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# An Empirical Analysis of the Migratory Flows to the United States

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AN EMPIRICAL ANALYSIS OF THE MIGRATORY FLOWS TO THE  
UNITED STATES

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by

Felipe I. Galán Uribe

2013

A mi madre y a Rocío, a quienes todo les debo.

A mis hermanos.

AN EMPIRICAL ANALYSIS OF THE MIGRATORY FLOWS TO THE  
UNITED STATES

By

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THESIS

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## **Chapter 1: Introduction**

Migration is defined as the movement of people, either across an international border or within a State (International Organization for Migration, 2004). There is no universally accepted definition of a migrant. However, there are characteristics that allow classifying persons that relocate internationally according to length, composition, and causes of their movement. Documented migrants are persons that enter in a country lawfully and remain there legally. Irregular migrants stay in a foreign country without satisfying legal requirements to do so. Skilled migrants are granted permission to stay in the host country due to special skills or abilities. Economic migrants leave their countries of origin to improve quality of life. The latter is commonly used to describe people that leave their country for the purpose of employment (International Organization for Migration, 2004).

The tag of economic migrant also applies for those changing of employer, occupation, and job location, whether within the same city, the same country, or from one country to another, due to pecuniary reasons (McConnell, Brue and McPhearson, 1999). This study focuses on the workers that leave their home country in the search for better opportunities in the United States. The United States is selected as benchmark because its real income is relatively high and draws many migrants to it (Hanson, 2006).

A commonly noted reason for economic migration is the income differential between source and host regions. Harris and Todaro (1970) develop a model to explain urban

unemployment in less-developed countries. The model is based on an income comparison between rural and urban sectors in a given country and concludes that migration from rural sector to urban areas will take place while wages in the latter exceed those in the former. The study concludes that, in the presence of a fixed endowment of capital and labor, the only solution that leads to full employment in both sectors is liberalization of labor market since it will allow marginal productivity to determine wages.

Corden and Findlay (1975) extend the Harris and Todaro (1970) model by introducing capital mobility among sectors, the possibility of economic expansion, and risk aversion. It is assumed that even the so-called economic migrants respond to non-pecuniary incentives when they decide to change residence. The possibility of being hired and the ability to survive at subsistence levels while unemployed influences the risk aversion of potential migrants. Those same principles can be applied to international migration when workers are moving from one country to another, higher income economy.

There are different types of potential regulatory burdens that violate the free market assumptions in labor market. Examples include the hiring process, work days and hours, and the cost of dismissing workers. The purpose of this paper is to examine how labor market regulations may also influence of work migration to the United States. The assumption is that economic migrants are willing to incur the costs related to a change of residence if the labor market in the destination country performs better and offers a chance to improve earnings.

There are several studies on related topics that are examined in this study. Section 2 reviews some of the previous migration research. Section 3 of this document summarizes data employed plus sources. That section also offers an overview of the econometric model utilized. Section 4 discusses empirical results obtained. Section 5 offers policy implications. A concluding section finalizes the study.

## **Chapter 2: Literature Review**

Most of the studies on migration approach the topic as a matter of investment. The human capital approach described by Sjaastad (1962) is largely employed in related studies. Both legal and illegal migration are affected by costs and gains associated with relocation. Factors that increase probabilities of being employed and raising incomes affect migratory flows positively. Sjaastad (1962) describes economic migration within the context of income disparities among regions within the United States. Migration costs and returns are categorized as pecuniary or non-pecuniary. Distance and number of dependents are among the pecuniary factors. Foregone earnings and psychic costs are among the non-monetary factors.

Harris and Todaro (1970) study rural-urban migration in Africa. Rural workers relocated from rural areas to urban areas even when their productivity was higher in their place of origin. Institutionally imposed minimum wages in urban areas create expected earnings differentials. Those conditions lead to an equilibrium with high level of unemployment in urban areas. The analysis employs a two sector model in which both sectors trade output with each other and the rural sector also exports labor to the city.

An extension of that model is developed by Corden and Findlay (1975). The study introduces capital mobility and economic growth to explain migration. The research also incorporates risk aversion in the model. Finally, the analysis eliminates the assumption of a close economy. It concludes that workers migrate from rural to urban

zones when there are expected wage differentials. In this model, migration flows are positively correlated with the probabilities of being employed in urban areas.

Other studies also utilize to the human capital approach to analyze factors that might influence decisions to migrate. Yezer and Thurston (1976) employ the job-searching model to study behavior of migrants within the United States between 1955 and 1960. Migrated distance is employed in the model as a proxy for information on the destination labor market. The study concludes that the probability of being hired in a new location, physical attributes of destiny and origin, and emotional ties might affect the return of migrants to places of origin.

Greenwood (1985) conducts a survey of studies on migration, primarily within the United States. Cross-sectional models built with micro data, commonly gathered through surveys or sampling, dominate among analyzed studies due to a lack of time series on migration. Surveyed research tends to hypothesize that migration originates from disequilibria in labor and land markets that correct with migration. Some of the surveyed research analyzes migration from an individual utility maximization perspective. Recurrent explanatory variables are related to the stock of human capital, conditions of labor and housing markets, and environmental amenities. Some other studies focus on the household as the decision-making unit. Those efforts employ factors such as birth and aging of children, marriage, divorce, and other life-cycle variables.

