some specific given values of Years of Education when the legal institution of country B (Brazil) improves. Figure 1 allows us to make the following inferences:

First, the difference in probability is positive because the values are above zero ($P_{Q2}-P_{Q1}>0$). This positive difference indicates that for any level of education people invest more in country B when we improve the legal institutions of country B.

Second, the difference in probability is decreasing with the participant's years of education. That is, the probability of investing in country B is smaller for people with more years of education, so long as all other factors remain constant.

Third, when comparing the effect of the treatment (i.e. improvements in the legal institutions of country B in Questionnaire version 2) for subjects of different countries with specific given values of years of education, we observe that the difference in probability of investment of United States' subjects is bigger than the difference in probability of investment of the Brazilian subjects. This difference in probabilities of investment infers that the effect of treatment was greater for U.S. study participants than for the Brazilian subjects for any given values of years of education, so long as all other factors remain constant.

Figure 2: Treatment Q_2 and Q_1/ Legal Experience

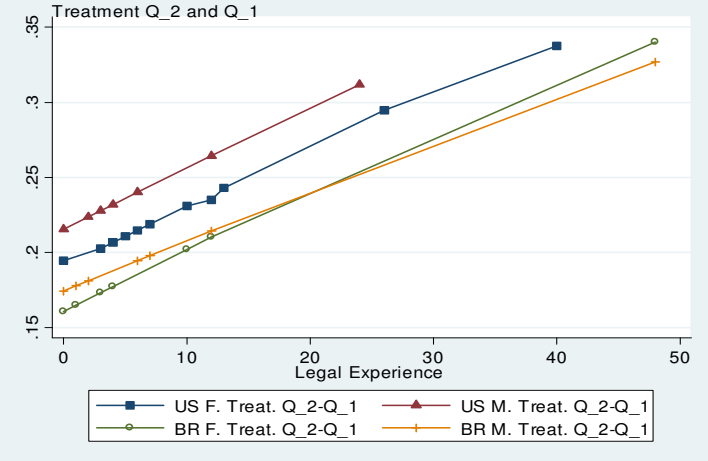


Figure 3: Treatment Q_2 and Q_1/ Business Experience

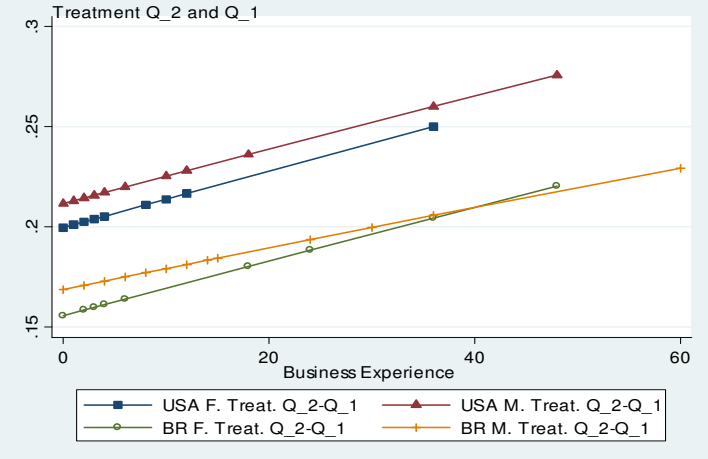
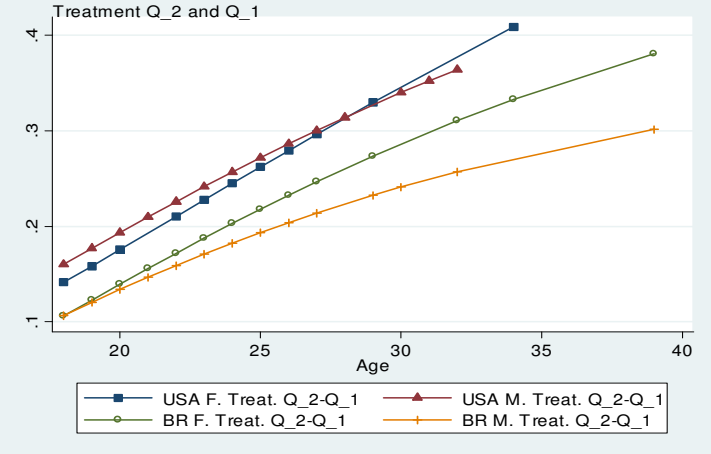


Figure 4: Treatment Q_2 and Q_1/ Age



The examination of figures 2, 3, and 4 (above) may be conducted in the same way that the examination of figure 1 is conducted. One can visualize how the survey participant variables moderated their decision to invest in country B as we move from version 1 to version 2 of the survey's instrument.

