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# An Empirical Analysis of Migratory Flows to the United States

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## Abstract

The decision by economic migrants to leave their country of origin for the purpose of employment and to improve quality of life is generally regarded as an investment decision. Real or expected income differentials between the source and the host country and the possibilities of being employed in each influence the decision to migrate. Economic migrants also respond to non-pecuniary factors, such as climate, environmental amenities, and life cycle variables. This paper examines how labor market regulations may influence work migration to the United States. The hypothesis is that the negative effects of excessive labor market regulations on income reported by Fullerton et al. (2007) and Licerio et al. (2010) will increase migration to countries with more flexible and less restrictive regulatory labor markets. Data from the *Doing Business 2010* report describing labor market conditions in several countries and territories during 2010 are employed to describe labor market restrictiveness in 168 countries. Four models are specified to measure the effects of labor market restrictiveness on migration. Deviance Information Criterion (DIC) estimates are utilized to select the best specification for modeling migration to the United States. Empirical results confirm many of the hypotheses, but some of the outcomes are relatively weak.

**Keywords:** International migration, labor market regulation, applied econometrics.

**JEL Classification:** F22, J11, J61.

## 1. Introduction

International migration is a topic that continues to dominate worldwide policy debates. The term of economic migrants is commonly used to describe people that leave their country of origin for the purpose of employment and to improve quality of life (IOM 2004). This study examines the volumes of people that migrate in search of better opportunities in the United States. The United States is selected because its real income is relatively high and draws many migrants to it (Hanson 2006).

In addition to income differentials, there are different types of potential regulatory burdens that may influence migratory flows due to the impacts those measures exert on labor markets. Examples include regulations on hiring processes, number of work days and hours, and procedural requirements for dismissing workers. Given that, the paper also attempts to explore how labor market regulations may influence work migration to the United States. Economic migrants are assumed to be more 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.

The next section reviews several of the previous migration studies. Sample data, plus sources, are then presented along with an overview of the econometric model utilized. Empirical results obtained and policy implications are then discussed. A concluding section summarizes the study.

## 2. Literature Review

Many of the studies on migration approach the topic as a matter of human capital investment. 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 equilibria with high levels 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.

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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 closed 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 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, destination and origin physical attributes, 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 and 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 et al. (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 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 apparent anomaly is that residents of impoverished countries generally do not have access to information on foreign labor markets and they cannot afford costs of migration. That correlation eventually turns negative at higher levels 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 et al. (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 et al. 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 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

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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 et al. (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 et al. (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. Although labor market regulatory burdens have been shown to increase unemployment rates in developing countries (Feldmann 2013), the potential impact of this type of regulation on international migration has not been extensively analyzed. This study attempts to shed light on how labor market inflexibility may affect migratory flows.

### **3. Data and Methodology**

In 2010, 1.043 million people from around the world migrated to the United States (OECD 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 are factors that influence the costs and rewards of migration. The dependent variable is immigrants per thousand inhabitants, *IMMG*.

Distance from the country of origin, *DIST*, 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 of the United States to the geographic center of each of the 168 countries in the sample. Distances 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 (2011) reports Gross National Income, *GNI*, 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, *NATD*, 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 (UNDP 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 et al. 2013). The use of a common language is expressed in the specification by means of a dummy variable, *ENG*, 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 where English is the official or national language are more likely to choose the United States as a destination when migrating. Data are also collected on the number of immigrants residing in the U.S. by country of origin in 2010. This variable (*STOCK*) represents immigrant networks in the destination country and is expected to positively affect immigration.

The Doing Business 2010 report released by the World Bank (2011) 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

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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 2011). 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 of fixed-term contracts include contract renewals. The countries with restrictions of any kind on fixed-term contracts, FIX, 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. A dummy variable, NIGHT, 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, is used. NIGHT takes a 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 category is the maximum number of work days, WDAY, 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 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, LEAVE, 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. A qualitative variable, NOTTHIRD, is 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. The corresponding dummy variable for collective dismissals of multiple workers is NOTTHIRDC.

A value of one is also assigned to a binary variable, APPTHIRD, for 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, APPTHIRDC. 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, PRDIS, 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. A dummy, PRRE, is also used to categorize countries that have priority rules applying to re-employment.

Employers are sometimes obligated to reassign or retrain workers before being able to declare redundancies. A binary variable, RET, 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 sign for the coefficient for this variable, NOTICE, is positive. The majority of countries in the sample require severance payments from employers 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, SEV1, and the cost of dismissing a redundant worker with ten years of tenure, SEV10. 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 % 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% 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.

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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% of that country's population. Nine out of the 10 nations with the lowest percentage of nationals 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 % of its own population. Reflective of the role distance plays in international migration, Mexico has the largest number of migrants in the United States.