Other research employs the human capital model to study the effect of unemployment on the individual decision to migrate. Pissarides and Wadsworth (1989) present three hypotheses related to the correlation between unemployment and probability of migration. First, an unemployed individual is more likely to migrate than an employed one. Second, there is a positive correlation between migration and unemployment rate differentials between regions. Third, the correlation between overall unemployment among a set of regions and migration between those regions is negative. Datasets from the United Kingdom Labor Force Survey are used to estimate logit regressions for inter-regional migration in 1977 and 1984. Results confirm the first and third hypotheses, but empirical support for the second assumption is not obtained.

Gallardo-Sejas, Llorca-Vivero and Gil-Pareja (2006) employ a gravity model to examine the determinants of immigration into 13 European countries. In addition to traditional variables such as the size of the economy and distance from origin countries, dummy variables for qualitative variables such as common languages and maritime links are included. In the final model, the correlation between migration and population at the origin is positive, and correlation between migration and distance between origin and destination is negative. The correlation between GDP at the origin and migration is positive for lower income economies. The reason for that is that people in poorest countries do not have access to information from foreign labor markets, and they cannot afford costs of migration. That correlation turns negative at a certain level of income.

Much of the literature suggests that migration is a matter of economic development and labor market conditions. Some authors have studied the effects of regulatory burdens on income, economic growth, and unemployment. Fullerton, De León and Kelley (2007) test the hypothesis that excessive business regulation affects economic development. A cross-section dataset of 114 countries is developed for the empirical analysis. GNI per capita is specified as a function of a set of regulatory measures in each country. Variables employed in the study are reported by the World Bank in the Doing Business 2005 report. The study shows potential gains of \$28.8 trillion as a result of at least partial deregulation.

A subsequent study on the same matter updates the dataset with the World Bank Doing Business report of 2008. That report includes information on regulatory burdens in 149 countries. New variables for construction licenses, tax burdens, international trade, and a dummy variable to classify countries by region are included in the analysis.

Somewhat surprisingly, endogeneity is not found to be present in the sample.

Outcomes are consistent with the previous study. Those outcomes show a loss of \$27.83 trillion in the GNI per capita of studied countries as a consequence of the regulatory burdens (Licerio, Fullerton, and Clark, 2010).

Feldmann (2008) studies the effects of economic regulations on labor markets. The hypothesis indicates that labor market inflexibility motivates firms to utilize more capital intensive processes. Components of an economic freedom index are employed as explanatory variables in a panel model. Unemployment rates are the dependent

variables. Results indicate that unemployment in countries included in the sample would be 280 basis points lower if they adopt more flexible labor market policies. The study employs the labor market in the United States as a benchmark.

Mexican nationals account for one-third of the 2010 U.S. foreign born population in the United States. According to Hanson and McIntosh (2010), migrant networks influence the migration of Mexicans to the United States. Such networks help reduce relocation costs. Birth cohorts between censuses in the United States and in Mexico are used to calculate the flow of illegal migrants. Explanatory variables in the model are growth of population in each state, school attendance in the U.S, and the stock of Mexican immigrants in recipient states. Output shows that growth of population at the origin is positively correlated with migration. The results also suggest that preexisting migrant networks at destination attract more migrants.

Ashby, Bueno, and Martínez Villarreal (2013) study the causes for undocumented migration flows from the 32 Mexican states to the 50 states in the United States. The model is specified with distance between states, relative employment growth, earnings differentials, climate, population, and the existence of immigrant networks as explanatory variables. A positive correlation is found between migration flows and the existence of immigrant networks in destination cities. Similar to Gallardo-Sejas (2006), location choices and distance are negatively correlated. Results also show that wage levels influence migration patterns as workers tend to migrate to states with higher wages.



Labor force migration has been studied using several different approaches. There is broad consensus on the causes of migration. Distance between origin and destination, climate, and other amenities, plus the existence of immigrant networks at destination are found to influence rates of migration. Some other factors relate to labor market conditions. Unemployment rates and wage differentials are among these variables. The influence of labor market regulatory burdens on migration has not been extensively analyzed. This study attempts to shed light on how labor market inflexibility may affect migratory flows.

### **Chapter 3: Data and Methodology**

In 2010, 1.043 million people from around the world migrated to the United States (Organization for Economic Co-operation and Development, 2012). The OECD collects data by means of correspondents appointed for each of the member countries. Because these data are mostly obtained from official sources in every country, undocumented migration might be undercounted. The approach utilized here studies migration from an investment perspective. Right-hand side regressors reflect the costs and earnings of migration.

Distance from the country of origin is used as a proxy for the cost and difficulty of relocating to the United States. Distance is measured in kilometers from the geographic center United States to the geographic center of each of the 168 countries in the sample. Distances measuring are obtained from a Web site that measures distance between two places by using a geographic information system. (DistanceFromTo, 2009). It is expected that people from nearby countries migrate to the United States in larger numbers.

The World Bank (2012) reports Gross National Income per capita for every country in the sample. Those figures are expressed in U.S. Dollars at official exchange rates. The ratio of the per capita income in the United States to the income in each country in the sample is employed to control for income differentials. The value of that variable is less than one if the income in the country of origin is higher than in the United States. The

ratio is greater than one when income in the country of origin is lower than in the United States. The assumption is that the larger the ratio of per capita income, the greater the incentive for an individual from a given country to try to relocate to the United States.