Step D: All of the associations completed between version 2 and 1 are repeated, but we now use versions 3 and 1. Using the results from the logistic regression of version 1 and version 3, we predicted the probabilities of investment in country B for specific given values of Years of Education, Legal Experience, Business Experience and Age. We calculated the difference between version 3 and version 1 $P_{Q3}(I=1|x)-P_{Q1}(I=1|x)$ of the predicted probabilities of investment in country B for some specific given values of Years of Education, Legal Experience, Business Experience and Age. The results lead to the following inferences.

Figure 5: Treatment Q_3 and Q_1/ Years of Education

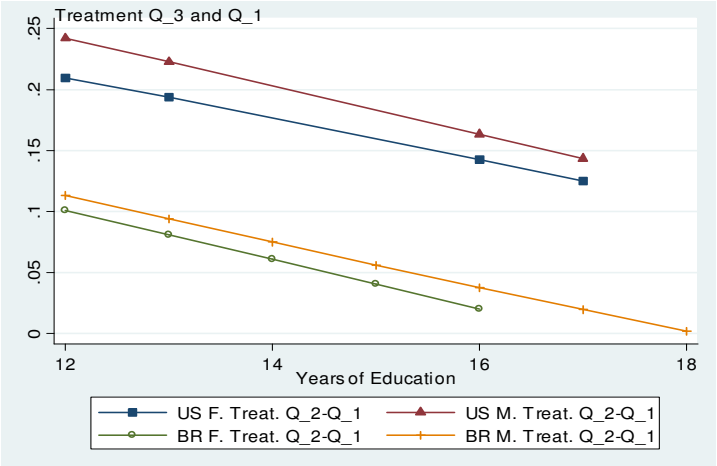


Figure 5 illustrates the difference in probabilities $P_{Q3}(I=1|x)-P_{Q1}(I=1|x)$ for some specific given values of Years of Education when the quality of the legal institution of country A (U.S.) deteriorates. Figure 5 allows us to make the following inferences:

First, the difference in probability is positive because the values are above zero $(P_{Q3} - P_{Q1} > 0)$. The positive difference indicates that for any level of years of education people invest more in country B when the quality of the legal institution of country A is reduced.

Second, the difference in probability is decreasing with the years of education; that is, the probability of investing in country B is smaller for people with more years of education, so long as all other factors remain constant.

Third, when comparing the effect of the treatment (i.e. deterioration of the legal institutions of country A in Questionnaire version 3) for subjects of different countries with specific given values of years of education, it can be observed that the difference in probability of investment of the United States participants is bigger than the difference in probability of investment of Brazil's participants. This difference in probabilities of investment leads us to infer that the effect of treatment was larger for United States' subjects than Brazilian subjects for any given values of years of education, so long as all other factors remain constant.

The examination of figures 6, 7, and 8 may be conducted in the same way that the examination of figure 5 was conducted. One can visualize how the survey participant variables moderated their decision to invest in country B as these differences are reflected when analyzing version 1 to version 3 of the survey instrument.