Australia, New Zealand, Guyana and another 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 of 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 employees 26 weeks prior to any 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 basis 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 3 % 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 including distance, income, language, climate, and stock of migrants are included in the equation.

$$Imm_{iUS} = \beta_0 + \beta_1(GNI_{USi}) + \beta_2(DIST_{USi}) + \beta_3(ENG_i) + \beta_4(NATD_i) + \beta_5(STOCK_i) + \sum_k \beta_k X_{ki} + \varepsilon_i \quad (1)$$

In Equation 1, *GNI* represents the ratio of Gross Nation Income Per Capita in the U.S. to per capita income in other countries, *DIST* represents distance; *ENG* is a dummy variable indicating if English is the official or national language; *NATD* stands for persons affected by natural disasters per 1,000 inhabitants and *STOCK* is the number of nationals 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 variable other than the binary variables included in the sample. 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>Mnemonic</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
Ratio of Gross National Income Per Capita in the U.S. to Gross National Income Per Capita in other countries	GNI	Ratio	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
Obligation to reassign or retrain workers prior to carrying out dismissals	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

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

#### 4. Empirical Results

Table 3 summarizes the outcomes of 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 magnitudes among variables, each one of the sets is presented in linear and logarithmic functional forms. Because of the nature of the sample, testing for heteroscedasticity is necessary. The homoscedasticity null hypothesis fails to be rejected, so ordinary least squares results are reported below.

Equations (1) and (2) include variables traditionally employed in gravity model specifications: 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 last two variables, but include all of the others.

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 different specifications (Spiegelhalter et al. 2002). The DIC for the linear and logarithmic specifications are computed using the procedures employed by Xiao et al. (2007). Computed DIC values favor Equation (2). That specification contains eight variables that are transformed using natural logarithms. In that model, seven of the coefficients are significant at the 90 % confidence level or greater. Two of the coefficients exhibit arithmetic signs that are opposite of what is hypothesized.

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 are generally lower and the probabilities of obtaining new jobs increase in the presence of preexisting migrant networks. Knowing people in the new country may also benefit migrants by providing greater social acceptance and safety.

Table 3. Alternative Estimation Output

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



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The Equation (2) benchmark specification output in Table 3 suggests a positive relationship 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. The elasticity estimated for this variable is 0.26, indicating that a 1 % increase in the *STOCK* variable for a given country leads to a 0.26 % increase in the number of migrants per 1000 inhabitants that relocate 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 in linear and in quadratic forms. Results shown for Equation (2) in Table 3 imply concavity in the migration function with respect 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 discussed by Gallardo-Sejas et al. (2006). These parameters indicate that migration from countries at the lower end of *GNI* ratio increases until that ratio reaches a value of 3.5. After that point, the elasticity becomes negative and migration to the United States decreases by 0.05 % for every 1 % increase in the *GNI* ratio. These results are consistent with the hypothesis that people migrate to countries with larger income levels (Groizard Cardosa 2008).

The other variable commonly included in migration research is distance between source and host countries. The coefficient estimated for *DIST* in Equation (2) of Table 3 says that a 1 % increase in distance causes migration to the United States to decrease by 0.13 %. The negative relationship between these two variables reinforces long-standing evidence reported in prior studies (Yezer and Thurston 1976). In Equation (2), distance is statistically significant at the 90 % 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. The computed *t*-statistic for its coefficient is significant at the 10 % level. The elasticity of migration with respect to *NOTICE* is 0.066. All else equal, a 1 % increase in the *NOTICE* term length leads to an increase of 0.066 % in migration to the United States. This is what is hypothesized for this parameter as it represents a source of regulatory rigidity in the labor market of the country from which a migrant originates.

The mandatory number of vacation days in each of the 168 countries is included in the sample to illustrate rigidity of hours. The results for Equation (2) indicate that the parameter estimated for *LEAVE* is significant at the 10 % level. It indicates that the elasticity of migration with respect to the number of mandatory vacation days is 0.10. Although nominally designed to improve working conditions, migration from a given country to the United States increases 0.10 % for every 1 % increase in the number of mandatory vacation days 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 interfere with market efficiency and, therefore, increase migration to better performing economies. Results in Equation (2) do not support this hypothesis. The coefficient for *FIX* has a negative sign and is significantly different from zero. 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 volumes of migration to the United States.

The sign of the estimated coefficient for the variable measuring difficulty of firing, *APPTHIRD*, does not support the hypothesis of a positive correlation 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 % confidence level. That outcome mirrors unemployment modeling results reported in Feldmann (2003) in which parameters estimated for firing and hiring regulations also fail to satisfy standard significance criteria.

The latter two variables with coefficient signs contrary to those hypothesized are excluded from 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 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 greater rates of emigration, presumably by causing labor markets to underperform. On the other hand, limits on a fixed-term employment relationships seem to help retaining people at their

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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.

#### 4. Conclusion

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 et al. 2007; Licerio et al. 2010). Burdensome red tape has also been found to hamper labor market efficiency and lower employment levels below full capacity (Pissarides and Wadsworth 1989; Feldmann 2003; 2008; 2013). Given these issues, migratory flows will potentially increase to less regulated, better performing economies.

