



Skilled labor migration and isomorphism in business sectors of the main Mexican cities

Migración de trabajo calificado e isomorfismo en sectores empresariales de las principales ciudades mexicanas

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Abstract

Recently, the contributions regarding the organizational theory highlight the importance of the symbiotic evolution between organizations and their environment. This study addresses this relation considering skilled labor migration as an environmental element that influences in the evolution of business organizations, manifested in isomorphism. In turn, isomorphism is measured by two indicators: the level of diversification of the economic sectors, and the number of companies certified with quality standards. The effect of a greater migration of people with higher education in the indicators of isomorphism for 78 Mexican cities is estimated through econometric models, utilizing instrumental variables to control the endogeneity of the migration. The results provide evidence that skilled labor migration affects both indicators, but it is necessary to cross a threshold so that it influences the isomorphism of the companies in the Mexican cities.

JEL Classification: D21, J24, O15, R23.

Keywords: Organizational environment, Organizational isomorphism, Migration, Qualified labor.

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Resumen

Recientemente los aportes referentes a la teoría organizacional apuntan a la importancia de la evolución simbiótica entre las organizaciones y su ambiente. El presente estudio aborda esta relación considerando la migración de trabajo calificado como un elemento ambiental que incide en la evolución de organizaciones empresariales, manifestada en un isomorfismo. A su vez, el isomorfismo es medido por dos indicadores: el nivel de diversificación de los sectores económicos y el número de empresas certificadas con estándares de calidad. Se estima el efecto de una mayor migración de personas con educación superior en los indicadores de isomorfismo para 78 ciudades mexicanas mediante modelos econométricos, utilizando variables instrumentales para controlar la endogeneidad de la migración. Los resultados dan evidencia de que la migración de trabajo calificado incide en ambos indicadores, pero se requiere pasar un umbral para que influyan en el isomorfismo de las empresas en las ciudades mexicanas.

Códigos JEL: D21, J24, O15, R23.

Palabras clave: Ambiente organizacional, Isomorfismo organizacional, Migración, Trabajo calificado.

Introduction.

From the evolutionary approach of organizations presented in the work by Hannan and Freeman (1977), the impact of environmental factors on the differentiation of organizations as a survival process has been researched. However, based on Powell and Di Maggio (1999), a series of studies derived from the premise which the environment causes organizations that are grouped in certain sectors to experience isomorphism, that is, a process of homogenization process of organizational structures.

The literature addresses several factors that cause isomorphism, such as accounting legislation reforms (Doadrio, Alvarado and Carrera, 2015), the interference of regulatory agencies (Moura, Domingos, Cabral and Santos 2014; Filho and Sousa, 2013), the implementation of environmental practices (Gellers, 2012; Morais, Oliveira and Souza, 2014; Borges, Dutra and Scherer, 2014), culture (Gallén and Peralta de Grado, 2016; Fuentes, 2013), the general legal system, governance and globalization (Gallén and Peralta de Grado, 2016), the participation of the Dow Jones Sustainability Index (Jacomossi, Casagrande and Reis, 2015), foreign financing (Mir and Bala, 2015; Salas, 2010), and the clients, workers and unions (Filho and Sousa, 2013). Evidently, the role of the workforce in organizational homogenization has been barely studied.

Regarding the workforce, migration is a variable of particular importance because it acts as an environmental mechanism that influences organizations by altering the available workforce, and thus determines its evolution and structure to a certain degree (Manic, 2016; Castelhana, Lawell, Sumner and Taylor, 2016; Mora Rivera and Arellano González, 2016; Santermer and Giangaspero, 2011; Nava-Tablada, 2012; Chen, Frank, Thomas and Jianguo, 2012). In the case of Mexico, there are few studies that address isomorphism (Sánchez Ramos, 2007; Ruiz Ortega, 2015; Lara Gómez and Pérez Sosa, 2015; Rivera and González, 2016; Cabrera Rubio, 2016; Rosas, Sánchez and Martínez, 2012); yet although Gonzáles Zepeda and Escala Rabadán (2014) analyze the case of migrants from Michoacán, they do not deem migration as a factor for isomorphism. In this sense, considering the historical and recent importance of national and international immigration in Mexico, and that organizational theory highlights that the environment acts as a symbiotic force in the development of organizations, interest arises in researching the role of immigration of skilled labor in the isomorphism of the corporate

structure of the main Mexican cities.

In this manner, this study continues in the second section addressing theoretical aspects regarding the two dimensions of analysis, i.e. the organizational environment and migration. On the one hand, organizational theory points out the argument that the environment and the organization affect each other (there is endogeneity); also (along with some migration theories discussed in section 2.2), that the evolution of both can be shown on an isomorphism caused by the highly skilled workforce that looks for greater competitiveness. Subsequently, the third section presents the methodology used to empirically analyze the effect of skilled labor migration on the isomorphism of the economic sectors of seventy-eight Mexican cities controlling the endogeneity of migration. The fourth section shows the results, and the fifth section presents some conclusions.