Figure 6: Treatment Q_3 and Q_1/ Legal Experience

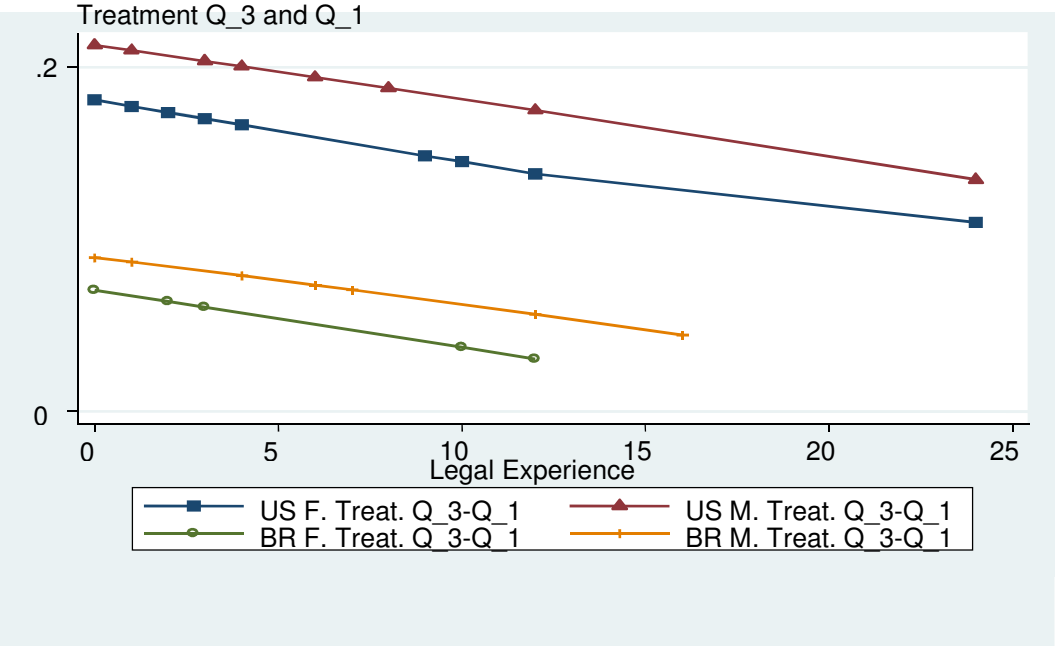


Figure 7: Treatment Q_3 and Q_1/ Business Experience

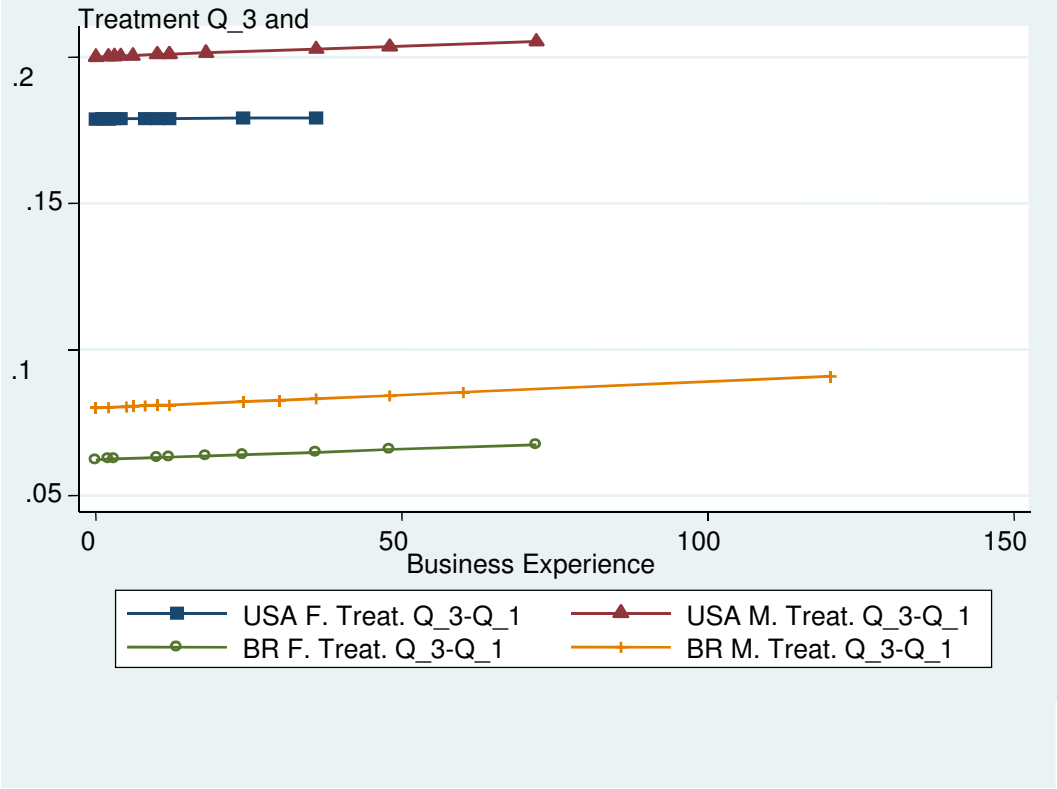
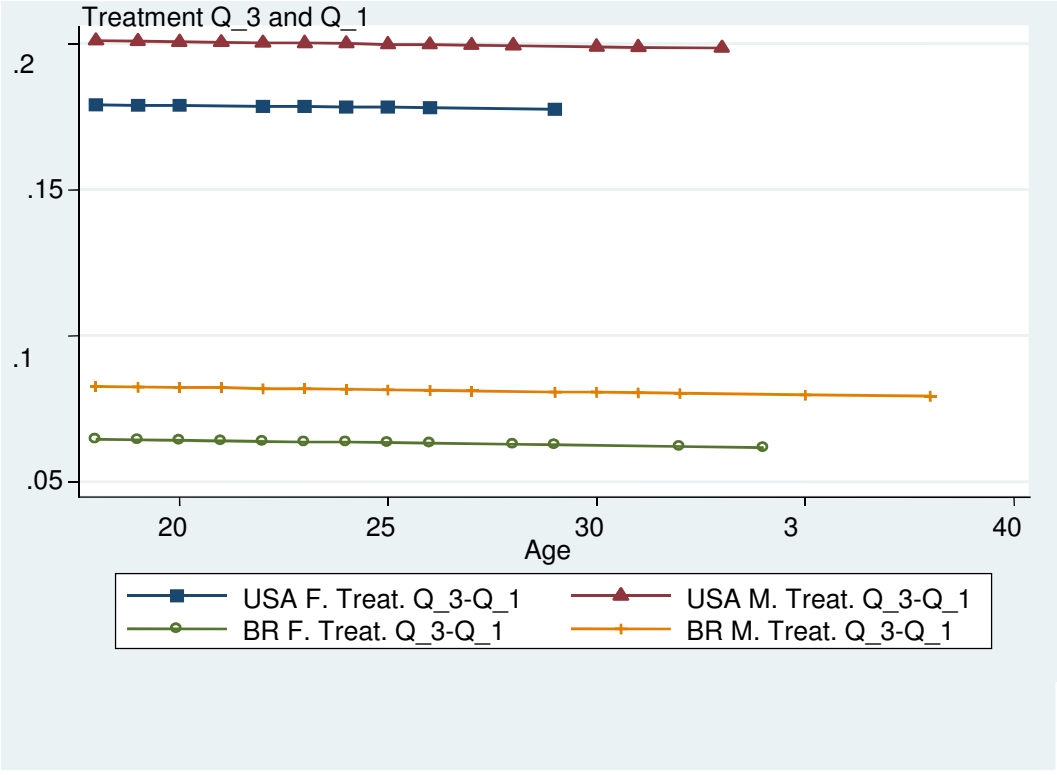