Natural disasters displace a number of persons in the world every year. The United Nations Development Program reports the annual number of persons affected by a natural disaster in each of the countries. The definition of people affected by natural disaster, according to that agency, encompasses people requiring immediate assistance during a period of emergency as a result of a natural disaster, including displaced, evacuated, homeless and injured people (United Nations Development Program, 2012). The variable is expressed in number of persons per 1,000 inhabitants at the country of origin. The coefficient related to this variable in the model is expected to have a positive sign.

A Web site dedicated to cataloging languages of the world provides a list of all the countries in which English is the official or national language (Lewis, Simmons, and Fening, 2012). The use of a common language is expressed in the specification by means of a dummy variable, giving the value of one to countries that use English as the official or national language and zero otherwise. The hypothesis is that people from countries that speak English as official or national language are more likely to choose the United States as a destination when migrating.

The Doing Business 2011 report released by the World Bank (2012) contains data describing labor market conditions in several countries and territories during 2010. That information is employed in the model to control for the influence of those labor market policies on migratory flows. The hypothesis is that negative effects of regulatory burdens on income reported by Fullerton, et al. (2007), and Licerio, et al. (2010) will increase migration to countries with more flexible labor markets. The Doing Business report divides information on labor market restrictions into four categories: difficulty of hiring; rigidity of hours; difficulty of redundancy, and redundancy costs. Each of those categories contains several variables. The sample includes complete information from 166 countries. Bolivia and Venezuela do not have data for some variables due to domestic legislation. These countries are also included in the sample by assigning values reflecting the restrictiveness of their labor markets. The final sample size is 168.

The difficulty of hiring category measures the restrictiveness of hiring workers under fixed-term contracts. A fixed-term contract is defined as a labor agreement that contains an expiry date or limited duration, even if the employee is performing a permanent task (World Bank, 2012). Some countries prohibit these kinds of agreements for workers performing permanent tasks. Most of the countries in the sample allow temporary employment relationships for non-permanent endeavors, but limit maximum cumulative durations. Limits on the duration fixed-term contracts include contract renewals. The countries with restrictions of any kind on fixed-term contracts are assigned a value of one, the value is zero otherwise. It is anticipated that those restrictions cause labor market distortions, leading to underemployment and migration.

Restrictions on night work are part of the rigidity of hours. That is a dummy variable that takes the value of one if the country imposes special restrictions on night work, or obligates the employer to obtain permission from a third party to assign activities to workers during evening hours. The variable takes the value of zero if night shifts are allowed without special permission requirements. Such restrictions may impede the employer from opening additional shifts and making production adjustments.

Another variable included in the rigidity of hours is the number of maximum work days per week allowed. Most of the countries in the sample allow 5.5 or six days per week. Having more days per week allows the employer to respond to increases in demand and permits generate labor force flexibility. Allowing fewer working days per week is considered more restrictive. Conversely, it is assumed that the larger the number of mandatory leaves per year in a given country, the more rigid is its labor market

Changes in demand faced by companies might make some activities redundant and, by extension, some workers. When the law recognizes redundancy as a cause for fair dismissal of workers, a labor market is assumed to perform better. Redundancy is the basis on which the Doing Business report calculates the difficulty and cost of dismissals. Dummy variables are employed to indicate if an employer must notify a third party in order to dismiss a redundant worker. A value of one is assigned to the countries that impose such restrictions; zero is used for those that do not.

A value of one is also assigned to the countries that require permission from a third party to dismiss a worker. Values of zero are assigned to countries that do not require that. The model also includes dummy variables for the requirement of engaging with third parties for collective dismissals. The logic of value assignment is the same; one for economies that mandate the intervention and zero for those that do not. Similar to other variables, the presence of a restriction is expected to cause the labor market to underperform.

Difficulty to dismiss is also measured by the application of special rules to dismiss a redundant worker. Special rules might apply to dismiss workers under certain conditions such as seniority or being part of a minority. Existence of that kind of regulation is specified in the model by using another dummy in which the value of one is assigned to countries with special rules and zero for those not applying them. The existence of those rules is considered restrictive and expected to be positively related with immigration to the United States.

Employers are sometimes obligated to reassign or retrain workers before being able to declared redundancies. A dummy variable assigns the value of one to countries with that requirement and zero otherwise. That restriction is also expected to cause migration.

Dismissal costs under redundancy include the number of weeks that an employer must wait to dismiss a redundant worker after notification is rendered. The hypothesized

value for the coefficient for this variable is positive. The majority of countries in the sample require severance payments from employer dismissing workers on the redundancy basis. Severance amounts are usually a function of the length of the tenure by the employee. Variables employed in the model include the cost of dismissing a worker with one year of tenure and the cost of dismiss a redundant worker with ten years of tenure. Both costs are calculated in weeks of salary at the moment of dismissal.

Mexico sent more migrants to the United States in 2010 than any other country in the world. Mexico is also the country nearest to the United States. When immigrants are counted on proportional basis, Guyana leads the sample. The equivalent of 0.9 percent of that country's population migrated to the United States during 2010.

The wealthiest country in the sample is Qatar. Per capita income in the United States is equivalent to the 62 percent of the income in that nation. The economy with the lowest income is Congo. Per capita income in the United States is 143 times larger than the income in Congo. 73 countries in the sample reported less than one in 1,000 inhabitants affected by natural disasters during 2010. Swaziland, the highest in the list, reports 117 out of every 1,000 inhabitants as impacted by natural disasters.