Theoretical aspects

Organizational environment

Recapitulating on the fact that the contributions of the scientific administration and the behavioral school were not enough to explain the complexity concerning the organizational sphere, several theorists began adopting the standpoint of viewing the organization as an open system, i.e. the environment affects, in some manner, the performance and operation of the organization. According to the contingency theory, the environment establishes certain restrictions and conditions that influence the functioning of the organizations, which requires a certain capacity to adapt to the particularities of the changing environment. Mintzberg (1997) argues that the contingency theory is incomplete when attempting to explain organizational performance in terms of the external and internal factors that affect the organization, thus suggests including the overall functioning of four main elements: the parts of an organization, its coordination mechanisms, the design parameters and the situational factors, among which is the environment.

The arguments of the contingency theory that state that certain type of organizations can only perform suitably in certain environments place the organization in a position of environmental adaptation. This position was contrasted with the population ecology theory by Hannan and Freeman (1977), who argue that a complete theory of the organization and its environment should consider both adaptation and selection for they are not mutually exclusive factors, but rather complement each other. In this sense, these authors depart from the core issue that the environment optimizes combinations of organizations (natural selection rationality), and this selection involves competition and the principle of isomorphism. Therefore, they present an ecological competition model, which, on the one hand, defines the growth process of the population according to the capacity of the environment to support organizational forms, and on the other, the rate at which the population changes when the environment withstands changes. Morgan (2006) argues that this deterministic posture has been criticized for minimizing the importance of strategic management; in this regard Mintzberg, Ahlstrand, and Lampel (1998) present some of the criticism of population ecology in general regarding the role of the origin of environmental variations and the aggressive strategic actions of another organization.

Morgan (2006) argues that the contingency theory is based on the assumption that the environment and the organization are independent. However, other theories refute this

assumption, such as the population ecology theory by Hannan and Freeman (1977) or the chaos theory. The latter assumes that the organization and the environment are elements of the same interconnected pattern, characterized by multiple organized and chaotic systems and interactions that present random disturbances which, in turn, produce unpredictable events and relations. Rivas Tovar (2009) emphasizes that according to Cambell (1993), chaos theory is characterized by being dynamic, non-linear and having transactional elements. Other theories assume a more complex relation between the organization and the environment, such as Prigogine's theory of the dynamics of far-from-equilibrium systems and the complex adaptive systems theory. Burgelman (2015) mentions that Prigogine judged that the evolution of a social system implied an interaction in the behavior of its actors and the random restrictive incidence of the environment. For its part, the adaptation to the edge of chaos theory considers that the complex systems are located between order and chaos, and are a normal result of selective evolution.

Even though up to this point the theories exposed have acknowledged the existence of a bidirectional relation between the organization and its environment, the role of the workforce characteristics gains importance with the institutional theory addressed by Powell and Di Maggio (1999). Although this theory is based on the way that formal and informal rules affect organizations, the authors mention that the isomorphism concept is more complex since an organization is induced (by environmental factors) to become similar to the rest in order to adapt to the environmental context, and this could be reflected on organizational characteristics related to the market (competitive isomorphism) or in the rules, policies or legislation (institutional isomorphism). It is under the concept of isomorphism that organizations begin a process of homogenization when seeking to innovate in order to achieve a better performance or an organizational change.

Powell and Di Maggio (1999) emphasize that institutions cause an organizational isomorphism through bureaucratization and through coercive, mimetic and normative environmental mechanisms; professionalization and the pressure of the highly skilled workforce stand out as normative mechanisms. Normative isomorphism happens for two reasons: first, because the professional profile is similar among highly skilled workers, given the similarity in the characteristics of their acquired knowledge (which in turn is caused by the existing isomorphism in professional education organizations); and second, due to the socialization or transcendence of professional networks outside the organization. Furthermore, given that homogenization can take place in the structure, process and/or behavior of the organizational fields or groups, the indicators of isomorphism will vary depending on the field and objective of the analysis, although these authors suggest observing the standard deviation of the variables under study. In this manner, considering that migration is closely related to the amount and quality of the workforce of a locality, the theory behind the concept of isomorphism justifies the importance of analyzing the migration of highly skilled labor as an environmental factor in the evolution of the productive organizations of a locality.

Migration

According to Massey (2015), migration theory focus on socioeconomic and institutional elements related to the places of origin and destination, as well as the characteristics of the individuals that are likely to migrate and the organizations that encourage migratory flows. Different theories relate these flows to the organizational environment and/or the quality of the migrant labor. The neoclassic economic theory proposes the idea that a greater workforce in a locality compared to another, results in a different marginal product of labor, and therefore on salary, cause a displacement of work (immigration of workers) towards the place where the pay is higher. The displacement causes the marginal product to decrease and with it the salary, until reaching a point of balance. The Harris-Todaro and Todaro-Maruszko models extend this theory, first arguing that the decision to migrate is more likely related to the expected income gap between the place of origin and the destination, and later basing this decision on the lifetime returns of labor. This theory implies that migration has a growth effect on the industry (by increasing production), but does not assume any specification on the quality of the migrant labor.