Figure 8: Treatment Q_3 and Q_1/ Age



2.4.3. Results and Analysis of Method 3:

Using the results of the logistic regression from version 1, we predicted the probabilities of investment in country B for specific given values of Years of Education, Legal Experience, Business Experience, and Age.

Figure 9: Quest_1/ Years of Education

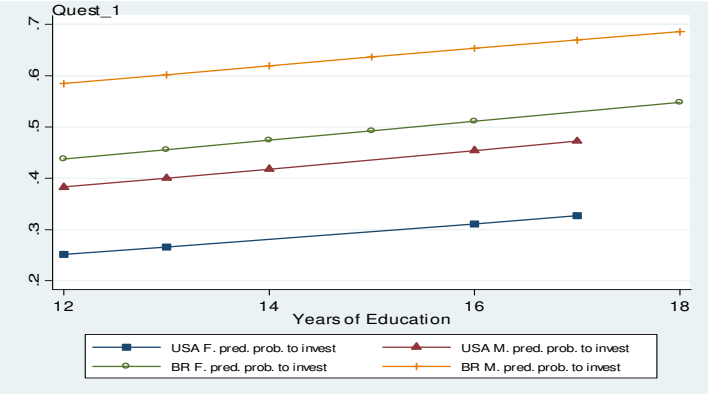


Figure 9 illustrates the probabilities of investment in country B $\left(P_{QI}\left(I=1|x\right)\right)$ for some specific given values of Years of Education. Figure 9 allows us to make the following inferences:

First, the probability of investment in country B is increasing with the years of education; that is, the probability of investing in country B is greater for people with more years of education, so long as all other factors remain constant.

Second, when comparing female and male participants in the same country, the probability of investment in country B is greater for males than females, independently of the years of education, so long as all other factors remain constant.

Third, when comparing Americans and Brazilians, the probability of investment in country B is greater for Brazilians than for Americans, independently of the years of education, so long as all other factors remain constant.