Countries with the greatest percentage of nationals living in the United States in 2010 are led by a group of Caribbean nations. Citizens of Dominica that live in the United States are equivalent to almost 60 percent of that country's population. Nine out of the

10 nations with the lowest percentage of originals living in the United States in 2010 are in Africa. None of those 10 countries has a stock of migrants in the United States that reaches the equivalent of 0.02 percent of its own population. Mexico leads the list of countries with the larger migrant networks in the United States when counted in absolute terms (See Annex 1).

Australia, New Zealand, Guyana and other five countries do not impose restrictions on the number of working days per week. 11 countries have rules that impede employees from working more than 5 days a week. On average, the number working days allowed per week is 6. That number is used by most countries in the sample. Eight countries force their employers to give workers 30 paid annual leave working days per year, the highest number in the sample. There are five countries in which paid annual leave days are not mandatory. The mean for mandatory paid vacation time per year in the sample is 17.44 days.

In some countries, employers must notify redundant workers before the dismissal takes place. Gambia requires the longest period of time between notification and dismissal. In that country, the employer has to notify the employee 26 weeks prior dismissals. Employers are not obligated to notify employees about dismissals in 22 of the countries in the sample. On average, the countries in the sample require a period of 4.3 weeks between notifications and dismissals. In Greece, an employer that needs to terminate a worker on a redundancy basis must pay a severance equivalent to 24 weeks of the worker's salary if that person has been with the company for one year at least. Almost a



third of the countries in the sample, 50 of them, do not require employers to make severance payments when they dismiss redundant workers with one year or less of tenure.

Employers in Sri Lanka are obligated to pay the equivalent of 97.5 weeks of salary as severance in order to dismiss a worker with 10 years of tenure. That is the highest amount in the sample and is 4.5 times greater than the value of the sample mean. Workers with 10 or more years with a company can be released without severance payments in 34 countries in the sample. Bolivia and Venezuela do not allow dismissing workers on the base of redundancy. In order to keep those countries in the dataset, those countries are assigned values greater than the highest in the sample for each of the variables measuring costs of redundancy. Bolivia and Venezuela are assigned redundancy costs values that are three percent greater than the highest in the sample.

The United States is employed as the benchmark economy in testing the effects of labor market rigidities on migration. The hypothesis is that workers tend to move from restrictive labor markets to less regulated economies where there are better opportunities to work and/or increase incomes. Variables to control for traditional causes of migration include distance, income, language, climate, and stock of migrants are included in the equation.

$$(1) \text{Imm}g_{i\ US} = \beta_0 + \beta_1(GNI_{US}/GNI_i) + \beta_2(DIST_{US\ i}) + \beta_3(ENG_i) + \beta_4(NATDIS_i) + \beta_5(STOCK_i) + \sum_k \beta_k X_{ki} + \varepsilon_i$$

In Equation 1,  $GNI$  represents the Gross Nation Income Per Capita,  $DIST$  distance;  $ENG$  is a dummy variable indicting if English is the official or national language;  $NATDIS$  stands for persons affected by natural disasters per 1,000 inhabitants and  $STOCK$  is the number of originals settled in the United States by year 2010. The sixth term in Equation 1 summarizes all the variables employed to measure labor market restrictions,  $k = 1, 2, 3, \dots, K$  for each of the variables describing labor market included in the model. The suffix  $US$  indicates that the variable relates to the United States, while  $i = 1, 2, 3, \dots, 168$  for each of the countries in the sample. All unobserved variables are included in the disturbance term  $\varepsilon$ .

Table 1 contains a glossary of the variables employed. The glossary also provides the source of each variable. Table 2 lists summary statistics for every series. Several combinations of variables are also utilized to test for interaction effects. Empirical results are discussed in the next section.

**Table 1. Mnemonics and Descriptions**

<b>Variable</b>	<b>Symbol</b>	<b>Unit</b>	<b>Hypothesized sign</b>
Immigrants / 1000 inhabitants	IMMG	Immigrants / 1000 inhabitants	Dependent
Distance from the United States	DIST	Kilometers	Negative
English as official or national language	ENG	Dummy	Positive
Gross National Income Per Capita	GNI	Rate	Positive
Population affected by natural disasters	NATD	People / 1000 inhabitants	Positive
Migrant stocks in the US	STOCK	People / 1000 inhabitants at the origin	Positive
<b>Difficulty of hiring</b>			
Restrictions on fixed-term contracts	FIX	Dummy	Positive
<b>Rigidity of hours</b>			
Restrictions on night work	NIGHT	Dummy	Positive
Paid annual leave	LEAVE	Days	Positive
Maximum number of working days per week	WDAYS	Days	Negative
<b>Redundancy Rules</b>			
Obligation for the employer to get the approval of a third party in order to dismiss one redundant worker	APPTHIRD	Dummy	Positive
Obligation for the employer to obtain approval from a third party before a collective dismissal	APPTHIRDC	Dummy	Positive
Priority rules applying to re-employment	PRRE	Dummy	Positive

Priority rules that apply to redundancy dismissals or lay-offs	PRDIS	Dummy	Positive
Obligation for the employer to notify a third party before dismissing one	NOTTHIRD	Dummy	Positive
Obligation for the employer to notify a third party prior to a collective dismissal	NOTTHIRDC	Dummy	Positive
Retraining or reassignment obligation before an employer can make a worker redundant	RET	Dummy	Positive
<b>Redundancy Costs</b>			
Severance pay for redundancy dismissal after 1 year of continuous employment	SEV1	Weeks of salary	Positive
Severance pay for redundancy dismissal after 10 years of continuous employment	SEV10	Weeks of salary	Positive
Notice period for redundancy dismissal	NOTICE	Weeks	Positive