Under the social capital theory, migration is explained by the creation of links or social networks established by pioneer migrants, who after acquiring knowledge and experience with regard to the expenses and risks inherent to migration, make it possible to reduce such expenses and risks for future migrants, incentivizing them to migrate (Massey, 2015). On the other hand, the institutional theory and the world systems theory explain migration through the interference that changes in the structure of markets, legislation, formal and informal standards, and rules, impose on the population of a location, causing a certain segment of this (such as the highly skilled workers) to be prone to migration (Massey, 2015). Now, according to the conventional economic theory by Piore (1979), migration is caused by industries that establish mechanisms to sustain work hierarchies with the lowest salaries through temporary migrant work programs sponsored by governments or by the industries themselves. Thus, these theories differentiate migrant workforce according to their quality, but focus on the effect of the industry towards migration.

The plausible difference in the quality of the migrant force is once again made evident in the new economics of labor migration theory exposed by Stark and Bloom (1985), in which migration originates in the sentiment of the individuals towards the perception they have about their deprivation or satisfaction regarding their income or skills. Therefore, the decision to migrate is generally taken within a group that has been affected by that decision, such as the family or a more complex social group, in order to reduce the expenses and risks (through remittances and income slightly correlated to the source of income obtained in the place of origin), and to take advantage of the network and kinship capital (Goldin, Reinert and Beath, 2007). Concerning the aforementioned, the financial portfolio theory has been applied (Anam and Chiang, 2007), in which it is argued that a family diversifies their portfolio of assets (family members) by mobilizing one of its members to different labor markets in order to increase the total income and reduce risk.

Another recent theory presented by Massey (2015) is that of the migration crisis, in which the migratory flows are explained by the interests and behaviors of bureaucrats, politicians and experts, who mobilize political and material resources for purposes that are seemingly unrelated to migration. According to this theory, migration is “demonized” by associating it to

negative concepts such as crime or illegality. Political actors use the solution to the “problem” as a means to achieve other objectives. This is very different to what is presented by the theory of the state, in which the organizations of employers and workers persuade political actors and the government to restrict or expand the flow of migrants, mainly due to economic reasons (Massey, 2015). In times of economic growth, unemployment is low and production increases, which motivates employer organizations to request a greater number of immigrants. In these cases, migration policy is flexible, in the sense that the characteristics of the migratory power can be limited, e.g. in terms of geography or human capital. The study of skilled labor or people with high human capital (e.g. high education) migration is of special interest, as it is considered that companies and organizations remarkably interfere in the determination of this group of migrants (Pekkala Kerr & Kerr, 2013; Bermúdez Rico, 2010; Rodríguez Gómez, 2009) and vice versa.

Although these theories are mainly focused on the determinants of migration, some important aspect regarding the objectives of this study are evident. On the one hand, different theories present evidence on the context in which the migratory flows of skilled and unskilled workers take place; for this reason, their effects on organizations could also be different and, therefore, it is justifiable to carry out an analysis that addresses one type of migrant workforce, in this case, the ones that are highly skilled. On the other hand, although some theories do not present specific effects of migration in the organization, they show the general effects in the industry through the effects in production or competitiveness. In this regard, the literature clearly shows that migration is a very important phenomenon because of its effects on both the place of origin and the destination (Peri, 2012; Tovar & Vélez, 2007; Boustan, Fishback, & Kantor, 2010; Hjorth, 2009; Ortega & Peri, 2009; Goldin et al., 2007), among which, the effects on the structure of productive organizational sectors stand out. For example, although some studies show that remittances are mainly allocated to consumption (Zarate-Hoyos, 2004; Cuong and Mont, 2012; Airola, 2007) there is evidence that migration can promote the development of productive organizations in the place of origin through the investment of remittances (Manic, 2016; Castelhana, Lawell, Sumner and Taylor, 2016; Mora Rivera and Arellano González, 2016; Santermer and Giangaspero, 2011); or, unless there is structural unemployment that allows the “replacement” of such workers, limit it through the decrease in workforce (Nava-Tablada, 2012; Miluka, Carletto, Davis & Zezza, 2007). One last aspect that should be highlighted is the existence of a causal bidirectional and possibly complex (non-linear) relation between migration and organizations, i.e. the two are mutually explained and, therefore, are endogenous variables. This situation can present bias when trying to estimate the effect of migration on the organizational variables if the opposite effect is not isolated.

Methodology

To estimate the effect of an environmental factor on organizational isomorphism, regardless of the effect of other environmental factors, an statistical analysis of the interest variables is carried out, so as to subsequently adapt a multivariate econometric analysis of the interest variables. For this, the variables proposed in the analysis are based on theory or on empirical evidence of previous studies. Regarding the dependent variable related to isomorphism, Powell and Di Maggio (1999) mention that it is reflected on the organizational characteristics related to the market (competitive isomorphism) or to the rules, policies or legislation (institutional

isomorphism); therefore, the proposal is to carry out the estimation of two dependent variables that correspond to these two types of isomorphism. Similarly, Powell and Di Maggio (1999) mention that the unit of analysis in isomorphism research can not only comprise the companies that compete with each other, but even covering the totality of the important actors. Thus, the analyzed organizational field in this study is the total number of companies established in the seventy-eight main Mexican cities.