Figure 10: Quest_1/ Legal Experience

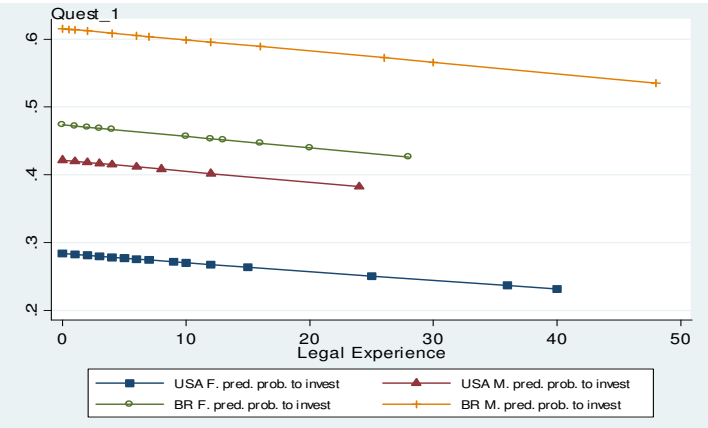


Figure 11: Quest_1/ Business Experience

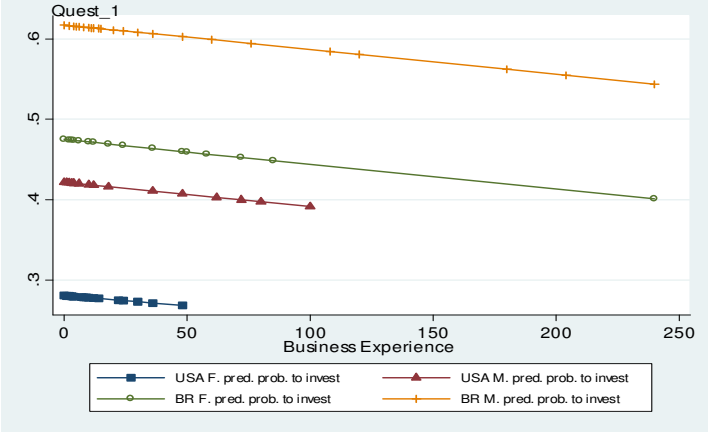
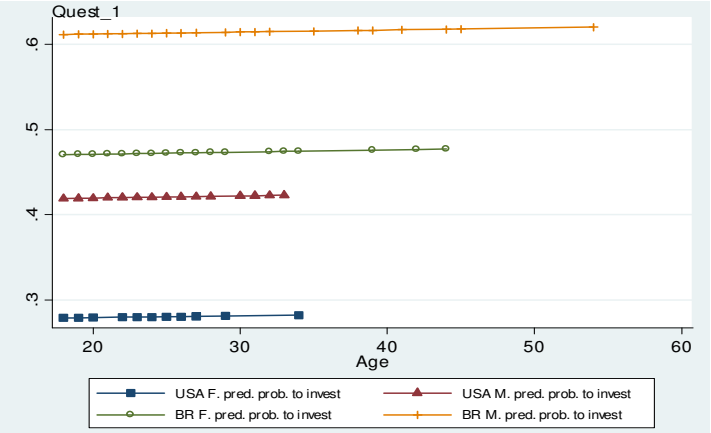


Figure 12: Quest_1/ Age



The examination of figures 10, 11, and 12 may be conducted in the same way that the examination of figure 9 was conducted. By examining these figures in the same manner this study provides empirical evidence that people of different gender, age, political traditions, and professional experience make different investment decisions.

3. Debating the Empirical Findings

How do people of different political and legal traditions, gender, age, education, and professional experience respond to changes in legal institutions?[21] – we used the results from section III, method 2 (steps A, B, C, and D) and method 3. These results suggested that people of different education, legal experience, business experience, political tradition and gender make different decisions when determining how to invest. In order to confront these results with the literature we assume that the survey participants can be inserted into the concept of a *rational economic person*.[22]

[21] *See supra* Introduction.

[22] "This hypothetical being is an ideally rational agent whose choices always are the most likely to maximize his personal profit. By appealing to a hypothetical society of rational economic men economists can derive laws of supply and demand and other important principles of economic theory." Michael D. Resnik, *Choices: An Introduction to Decision Theory* (Minneapolis: University of Minnesota Press, 1987), 4.

According to the rational economic person concept, profit maximization should guide the choices of the survey subjects. We additionally assumed that survey subjects' profits were a function of the maximization of company profits;[23] so it follows that subjects' investment decisions were made in order to maximize both company and individual profits. When confronting the result in method 2 (steps A, B, C, and D) and method 3 of the survey – where subjects of different education, legal experience, business experience, political tradition and gender differently decide how to invest – with the concept of a rational economic person, it is notable that these results and the concept of a rational economic person do not match.

The assumption that the survey's subjects are rational economic men allows the inference that a survey's subject is hypothetically an "ideally rational agent whose choices always are the most likely to maximize his personal profit."[24] As a result, subjects of different education, legal and business experience, political tradition and gender do not make different decisions when deciding how to invest, since profit maximization is theoretically their only goal. Therefore, the survey's subjects in method 2 (steps A, B, C, and D) and method 3 should decide how to invest in the same way and with essentially identical results. However, the results of this survey results do not allow us to make this assertion.

We could try to explain these differences in investment choices by saying that the concept of a rational economic person is not a good descriptive model, or that profit maximization is not the only goal for all individuals, or that subjects miscalculate their decisions. This would imply that the concept of a rational economic person is not a well-formulated concept. But we will not use these arguments to explain the different investment decisions of subjects from different education, legal and business experience, political tradition, and gender. We argue that the differences in subjects' investment choices are a matter of institutions – both formal and informal – combined with the subjects' economic behavior, which is a flaw on the rational economic person concept.