**Table 2. Summary Statistics**

<b>VARIABLE</b>	<b>MEAN</b>	<b>MEDIAN</b>	<b>MAX</b>	<b>MIN</b>	<b>STD DEVIATION</b>
<b>IMMG</b>	0.711852	0.11885	9.0169	0	1.60125
<b>GNI</b>	14.69827	6.035	143.36	0.62	20.57
<b>DIST</b>	9656.149	9835	16849	1634	3482.292
<b>NATDIS</b>	11.44671	1.7555	117.34	0	19.52455
<b>STOCK</b>	26.93524	3.88	582.44	0.05	69.01515
<b>WDAYS</b>	5.94369	6	7	5	0.360297
<b>LEAVE</b>	17.43988	18	30	0	6.490021
<b>NOTICE</b>	4.31119	4.33	28	0	3.921139
<b>SEV1</b>	3.756131	2.14	25	0	4.877029
<b>SEV10</b>	21.24464	14.2	100	0	21.88649

## Chapter 4: Empirical Results

Table 3 presents four different regression equations. Those models include some of the variables listed in Table 1. The models are specified using two different sets of variables. Given the differences in the order of magnitude among variables, each one of the sets is presented in linear and logarithmic functional forms. Because of the nature of the sample, a test for heteroskedasticity is necessary. The results fail to reject the null hypothesis of homoscedasticity, so OLS results are reported below.

Equation (1) and (2) include variables traditionally employed in a gravity model: the migrants from each country already settled in the United States in 2010 (*STOCK*), the ratio of per capita income in the United States to per capita income in each country (*GNI*), and the distance from each country to the United States (*DIST*). Those equations also include one variable from each of the Doing Business categories that describe labor market rigidity: *NOTICE* measures the cost of dismissals, *LEAVE* accounts for the rigidity of hours, *APPTHIRDC* controls for the difficulty of firing, and *FIX* controls for difficulty of hiring. Equations (3) and (4) exclude those two last variables, but include the rest.

**Table 3. Alternative Estimations Outputs**

VARIABLES	EQUATIONS							
	(1)		(2)		(3)		(4)	
	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
C	1.2907	2.8657	0.1998	0.2556	1.0863	2.4639	-0.0719	-0.0902
FIX	-0.3251	-1.7740	-0.1399	-2.6737				
APPTHIRDC	-0.1070	-0.5271	-0.0771	-1.2869				
LEAVE	-0.0112	-0.7152	0.1000	1.8317	-0.0160	-1.0412	0.0722	1.3093
NOTICE	0.0143	0.6958	0.0660	1.8961	0.0112	0.5417	0.0646	1.8201
DIST	-0.0001	-2.6067	-0.1298	-1.7633	-0.0001	-2.2921	-0.0990	-1.3231
GNI	0.0079	0.8432	0.3948	3.6931	0.0069	0.7346	0.3497	3.2291
GNI^2	-0.0001	-0.6008	-0.0565	-2.5811	-0.0001	-0.5802	-0.0486	-2.1820
STOCK	0.0148	10.0167	0.2589	9.9193	0.0154	10.5984	0.2721	10.2918
R-squared	0.5779		0.6587		0.5675		0.6362	
Adjusted R-squared	0.5567		0.6415		0.5514		0.6227	
F-statistic	27.2160		38.3534		35.2119		46.9350	
DIC	489.0268		188.1167		493.1261		198.8057	

The Deviance Information Criterion (DIC) is employed to compare the four equations. The DIC is a combination of measures of complexity and fit that allows comparing specifications (Spiegelhalter, Best, Carlin, and van der Linde, 2002). The DIC for the linear and logarithmic specifications are computed using the procedures employed by Xiao, Zarnikau, and Damien (2007). Computed DIC values favor Equation (2). That specification contains eight variables in logarithmic form. In that model, seven of the coefficients are significant at the 90 percent confidence level or greater. Two of the coefficients present signs contrary to the hypothesis.

The results obtained for Equation (2), selected as the benchmark specification, validate many of the findings obtained in previous studies. *STOCK* is highly significant in all the equations in Table 3, corroborating results reported in Hanson and McIntosh (2010). Migrant networks are a major deciding factor of where people relocate for economic reasons. Relocation costs might decrease and probabilities of getting a new job increases in the presence of preexisting migrant networks. Besides, knowing people at the new country could benefit migrants by providing safety.

The benchmark specification output suggests a positive correlation between the number of people from a given country established in the United States, and the number of people from that same country migrating to the United States in 2010. Results show an elasticity of 0.26, meaning that a 1 percent difference in the *STOCK* variable for a given country leads to a 0.26 percent increase in the number of migrants per 1000 inhabitants moving from that country to the United States.



The variable *GNI*, calculated as the ratio of per capita gross national income in the U.S. to per capita income in each country in the sample, is included lineal and in quadratic forms. Results show concavity in the function of migration to the *GNI* ratio. The fact that coefficients of linear and quadratic specification of the variable are positive and negative, respectively, validates the poverty factor introduced by Gallardo-Sejas et al. (2006). The results indicate that migration from countries at the lower end of *GNI* ratio increases until that ratio reaches a value of 1.01. After that point, the elasticity becomes negative and migration to the United States decreases 0.05 percent for every 1 percent increase in the *GNI* ratio. These results are consistent with the idea that people migrate to countries with larger income levels.