According to Hannan and Freeman (1977) cited by Powell and Di Maggio (1999), competitive isomorphism can be generally measured by the changes in market niches; this ranges from modifications in the business structure in a specific field to modifications in groups of aggregated economic sectors. Thus, it is possible to investigate if a decrease in the number of economic sectors in a city is influenced by competitive isomorphism mechanisms that seek, for example, to make use of the economies of scale in an industry through their concentration in a locality. On the other hand, as previously mentioned, institutional isomorphism can be measured by variables related to change in organizational policies; thus, the idea is to measure this type of isomorphism through the ratio of companies that adopt a quality or sustainability policy manifested through the acquisition of an ISO 9000 or ISO 14000 certification. Regarding the explicative variable, the aim is to identify whether a greater immigration of skilled people (potential workers) has an effect in a competitive or institutional isomorphism in the established companies of a specific city, measured by a convergence in the attainment of certifications or a fewer number of economic sectors.

According to econometric theory, it is important to include the appropriate control variables to obtain a reliable estimator of the independent variable of interest. Based on theory and the empirical evidence referred to in the first section, these variables include forces related to the degree of dependence of the organization to external factors. Powell and Di Maggio (1999) argue that the dependence and the imitation of other organizations are coercive and mimetic mechanisms of isomorphism; therefore, the number of large companies in the CNN-expansion ranking of the 500 more important companies of Mexico (*empgrand*) were included, since they are considered leaders. Furthermore, given that they refer to isomorphism as a process in which organizations change according to the changes of others in the same field, it is important to control the past values of the dependent variable (the certification or the diversification). In the same manner, Powell and Di Maggio (1999), Mir and Bala (2015), and Salas (2010) suggest that a greater dependency of external financing generates greater isomorphism, therefore, the amount of credits granted to the companies in pesos (*créditos*) and net foreign investment (*ied*) are included. A productivity variable is also included, as it is linked to isomorphism mechanisms such as the interference of regulatory agencies, workers and syndicates (Filho and Sousa, 2013), culture (Fuentes, 2013), and the implementation of environmental practices (Gellers, 2012). Finally, a variable of the population with higher education (*pobeducsup*) is also included given that Powell and Di Maggio (1999) argue that professionalization is a normative mechanism of isomorphism.

Econometric model

Finally, endogeneity is econometrically addressed through instrumental variables, that is, variables that are not correlated to the dependent variable, but are correlated to the explicative endogenous variable (Wooldridge, 2009). When data are available in time, as is the case of

longitudinal panel, the strategy is to use lags of the variables as instruments of themselves (Cameron and Trivedi, 2010). Thus, to estimate the effect of skilled labor migration on the two variables of corporate isomorphism controlling the endogeneity of the migration variable, the following econometric model is proposed (1):

$$vd_{it} = \alpha + \beta mtc_{it} + C_{it}'\gamma + \varepsilon_{it} \quad (1)$$

where the isomorphism indicator (vd) is expressed by the number of economic sectors (*diversec*) based on the North American Industry Classification System (NAICS) or on the number of companies with ISO 9000 and ISO 14000 (*eciso*) certification for each thousand companies of entity i in time t . For the migration indicator for skilled labor (mtc) the number of migrants above 25 years of age with a higher education in thousands (*migc*) or the ratio of these migrants with relation to the total population (*pmigc*) of entity i in time t is utilized as variable. C is the vector of control variables explained in the above section, ε is the idiosyncratic error, α and β are parameters, and γ is a parameter vector.

Data

Starting from the characteristics of the unit of analysis (Mexican cities) and considering that the interest variables are linked to the competitiveness subject, this study uses raw data from the Mexican Institute for Competitiveness (IMCO for its acronym in Spanish) employed in the creation of the urban competitiveness index (IMCO, 2016), which includes annual data (2008-2014) from seventy-eight cities considered in that index. It is worth mentioning that due to a lack of availability of data at the city level of the *eciso* variable (number of companies certified with ISO 9000 and 14000), the data of the cities were grouped by state, so annual state data (2008-2013) is reported in the estimations of this model. The properties of (1) and the availability of data for several cities for several years allow the estimation of a dynamic econometric model with longitudinal panel data through Arellano-Bond's generalized method of moments in two stages (Cameron and Trivedi, 2010).

Results

Figure 1 shows the number of classes of economic sectors in the seventy-eight cities considered in the analysis. From this graph, it can be first observed that the main cities of Mexico (Mexico city, Monterrey and Guadalajara) have a broad diversification of economic classes, approximately 900², due to their size. On the other hand, the cities with a lower average diversity were Rio Verde-Ciudad Fernández and Guanajuato (a little less than 360 economic classes). Another interesting information is that in most cities (56 out of the 78 analyzed) the number of economic sectors decreased between 2012 and 2013, indicating a smaller diversity. Disaggregating the analysis by levels, this decrease was mainly present in those cities with a little more than 600 economic sectors.

²According to the INEGI, the total economic sectors of the NAICS is 20, which are disaggregated into 1051 classes.