Our arguments begin by separating the gender variable from the rest of the other variables. We will analyze each gender separately later at the end of this topic. This separation is necessary because the explanation for differences in investment choice related to subjects' gender and is better explained by the psychological field than by differences in the institutional framework in which the economic subject is embedded. The differences in the investment decisions of subjects of different education, legal and business experience, and political tradition are better explained by the institutional framework differences in which subjects are embedded as well as by differences in the behavioral economics of subjects.

To begin our analysis we call attention to differences in the place that subjects are inserted and in their experience gathering.[25] Subjects' investment choice is directly related to their institutional framework and economic behavior, and those factors are, in turn, connected to where the subjects reside and their individual experiences.

The difference in the willingness of the survey's subjects from different political traditions – subjects from the United States and Brazil – to invest may have been caused by differences in the institutional framework of each political tradition. American subjects made their decision to invest differently from the Brazilian subjects. One explanation for this difference in investment choice is that subjects from Brazil may feel more comfortable investing in a hypothetical country that is more closely related to the real world that they live.

[23] It is the same assumption that we made in the last topic – the bias for non-remuneration topic.

[24] Resnik, "Introduction to Decision Theory".

[25] A subject's experience, in our analysis, is a function of the combined time and training, which in turn is influenced by both formal and informal institutions.

The "inefficiency" of the legal institutions of country B (Brazil) may not have been a significant problem to Brazilian subjects when compared to the opportunity of profit provided by country B. On the other hand, the survey's subjects from the United States may have deep concerns regarding the insecurity of legal institutions in country B. Although the profit in country B could be bigger than in country A, subjects appear to have preferred to invest in a hypothetical country that was more closely related to the way institutions operate in their country of origin.

Another explanation for this difference in investment choice may be that subjects from the United States and Brazil made different interpretations of the information provided to them by the survey instrument. For example, the information that the participants received through the survey instrument was interpreted differently by subjects that had divergent political traditions. Each subject's decision to invest in country A or B was made not only on the information provided by the survey instrument but also by the influence that subjects differently felt from the formal and informal institutions with which they were familiar.

Although the participants were tasked with attempting to maximize their profit – the concept of *rational economic men* – the way they choose was different, and this difference is a result of the each subject's institutional framework, which in turn influenced their economic behavior. In summary, the investment choices of subjects from different political traditions were influenced by concepts from their own society.[26]

Another factor that influences investment choice, not only from subjects of different political traditions but also from subjects with divergent educational background, legal experience, and business experience, is explained by the uncertainties involved in human interaction.

For North, "uncertainties arise as a consequence of both the complexity of the problems to be solved and the problem-solving software possessed by the individual".[27] The "problem-solving software" of this study's participants varied according to their political traditions, education, legal and business experience and, as a result, the solutions to the problem presented to them were different. These variables influenced the subjects' mental capacities to process, organize, and utilize the information given to them.

The computational limitations of the surveys' subjects were determined by the differences in the variables described.[28] A subject's investment choice was influenced not only by the formal rules – rules supplied by the survey instrument for each country – but also by the informal constraints and personal problem-solving capacity embodied in their level of education, legal and business experience, and political tradition.[29] The formal information supplied by the survey instrument was only part of the information used by the survey's subjects on the process of investment choice; the formal information was complemented by each subject's mental construction, which in turn is influenced by the variables discussed and can produce many different solutions.

The survey instrument supplied formal information that reflects the functioning of the formal institutions of country A and B. Subjects made their investment choices by mixing the formal information supplied with the informal information they had accumulated in their lives. The differences in investment choice may be the result of the differences in the informal information accumu-

[26] For further explanation of how people are influenced by concepts from their own societies, *see* David M. Trubek, "Toward a Social Theory of Law: An Essay on the Study of Law and Development," *The Yale Law Journal* 82.1 (1972): 1-50.

[27] North, "Institutions".

[28] For more information on how people process information differently, *see* North, "Institutions"; Douglas C. North, *Understanding the process of economic change* (Princeton: Princeton University Press, 2005).

[29] North explains that this type of informal constraint is impervious to formal changes. North, "Institutions".

lated by each subject combined with the formal information supplied by the survey instrument, and therefore not only as a result of the formal information supplied. The ability to process the formal information was directly connected to the informal information that each subject had stored – the participant's individual experience.

Formal institutions may have different outcomes because of informal constraints; the informal constrains of the survey participants were the heritage of their different level of education, legal and business experience, and political tradition. The way the minds of the survey's subjects processed the information supplied by the survey instrument depended upon the individual subjects' ability to solve the problem.