The other variable commonly included in migration research is distance between source and host countries. The coefficient estimated for *DIST* in Equation (2) says that a 1 percent increase in distance causes migration to the United States to decrease by 0.13 percent. The negative relationship between these two variables reinforces findings in previous studies on the matter (Yezer and Thurston, 1976). In Equation (2) distance is statistically significant at the 90 percent confidence level.

The variable *NOTICE* accounts for the period of time the employer is obligated to wait after notifying the worker of the dismissal to make it effective. Its corresponding *t-statistic* value is significant at the 10 percent level. The elasticity of migration with respect to *NOTICE* is 0.066. All else equal, a 1 percent increase in the *NOTICE* term length leads to an increase of 0.066 percent in migration to the United States.

The mandatory number of vacation days in each of the 168 countries is included in the sample to describe the rigidity of hours. The results of Equation (2) indicate that *LEAVE* variable is significant at the 10 percent level. Coefficient computed in Equation (2) describes a 0.10 elasticity of migration to variable *LEAVE*. With everything else held constant, migration from a given country to the United States increases 0.10 percent per every 1 percent increase of the mandatory vacations period in the source country.

Regulatory limits on fixed-term employment relationships are another type of red tape affecting many labor markets. It is hypothesized to cause malfunctions to the market and, therefore, increase migration to better performing economies. Results in Equation (2) do not corroborate the hypothesis, as the coefficient for *FIX* has a negative sign. The inverse relationship between migration and term limitation on temporary contracts might be a consequence of risk aversion. Employed persons might be willing to migrate, despite their status in the country of origin, if they know that status is temporary. On the other hand, those under permanent contracts might be less willing to relocate, despite lower income levels. This result also implies that increased “formal sector” employment in countries such as Mexico will precipitate lower values of migration to the United States.

The sign of the estimated coefficient for the variable measuring difficulty of firing, *APPTHIRDC*, does not support the hypothesis of a direct relationship between labor market restrictions and out-migration. The negative sign of this coefficient implies that the existence of a bureaucratic barrier to dismiss groups of workers might help to retain

people within a country. The computed *t-statistic* does not reach the 90 percent confidence level. The results related to the variable *APPTHIRDC* are in concordance with outputs reported in Feldman (2003) in which firing and hiring regulations also fail to reach significance when used to explain unemployment.

Those two variables with coefficient signs contrary to those hypothesized are excluded in Equations (3) and (4) for comparison purposes. Eliminating those variables does not enhance the results and the respective DIC are higher than that for the benchmarking specification (2). Although labor market efficiency may be reduced and income performance damaged, risk aversion on the parts of workers potentially reduces out-migration in the presence of these contract term and dismissal regulations.

Different approaches to the study of migratory flows reaffirm the importance of both: i) distance from source to host countries and ii) income differentials on people's decision to relocate. The existence of migrant networks in a country is also confirmed as an attraction factor for people looking for places where to migrate. Equation (2) shows that, in the presence of aspects traditionally employed to explain migratory flows, labor-market regulatory burdens affect migratory patterns, even though not always as hypothesized. According to the results, effects of regulations that increase the cost of dismissals, and those imposing rigidity of hours foster emigration by causing the labor market to underperform. On the other hand, limits on a fixed-term employment relationship seem to help retaining people at their source country potentially due to

worker risk aversion. The results are unable to establish a strong statistical relationship between bureaucratic difficulties to dismiss employees and the decision to migrate.

## **Chapter 5: Conclusions**

Migration is generally regarded as an investment decision. Factors that affect costs of changing residence are some of the main catalysts behind relocation decisions. Non-pecuniary factors, such as climate, environmental amenities, and life cycle variables are also commonly employed to explain migration decisions. Labor market conditions with respect to: i) real or expected income differentials between source and host countries, and ii) the possibilities of being employed in the source and in the host country can also influence the decision to migrate.

A variety of studies quantify the negative impacts of regulatory excess on economic performance. Some regulatory burdens affect the economy as a whole and worsen income performance (Fullerton, De Leon and Kelley, 2007; Licerio, Fullerton and Clark, 2010). Burdensome red tape has also been found to hamper labor market efficiency and lower employment levels below full capacity (Pissarides and Wadsworth, 1989; Feldman, 2003; Feldman, 2008). Given these issues, migratory flows will potentially increase to less regulated, better performing economies.

Data from the Doing Business 2011 report is employed to describe labor market restrictiveness in 168 countries. Four models are specified to measure the effects of labor markets restrictiveness on migration to less regulated economies. Deviance Information Criterion (DIC) estimates are utilized to select the best specification for modeling migration to the United States. Results obtained confirm many of those

reported in prior studies on migration. The existence of migrant networks at a given place is highly important (Hanson and McIntosh, 2010). Distance, along with income differentials, also influences migratory flows (Sjaastad, 1962; Gallardo-Sejas, Llorca-Vivero and Gil-Pareja, 2006). Outcomes regarding the effects of labor markets restrictions on migration are somewhat ambiguous.

Contrary to the hypothesis, restrictions on fixed-term contracts imposed by some countries seem to discourage migration. That result is potentially due to worker risk aversion (Corden and Findlay, 1975). Institutional limits on redundant worker dismissals are not found to affect migration to the United States in a statistically significant manner. These results complement findings in Feldman (2008), where difficulties of hiring and firing workers are reported to be unrelated to employment levels.