The fact that the cities with greater diversity are those that have a bigger population, in addition to the fact that most showed a decrease in the number of sectors since 2013, could arise the problem of presenting a spurious relation to arguing that the migration of skilled people is positively correlated to the size of the locality where they migrate; however, by observing Figure 2³, it is clear that there is not a constant positive relation between the number of sectors and the ratio of skilled migrants, but it rather increases to a decreasing rate.

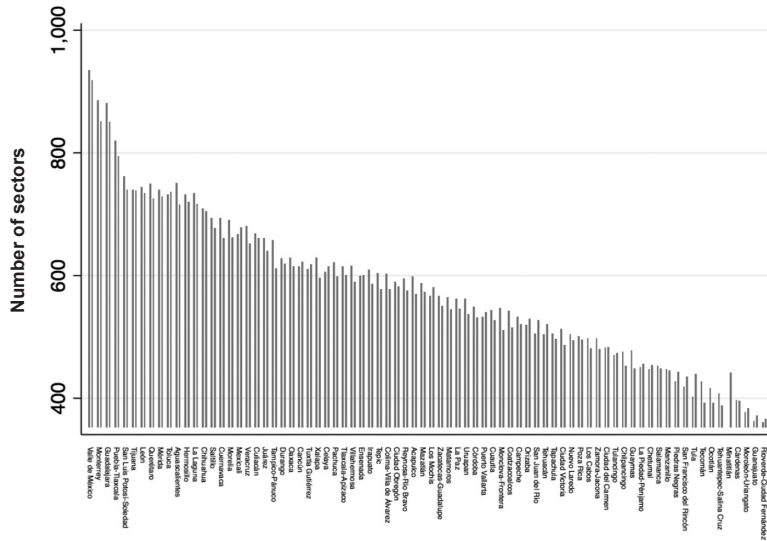


Figure 1. Diversification of economic sectors by city 2012-2013.
 Source: own elaboration with data from IMCO (2016).

In the same manner, it is evident that the average and the standard deviation of the number of sectors decreased during the analyzed period (quadrant I of Figure 3), which according to Powell and Di Maggio (1999) suggests the presence of isomorphism. Besides, the number of skilled migrants and their ratio in accordance with the total population in the same age range (25 years or more) show a sustained increase in the observed period, with a slight sustained decrease in the ratio of skilled migrants between 2013 and 2014. From this figure, the inverse relation between both variables in time is evident, i.e., while the number of migrants and their ratio increased, the number of economic sectors decreased. However, although this inverse relation seems to back up the hypothesis that skilled labor migration causes isomorphism, it is necessary to carry out the adequate analysis of causality through the econometric model.

Departing from the relation found in Figure 2, model (1) was estimated by first analyzing whether there was evidence of a positive linear relation, and then allowing a quadratic behavior. In models 1 and 2 of Table 1, *migc* is used as an independent variable, and *pmigc* is used for the rest; the functional form of models 1, 3 and 5 allows a linear effect of migration, while models

³Although only the relation for 2014 is shown in this figure, the same relation is present in the other years.

2, 4 and 6 assume a quadratic relation; models 3 and 4 prove whether or not the significance of *pmigc* is robust despite the high correlation (Pearson correlation coefficient of .99) of *pobeducsup* with the above of 25 years of age population variable utilized in the construction of *pmigc*. Finally, it is important mentioning that tests were done to confirm the compliance of the consistency assumptions for Arellano-Bond estimators as well as valid overidentification by Sargan, with all models being 95% adequate in both tests. Moreover, given that the standard errors normally reported show bias (Cameron and Trivedi, 2010), robust standard errors are utilized, which also resolve potential heteroscedasticity in the idiosyncratic error.

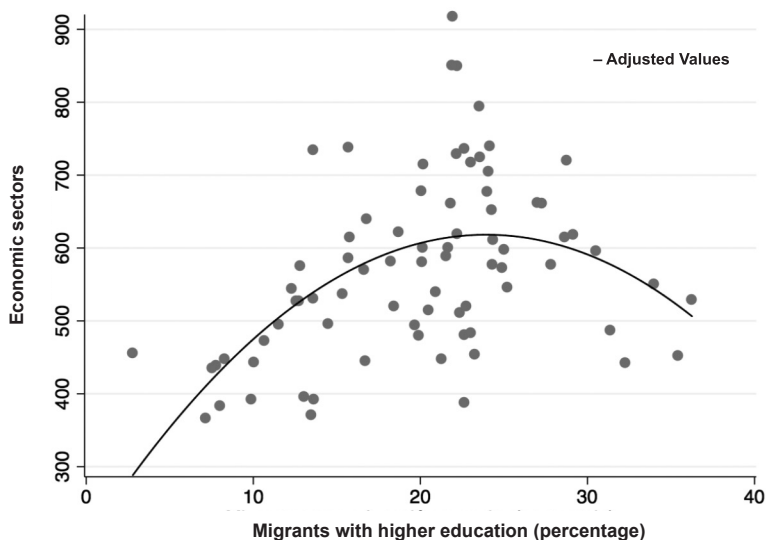


Figure 2. Economic sectors and skilled migrants in Mexican cities (2014)
 Skilled migrants as a ratio of the total population above 25 years of age.
 Source: own elaboration with data from IMCO (2016).