This debate suggests that changes in formal institutions – such as legal institutions – need to be made not only looking for the experience of foreign countries but also to the experience of the individuals that will use the new institutional framework. A country that wants to provide a better system of property rights or contract enforcement may look for how foreign countries have structured their institutions and use it as a start point to formulate its own system. However, it is rare for a country to succeed if it simply copies foreign institutions without adapt them to the copying country's culture. Analyzing only formal institutions may give us an insufficient and sometimes erroneous notion regarding the link between formal institutions and their performance.[30]

The success of the new institutional framework is the combined result of transplanting formal institutions and the informal rules provided by the host country's informal institutions. The investment choices of the study's participants with different education, legal and business experience, and political tradition evidenced that they were clouded by the concepts inherited from each of these variables, or a choice *with clouded concepts*.

The difference in the willingness to invest of evidenced by survey subjects of different genders may have psychological causes. The psychological literature suggests that women and men may experience how they perceive themselves differently and that this difference may affect their economic decisions.[31] A rational survey's subject only chooses to invest in country A or B if the expected gain exceeds the transactions costs in his own perception.[32] A subject may overestimate the precision of the information provided to him and, as a result, the expected gains of investing in country A or B.

Some studies show that people may even invest when the true expected net gain is negative and that men are more overconfident than women.[33] Some financial studies indicate that women are more cautious to invest their asset portfolios than are their male counterparts.[34] Vickie Bajtelsmit and Alexandra Bernasek assert that differences in investment choice between genders is fairly accepted in recent studies, but the causes for this difference have not yet been recognized yet.[35] Human capital theory purported in economics also explains the differences in investment choice between genders. Gary Becker asserts that women make different choices than men because they are more

[30] *See* North, "Institutions".

[31] Sylvia Beyer, "Gender Differences in the Accuracy of Self-Evaluations of Performance," *Journal of Personality and Social Psychology* 59 (1990): 960.

[32] Sylvia Beyer and Edward M. Bowden, "Gender Differences in Self-Perceptions: Convergent Evidence from Three Measures of Accuracy and Bias," *Journal of Personality and Social Psychology* 23 (1997): 157.

[33] Brad M. Barber and Terrance Odean, *Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment* 116 (Oxford: The Quarterly Journal of Economics, 2001), 261.

[34] For more on this subject, *see* Vickie L. Bajtelsmit and Alexandra Bernasek, Why Do Women Invest Differently Than Men?,*" Financial Planning and Counseling* 1 (1996): 1. .

[35] Bajtelsmit and Bernasek, "Women Invest Differently".

concerned with family responsibilities.[36] Additionally, there are biological arguments for the gender differences in investment choice. Some researchers contend that women have greater biological responsibility for reproduction and are therefore more risk averse than men.[37]

One could argue that the results from this survey that evidence different genders choose how to invest differently do not represent a realistic sample of the world population. It may be argued that in the real world the gender difference in investment choices does not exist. In addition, it could be argued that such a difference in investment choice would create a market between men and women – a gender market.

We do not accept these arguments because (a) maybe there is a gender market, men and women may be buying and selling from each other as a result of their different investment choices, but there are no studies showing that this market exists, and (b) the gender variable is not the only variable that guides an individual's investment choice, as the survey results showed there are other variables – such as political traditions, age, education, and professional experience – that influence the investment choice of the individual.

As described above, the psychology literature has found a gender bias in investment decision-making by utilizing experimental methods that use very stark investment choices on simple facts. The results from the survey we conducted also found a gender bias in investment decision making, however, we used a more nuanced instrument than has been used in the psychology studies.[38] Hence, our survey's results are supported by confirmatory evidence of this general phenomenon described in the psychological literature. Our results evidence that the gender of the survey participants is a meaningful characteristic and that men invest more in country B than women, so long as all other factors remain constant.

4. Conclusion

The results of our survey experiment fit and complement the theoretical framework that a country's legal institutions generally affect the willingness of its citizens to invest money in their country. No less important, the results also suggested that people of different education, legal and business experience, political tradition, and gender make different decisions for how to invest.

The implications of our results are twofold: (i) the survey's subjects made their investment decision in country A or B according to their perception of the chance for their company to profit; and (ii) a subject's perception of country A and B depended on how their individual minds processed the given information. The investment choices of the survey participants were guided and restricted by the institutional framework provided by the instrument survey – through the information regarding country A and B – and by their cultural heritage.[39] Thus, is the results of this survey do not imply whether the survey subjects' investment choices were right or wrong.

The beliefs that the survey's subjects hold, in addition to the information provided by the survey instrument, shaped their ultimate investment decisions. The survey's subjects' investment

[36] Gary Becker, *Human Capital* (New York: NBER, 1975).

[37] Bajtelsmit and Bernasek, "Women Invest Differently".