Results obtained in this paper 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 et al. 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 Feldmann (2008), where difficulties of hiring and firing workers are reported to be unrelated to employment levels.

Two of the variables representing labor market regulatory burdens are found to affect immigration in a manner consistent with the hypotheses. 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 % significance criterion. Together, these coefficients imply that countries wishing to avoid unnecessary labor resource losses will generally 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.

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#### References

- Ashby, N., Bueno, A., & Martínez Villarreal, D. (2013). The Determinants of Immigration from Mexico to the United States. *Applied Economics Letters*, 20, 638-641. <http://dx.doi.org/10.1080/13504851.2012.727964>
- Corden, W.M., & Findlay, R. (1975). Urban Unemployment, Intersectorial Capital Mobility and Development Policy. *Economica*, 42, 59-78. <http://dx.doi.org/10.2307/2552986>
- DistanceFromTo. (2009). *Countries*. Retrieved from: [tp://www.distancefromto.net/countries.php](http://www.distancefromto.net/countries.php)
- Feldmann, H. (2003). Labor Market Regulation and Labor Market Performance: Evidence Based on Surveys among Senior Business Executives. *KYKLOS*, 56, 509-540. <http://dx.doi.org/10.1046/j.0023-5962.2003.00236.x>
- Feldmann, H. (2008). Business Regulation and Labor Market Performance around the World. *Journal of Regulatory Economics*, 33, 201-235. <http://dx.doi.org/10.1007/s11149-007-9040-1>
- Feldmann, H. (2013). The Unemployment Effect of Hiring and Firing Regulation in Developing Countries: Survey Evidence. *Applied Economics Letters*, 20, 1603-1607. <http://dx.doi.org/10.1080/13504851.2013.829176>

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- Fullerton, T. M., Jr., De León, M., & 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., & Martínez-Serrano, J. A. (2006). Determinants of European immigration: a cross-country analysis. *Applied Economics Letters*, 13, 769-773. <http://dx.doi.org/10.1080/13504850500424975>
- Greenwood, M. J. (1985). Human Migration: Theory, Models, and Empirical Studies. *Journal of Regional Science*, 25, 521-544. <http://dx.doi.org/10.1111/j.1467-9787.1985.tb00321.x>
- Groizard Cardosa, J. L. (2008). Migration to Developed Countries: New Evidence. *Revista de Economía Aplicada*, 16(46), 5-35.
- Hanson, G. H. (2006). Illegal Migration from Mexico to the United States. *Journal of Economic Literature*, 44, 869-924. <http://dx.doi.org/10.1257/jel.44.4.869>
- Hanson, G. H., & McIntosh, C. (2010). The Great Mexican Emigration. *Review of Economics and Statistics*, 92, 798-810. [http://dx.doi.org/10.1162/REST\\_a\\_00031](http://dx.doi.org/10.1162/REST_a_00031)
- Harris, J., & Todaro, M. P. (1970). Migration, Unemployment and Development: A Two-Sector Analysis. *American Economic Review*, 60, 126-142.
- IOM. (2004). *Glossary on Migration*. Geneva: International Organization for Migration.
- Lewis, P. M., Simmons, G. F., and Fening, C. D. (2013). *Ethnologue: Languages of the World* (17<sup>th</sup> Edition). Dallas, TX: SIL International.
- Licerio, E., Fullerton, T. M., Jr., & Clark, D. P. (2010). Empirical Evidence Regarding Regulatory Burdens and Global Income Performance. *Economic Studies of International Development*, 10(2), 5-32.
- OECD. (2012). *Stat Extracts*. Paris: Organization for Economic Co-operation and Development. Retrieved from: <http://stats.oecd.org/Index.aspx?DataSetCode=MIG#>
- Pissarides, C. A., & Wadsworth, J. (1989). Unemployment and the Inter-Regional Mobility of Labour. *Economic Journal*, 99, 739-755. <http://dx.doi.org/10.2307/2233768>
- Sjaastad, L. A. (1962). The Costs and Returns of Human Migration. *Journal of Political Economy*, 70, 80-93. <http://dx.doi.org/10.1086/258726>
- 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, 583-616. <http://dx.doi.org/10.1111/1467-9868.00353>
- UNDP. (2012). *Indicators*. New York: United Nations Development Program. (2012). Retrieved from: <http://hdrstats.undp.org/en/indicators/98706.html>
- World Bank. (2011), *Doing Business 2010*, Washington, DC: Oxford University Press.
- Xiao, J., Zarnikau, J., & 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. <http://dx.doi.org/10.1016/j.eneco.2006.02.005>
- Yezer, A. M., & Thurston, L. (1976). Migration Patterns and Income Change: Implications for the Human Capital Approach to Migration. *Southern Economic Journal*, 42, 693-702. <http://dx.doi.org/10.2307/1056262>