Table 1 shows that the *créditos* coefficient for companies presents a different sign depending on whether the number or ratio of skilled migrants is included in the model; when the number of migrants is included, the *créditos* coefficient has a positive sign, contrary to the theory, but it is only significant in model 2 (although not all decimals appear due to space issues, around two hundred billion pesos in credit are needed for companies to create one more economic sector). In the case of models that estimate the ratio of migrants, the sign of the *créditos* coefficient for companies is negative according to the theory, but is only significant at 95% in models 5 and 6; furthermore, the effect is once again minuscule. These discrepancies question the role of the credits in the economic diversification of the cities, and encourage the realization of a more in-depth study on the characteristics of these credits as the granting mechanisms, the acquirers characteristics, and the real destination of resources. For example, it is possible that a considerable portion of these credits are destined to small companies that offer traditional products or services such as food preparation (restaurants) or beauty salons, which belong to

economic sectors that present few or no changes over time, and which require little innovation in their processes and, therefore, do not have a significant interference in the diversity of other economic sectors.

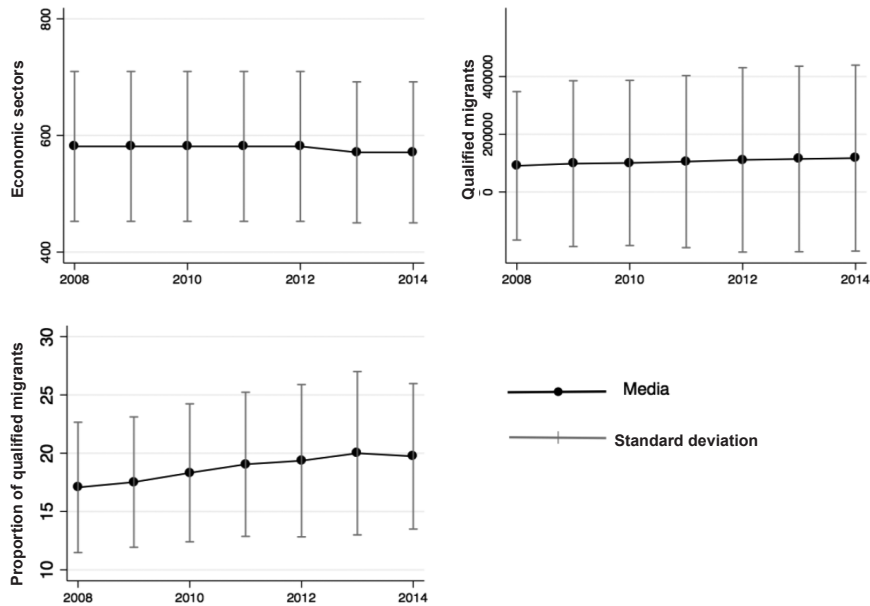


Figure 3. Evolution of the economic sectors and skilled migrants in Mexican cities (2008-2014). Averages and standard deviations correspond to the total number of cities. Source: own elaboration with data from IMCO (2016).

Table 1 shows that the foreign direct investment (FDI) coefficient has the expected sign and is significant in the first four models, indicating that an increase of approximately one hundred million dollars of FDI leads to a reduction of 1 or 2 economic sectors on average. This result provides evidence that the economic sectors in the Mexican cities have a greater dependency (as organizational field) on FDI than locally granted credits, possibly because they are mainly destined to research projects and development, which translates into greater isomorphism. Finally, there is no doubt that the last control variable included (large companies) influences isomorphism, as it is significant in all models; however, it is inconsistent by having the expected sign only in models 5 and 6 of Table 1, when it is not controlled by population with a higher education. Evidently, there is a high correlation between the variables of large companies and the population with higher education (Pearson correlation of .98), which makes it difficult to isolate the partial effect of both variables.

Table 1
Estimation of (1) using the number of economic sectors in the city as dependent variable (*diversec*).

<i>diversec</i>	1	2	3	4	5	6
<i>diversec (LI)</i>	0.1960**	0.2145**	0.3703**	0.3606**	0.6281**	0.5961**
<i>pobeducsup</i>	-0.6787**	-0.6266**	-0.2198**	-0.2227**		
<i>productividad</i>	-0.0076	-0.0127	-0.0015	-0.0012	-0.0200	-0.0514*
<i>créditos</i>	0.0000	0.0000**	-0.0000	-0.0000	-0.0000*	-0.0000*
<i>ied</i>	-0.0161**	-0.0125**	-0.0210**	-0.0210**	-0.0076	-0.0073
<i>emprgrand</i>	10.9407**	9.4044**	6.9084**	7.1448**	-1.7745**	-1.8130**
<i>mígc</i>	0.4520**	0.3526*				
<i>mígc_{sq}</i>		0.0000				
<i>pmígc</i>			0.2939	0.2849	-1.6350**	1.8104**
<i>pmígc_{sq}</i>				-0.0001		-0.0875**
N	370	370	370	370	370	370
chi2	147.56	453.07	297.22	297.43	324.01	343.95
p-value	0.00	0.00	0.00	0.00	0.00	0.00

Legend: * $p < .05$; ** $p < .01$

Source: own elaboration with data from IMCO (2016).