[38] For a more thoughtful discussion on the experimental methods used in psychology studies, *see* Christine R. Harris, Michael Jenkins, and Dale Glaser, "Gender Differences in Risk Assessment: Why Do Women Take Fewer Risks Than Men?," *Judgment and Decision Making* 1 (2006): 48; Muriel Niederle and Alexandra H. Yestrumskas, "Gender Differences in Seeking Challenges: The Role of Institutions," *National Bureau of Economic Research* 13922 (2008).

[39] By cultural heritage we mean the set of formal and informal institutions that surrounded and influenced the survey's subject up until the time he participated in this study.

choices that were based on their individual beliefs were affected not only by the formal institutions – changes in the legal and judicial system characteristics of countries A and B – but also by the different cultural backgrounds.[40]

The cultural heritage of each survey participant was, in turn, affected by their different education, legal and business experience, political tradition, and gender. The list of variables that influenced the survey's subject cultural heritage is not limited to those empirically tested with the survey instrument; rather, they are a sample of a very large list. The results of this survey suggest that both informal and formal institutions shape an individual's behavior and his ultimate decision. This survey also provided some insight as to how cautious public policy should be when aiming to achieve certain outcomes if only focusing on a society's formal institutions.

5. References

Acemoglu, Daron et al. (2004) "Institutions as the Fundamental Cause of Long-Run Growth." *National Bureau of Economic Research* NBER Working Paper 10481. Issued in May 2004. Avaiable at: http://www.nber.org/papers/w1048.

Bajtelsmit, Vickie L. & Bernasek, Alexandra. (1996) Why Do Women Invest Differently than Men?. *Financial Counseling and Planning.* Available at: http://dx.doi.org/10.2139/ssrn.2238.

Barber, Brad M. & Terrance Odean. (2001) Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment. *The Quarterly Journal of Economics*, 116 (1): 261-292. DOI: 10.1162/003355301556400.

Becker, Gary. (1975) *Human Capital.* New York: NBER.

Beyer, Sylvia. (1990) "Gender Differences in the Accuracy of Self-Evaluations of Performance." *Journal of Personality and Social Psychology* (Impact Factor: 5.08). 10/1990; 59(5):960-970. DOI:10.1037/0022-3514.59.5.960.

Beyer, Sylvia and Edward M. Bowden. (1997) "Gender Differences in Self-Perceptions: Convergent Evidence from Three Measures of Accuracy and Bias." *Journal of Personality and Social Psychology*. February 1997, vol. 23 no. 2 157-172. DOI: 10.1177/0146167297232005.

Demiegüç-Kunt, Asli and Ross Levine. (2001) *Financial Structure and Economic Growth: A Cross-Country Comparison of Banks, Markets, and Development*. Cambridge: MIT Press.

Harris, C. R., Jenkins M., Glaser D., "Gender Differences in Risk Assessment: Why Do Women Take Fewer Risks Than Men?" *Society for Judgment and Decision Making*, vol. 1, pages 48-63, July. Available at: http://journal.sjdm.org/06016/jdm06016.htm.

La Porta, Rafael et al. (1998) "Law and Finance." *Journal of Political Economy* , Vol. 106, No. 6 (December 1998), pp. 1113-1155 DOI: 10.1086/250042.

Niederle, Muriel & Alexandra H. Yestrumskas. (2008) "Gender Differences in Seeking Challenges: The Role of Institutions." *National Bureau of Economic Research* 13922. Issued in April 2008. Available at: http://www.nber.org/papers/w13922.

North, Douglas C. (1990) *Institutions, Institutional Change and Economic Performance: The Political Economy of Institutions and Decisions*. Cambridge: Cambridge University Press

North, Douglas C. (2005) *Understanding the process of economic change*. Princeton: Princeton University Press.

[40] *See supra* Table IV.

Ott, R. Lyman & Michael Longnecker. (2010) *An Introduction to Statistical Methods and Data Analysis*. Belmont, CA: Duxbury Press.
Resnik, Michael D. (1987) *Choices: An Introduction to Decision Theory*. Minneapolis: University of Minnesota Press.
Rodrik D., Subramanian A., & Treb F.. "Institutions Rule: The primacy of institutions over geography and integration in economic development," *Journal of Economic Growth*, 2004, v9 (2,Jun), 131-165. Available at: http://www.nber.org/papers/w9305.
Trubek, David M. (1972) "Toward a Social Theory of Law: An Essay on the Study of Law and Development." *The Yale Law Journal*, Vol. 82, No. 1 (Nov), pp. 1-50 Available at: http://www.jstor.org/stable/795251.
UCLA. (2007) *Stata Data Analysis Examples: Probit Regression*. UCLA Academic Technology Services.
Wooldridge, Jeffrey M. (2002) *Introductory Econometrics, a Modern Approach*. Cambridge: The MIT Press.