Links are found to exist between labor market regulatory burdens and migration in two cases. Those variables are rigidity of hours, as measured by mandatory vacation time, and the cost of dismissals. Estimated parameters for both of these regressors are greater than zero and satisfy the 10-percent significance criterion. Together, these coefficients imply that countries wishing to avoid unnecessary labor resource losses might benefit from allowing employers more freedom to adjust payrolls.

This study represents an early attempt to link labor market restrictions to migratory flows. Subsequent research may be able to add to this area of the literature by

examining different types of migration. Examples include legal and illegal migration as well as skilled and unskilled labor outflows. The assembly of time series data would allow examining how changes in labor market legislation such as that recently adopted in Mexico can affect migration. Additional research on this topic appears warranted.

## References

- Ashby, N., Bueno, A., and Martínez Villarreal , D. (2013). "The Determinants of Immigration From Mexico to the United States: A State-to-State Analysis." *Applied Economics Letters*, 20, 638-641.
- Corden, W., and Findlay, R. (1975). "Urban Unemployment, Intersectorial Capital Mobility and Development Policy." *Economica*, 42, 59-78.
- DistanceFromTo. (2009). *Countries*. Retrieved from:  
<http://www.distancefromto.net/countries.php>
- Feldman, H. (2003). Labor Market Regulation and Labor Market Performance: Evidence Based on Surveys among Senior Business Executives. *KYKLOS*, 56, 509–540.
- Feldmann, H. (2008). "Business Regulation and Labor Market Around the World." *Journal of Regulatory Economics*, 33, 201-235.
- Fullerton, T. M., Jr., De León, M., and Kelley, B.W. (2007). "Regulatory Burdens and International Income Performance." *Applied Econometrics and International Development*, 7:1, 5-14.
- Gallardo-Sejas, H., Llorca-Vivero , R., Gil-Pareja, S., and Martínez-Serrano, J. A. Determinants of European immigration: a cross-country analysis. *Applied Economics Letters*, 13, 769-773.
- Greenwood, M. J. (1985). "Human Migration: Theory, Models, and Empirical Studies." *Journal of Regional Science*, 25, 521-544.
- Hanson, G. H. (2006). "Illegal Migration from Mexico to the Unites States." *Journal of Economic Literature*, 44, 869-924.



- Hanson, G. H., and McIntosh, C. (2010). "The Great Mexican Emigration." *Review of Economics and Statistics*, 92, 798-810.
- Harris, J., and Todaro, M. P. (1970). "Migration, Unemployment and Development: A Two-Sector Analysis." *American Economic Review*, 60, 126-142.
- International Organization for Migration. (2004). *Glossary on Migration*. Geneva: International Organization for Migration.
- Lewis, P. M., Simmons, G. F., and Fening, C. D. (2012). *Language*. Retrieved from: <http://www.ethnologue.com/language/eng>
- Licerio, E., Fullerton, T. M., Jr., and Clark, D. P. (2010). "Empirical Evidence Regarding Regulatory Burdens and Global Income Performance." *Economic Studies of International Development*, 10:2, 5-32.
- McConnell, C. R., Brue, S. L., and McPhearson, D. A. (1999). *Contemporary Labor Economics* 5th Edition. Boston, MA, United States of America: Irwin/McGraw-Hill.
- Organization for Economic Co-operation and Development. (2012). *Stat Extracts*. Retrieved from: <http://stats.oecd.org/Index.aspx?DataSetCode=MIG#>
- Pissarides, C. A., and Wadsworth, J. (1989). Unemployment and the Inter-Regional Mobility of Labour. *Economic Journal*, 99, 739-755.
- Sjaastad, L. A. (1962). "The Costs and Returns of Human Migration." *Journal of Political Economy*, 70, 80-93.
- Spiegelhalter, D. J., Best, N. G., Carlin, B. P., & van der Linde, A. (2002). Bayesian Measure of Model Complexity and Fit. *Journal of Royal Statistical Society Series B (Statistical Methodology)*, 64, 583-639.

United Nations Development Program. (2012). *Indicators*. Retrieved from:

<http://hdrstats.undp.org/en/indicators/98706.html>

Wooldridge, J. M. (2003). *Introductory Econometrics A Modern Approach* (2 ed ).

Mason, OH, U.S: Thomson Learning.

World Bank. (2005), *Doing Business in 2005*, Oxford University Press: Washington, DC.

World Bank. (2008), *Doing Business in 2009*, International Finance Corporation:

Washington, DC.

World Bank. (2012). *Indicator*. Retrieved from:

<http://data.worldbank.org/indicator/NY.GNP.PCAP.CD>

World Bank. (2012). *Employing Workers*. Retrieved from:

<http://www.doingbusiness.org/data/exploretopics/employing-workers>

World Bank. (2012). *Employing Workers Survey*. Retrieved from:

[http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Methodology/Survey-Instruments/DB2013/Employing\\_survey\\_en.pdf](http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Methodology/Survey-Instruments/DB2013/Employing_survey_en.pdf)

Xiao, J., Zarnikau, J., and Damien, P. (2007). Testing Functional Form in Energy

Modeling: An Application of the Bayesian Approach to U.S. Electricity Demand.

*Energy Economics*, 29, 158-166.

Yezer, A. M., and Thurston, L. (1976). "Migration Patterns and Income Change:

Implications for the Human Capital Approach to Migration." *Southern Economic Journal*, 42, 693-702.