Regarding the estimators of the interest variable of models 1 and 2 of Table 1, it can be observed that the number of skilled migrants variable presents a positive sign and there is no statistical evidence that the relation is quadratic. This coefficient explains that if the number of skilled migrants in a city increases by approximately two thousand individuals, then an economic sector is expected to rise; in other words, there is no evidence that a greater number of migrants will lead to isomorphism, as argued after Figure 3. However, the arguments presented in figures 2 and 3 on the effect of the ratio of skilled migrants on the number of economic sectors are supported by models 5 and 6. The coefficient of the migrant ratio in model 5 indicates that an increase of 1 percentage point leads to a decrease of 1.6 economic sectors on average (there is isomorphism according to what was expected). Besides, the specification of model 6 is the only one with all the significant coefficients and the expected sign; in this case, it indicates that as the ratio of migrants with higher education increases, the number of economic sector classes in a city increases to a decreasing rate, meaning that there is evidence of a threshold in that ratio (approximately 10.34%) from which a higher ratio of skilled migrants in a city decreases the number of economic sectors, i.e. there is isomorphism. Therefore, it seems to be a reconciliation with the findings of models 1 and 2 in which a positive effect on a greater number of migrants is found: in order for isomorphism to be present, it is not enough to have a greater immigration of skilled workers, as the population of the city will naturally increase; it is necessary that these skilled immigrant workers cross a threshold so that they represent the majority in relation to the rest of the skilled people. These results make sense under the argument that the greater a group of workers with a certain ideological profile, the easier it is for that ideology to be instilled in the other workers, which is basically the justification behind normative isomorphism presented by Powell and Di Maggio (1999).

Continuing with the analysis of institutional isomorphism, Figure 4 shows something

similar to Figure 1 in the sense that the most economically relevant cities or entities are those with a greater number of companies certified with ISO. Moreover, it can be observed that even though the number of these companies increased annually in all entities, it is quite evident the relatively low number of companies that obtain this certification in the main Mexican cities—where the average is of only approximately 71 per thousand companies in the city—. Also, the relation between the number of certified companies and migrants with higher education is shown in Figure 5, which seems to support the hypothesis of the study as there is a clear positive relation between both variables in each year.

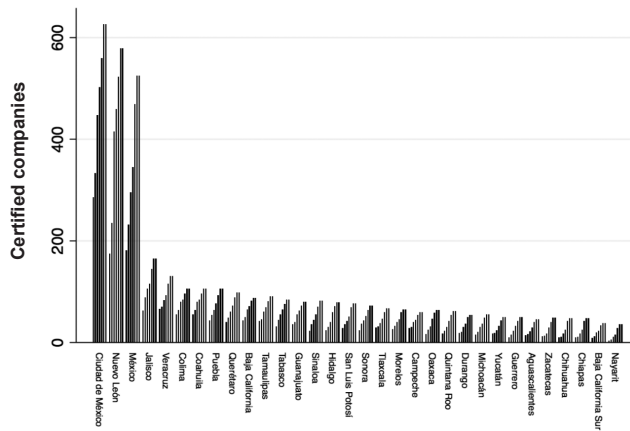


Figure 4. Companies with ISO 9000 and ISO 14000 certification by entity. Number of annually certified companies per thousand (2008-2014). Source: own elaboration with data from IMCO (2016).

Thus, the estimations of model (1) are shown in Table 2⁴, considering the logarithm of the number of ISO 9000 and ISO 14000 certified companies as dependent variable. In models 1 and 2 the ratio of skilled migrants was estimated. The results of Table 2 indicate that the models were estimated with data for the 32 states of Mexico for four years (due to the loss of information when using the instruments); furthermore, all the models were statistically significant overall. Almost all variables were individually significant, although some present the opposite sign to what was expected, since according to the theoretical discussion on isomorphism it is expected that an increase in these would generate a greater number of certified companies.

Thus, Table 2 first shows that the dynamic of the dependent variable in time is significant and positive, that is, an increase in the number of ISO 9000 and ISO 14000 certified companies in a certain year will have a positive effect of almost the same magnitude in the number of certified companies the following year. This result was evident in Figure 4, where the sustained increase in the number of certified companies for all states in the country can be clearly observed.

⁴Once again, the consistency tests by Arellano-Bond and the test of valid overidentification by Sargan were carried out, with all the models being 99% adequate in both tests.

Therefore, in this case, it can be confirmed that institutional isomorphism follows the feedback of the same homogenization process, i.e. there is a “spread” through which the presence of certified companies causes other companies to seek and obtain a certification.