## Appendix A

### List of countries with the largest migrant networks

Country	2010 Migrant Stock in USA
Mexico	11,635,995
China	1,736,314
Philippines	1,717,771
India	1,654,272
Viet Nam	1,160,309
El Salvador	1,116,420
Korea	1,050,860
Canada	834,945
Dominican Republic	787,015
Guatemala	753,720
United Kingdom	701,093
Germany	653,968
Jamaica	649,046
Colombia	611,971
Haiti	545,437
Poland	487,934
Honduras	469,202
Russian Federation	421,459
Ecuador	420,751
Italy	400,484
Peru	392,455
Japan	340,393
Brazil	339,141
Ukraine	332,155
Pakistan	288,011
Guyana	263,147
Nicaragua	242,886
Trinidad and Tobago	229,650
Hong Kong (China)	214,572
Nigeria	210,647
Thailand	202,971
Laos	192,978

<b>Country</b>	<b>2010 Migrant Stock in USA</b>
Portugal	176,694
Venezuela	171,891
Romania	171,253
Argentina	163,353
France	160,721
Greece	151,239
Israel	149,039
Cambodia	148,774
Bangladesh	148,326
Ethiopia	139,693
Ireland	137,537
Egypt	132,513
Lebanon	130,237
Bosnia and Herzegovina	121,495
Ghana	110,931
Turkey	107,284
Iraq	102,942
Panama	98,009
Chile	93,382
Indonesia	87,530
Netherlands	87,311
Kenya	85,123
Morocco	84,496
Albania	83,018
Costa Rica	82,624
Spain	82,440
Hungary	81,905
South Africa	81,142
Australia	77,619
Armenia	77,208
Bolivia	72,890
Jordan	72,286
Syria	67,370
Liberia	66,652
Afghanistan	61,906
Yemen	58,342
Malaysia	55,007

<b>Country</b>	<b>2010 Migrant Stock in USA</b>
Austria	53,738
Uruguay	47,772
<b>Country</b>	<b>2010 Migrant Stock in USA</b>
Croatia	46,499
Sweden	42,665
Dominica	42,409
Fiji	41,338
Saudi Arabia	40,480
Singapore	40,380
Nepal	39,991
Belize	39,840
Sudan	39,573
Bahamas	37,796
Belgium	34,635
Sri Lanka	34,572
Bulgaria	33,611
Grenada	33,568
Czech Republic	32,071
Denmark	32,020
Belarus	32,007
Switzerland	31,195
Latvia	30,167
Lithuania	27,853
Cameroon	26,912
Norway	26,907
Paraguay	26,121
Slovak Republic	25,356
Georgia	25,310
Moldova	25,280
Kuwait	25,044
Uganda	22,460
Samoa	21,813
Uzbekistan	21,083
Cape Verde	20,855
New Zealand	19,402
Antigua and Barbuda	17,611
Sierra Leone	17,549

<b>Country</b>	<b>2010 Migrant Stock in USA</b>
Senegal	16,745
Finland	13,490
Saint Lucia	13,278
Estonia	12,738
Eritrea	12,689
Iceland	12,120
Kazakhstan	11,906
Tonga	11,703
Saint Kitts and Nevis	11,456
Cyprus	11,244
Azerbaijan	9,689
Côte d'Ivoire	9,388
Micronesia	9,228
United Arab Emirates	9,197
Tanzania	8,856
Tunisia	8,480
Saint Vincent and the Grenadines	8,274
Zambia	7,905
Former Yug. Rep. of Macedonia	7,892
Slovenia	7,578
Gambia	7,472
Democratic Republic of the Congo	7,386
Algeria	7,306
Suriname	7,182
Guinea	6,403
Congo	6,150
Angola	5,637
Togo	3,671
Tajikistan	3,545
Mali	3,480
Luxembourg	3,325
Bahrain	3,183
Mongolia	3,121
Kyrgyzstan	3,114
Palau	2,781
Mauritania	2,769

<b>Country</b>	<b>2010 Migrant Stock in USA</b>
Rwanda	2,614
Mozambique	2,559
Papua New Guinea	2,268
Qatar	2,237
Malawi	2,188
Botswana	1,922
Mauritius	1,916
Oman	1,644
Madagascar	1,496
Benin	1,415
Niger	1,329
Kiribati	1,248
Namibia	1,205
Burundi	1,187
Seychelles	841
Burkina Faso	810
Swaziland	766
Gabon	600
Guinea-Bissau	562
Chad	488
Bhutan	420
Lesotho	396
Equatorial Guinea	376
Central African Republic	371
Solomon Islands	192
Sao Tome and Principe	68
Maldives	49

## Curriculum Vita

Felipe Galán Uribe was born in Mexico City in 1977. He is the youngest of three children of Enrique J. Galán and Socorro A. Uribe. He graduated from CBTIS 122 in Chihuahua in 1995. After that he moved to the city of Juarez to study his Bachelor of Economics from the *Universidad Autónoma de Ciudad Juárez* in the summer of 2001. Mr. Galán entered the graduate school at the University of Texas at El Paso, in the summer of 2007, in order to pursue a Master of Science in Economics degree. At that time Felipe was the director of *Desarrollo Económico de Ciudad Juárez, A.C.*, a non-profit organization dedicated to promote economic development in his hometown, Juarez, Mexico. In 2008 he started teaching economics at the *Universidad Autónoma de Ciudad Juárez*. While pursuing the master's degree, Felipe Galán served in several organizations performing duties related to economic and social development planning, as well as bi-national cooperation between Mexico and the United States.

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