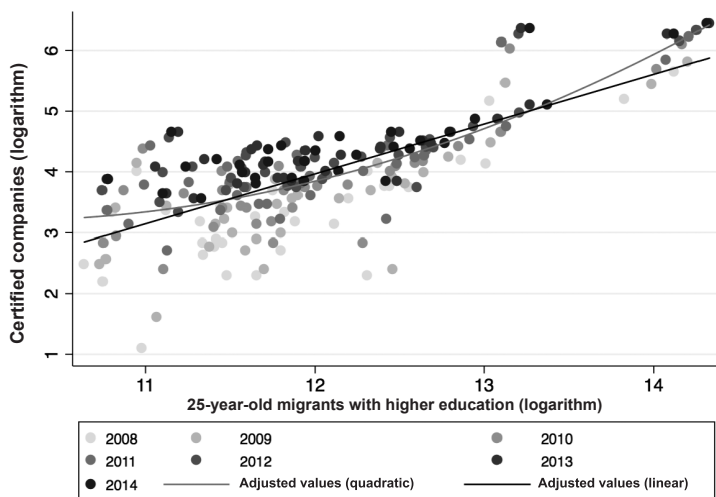


Figure 5. Migrants with higher education and companies certified with ISO 9000 and ISO 14000 State data for years 2008-2014.

Source: own elaboration with data from IMCO (2016).

The models of Table 2 show that an increase in the population with higher education has a negative effect on the participation of certified companies per every thousand. If the increase in population with higher education occurs only through residents (non-migrants), then an additional 50 thousand skilled migrants would be needed for the number of certified companies per every thousand to decrease by 1%, and considering that this average is lower than one hundred companies (Figure 4), then many more residents would be needed to reduce a certified company. Now, if the inclusion of migrants with a higher education is allowed, an increase in the skilled population of around 20 thousand people would be needed for such reduction to occur. The negative effect of the *pobeducsup* variable towards the certified companies variable can be explained when changes in this segment of the population are linked to a disproportionate change in the relation of certified companies to total companies. In other words, it is possible that a greater population with higher education increases both the number of total companies as well as the number of certified companies, but the speed with which the number of total companies increases is greater (due to the time that it takes to obtain an ISO certification and/or because some companies cannot cover the costs), which reduces the value of the *eciso* variable despite the fact that there are actually more certified companies.

Table 2
 Estimation of model (1) using the number of ISO 9000 and ISO 14000 (*eciso*) certified companies as a dependent variable

	1	2	3	4
<i>eciso (LI)</i>	0.9116**	0.9354**	0.9323**	0.9282**
<i>pobeducsup</i>	-0.0002**	-0.0007**	-0.0001	-0.0001
<i>ied (log)</i>	-0.1192**	-0.1344**	-0.1313**	-0.1393**
<i>créditos (log)</i>	0.0489**	0.0453**	0.0358	0.0339
<i>productividad</i>	0.0020**	0.0026**	0.0024**	0.0025**
<i>empgrand</i>	-0.0001**	-0.0001*	-0.0001**	-0.0001**
<i>migr (log)</i>	0.1517**	-0.9456*		
<i>migrsq (log)</i>		0.1096**		
<i>pmigr</i>			-0.0008	0.0064
<i>pmigrsq</i>				-0.0001
N	128	128	128	128
chi2	2 100 744	1 565 064	5 901 490	7 477 345
p-value	0.00	0.00	0.00	0.00

Legend: * $p < .05$; ** $p < .01$

Source: own elaboration with data from IMCO (2016).

A similar effect shown in Table 2 is the increase in foreign direct investment and the number of large companies; a 1% increase in the FDI or in a large company causes a decrease in the number of companies certified with ISO 9000 and ISO 14000 of approximately 0.12% or 0.01%, respectively. Once again, the explanation is based on the relation that the FDI or the establishment of large companies could have with the relation of certified companies to total companies: it is possible that the FDI flow or the establishment of a large company could have a lower impact on the certification of existing companies.

Although *créditos* coefficient shows the expected sign according to the theory in all models, it was only significant when the number of skilled migrants remained constant (models 1 and 2 of Table 2), and its effect was small: a 1% increase in the credit to the companies of a city on average increases the number of certified companies by 0.05%. Contrary to what happened with the FDI and the establishment of large companies, it is clear that this variable would have the expected effect, given that the resource is susceptible to be destined to the payment of the certification rather than to the creation of new companies. Furthermore, the productivity coefficient presented the expected sign and was very significant in all the models; in this case, a one percentage point increase in productivity on average leads to an increase of 0.25% in the number of certified companies.

The models of Table 2 show that the number and the ratio of skilled migrants in a city has an effect according to the theory in both functional forms (linear and quadratic); however, the ratio of migrants was not significant (models 3 and 4), indicating that in the case of the certified companies, the presence of skilled migrants is more relevant, regardless of how many non-migrant skilled workers there are in the city. When the number of skilled workers (model 1) is linear and show an increase, the estimation shows that the number of certified companies also increases by .15% on average. This is interesting and supports the hypothesis of the study regarding the effect of skilled labor migration on isomorphism and the findings of Figure 5. Furthermore, the quadratic model (model 2) complements the findings, indicating that if the number of skilled migrants is low in a city, then an increase of these migrants causes a decrease

in the number of certified companies per every thousand in almost the same magnitude, possibly due to its greater effect on the creation of new companies. However, when the city has crossed a threshold of migrants (calculated to be 75 thousand), the effect is reverted, increasing the number of certified companies.

It can be inferred from Figure 5 that the threshold is related to the number of certified companies in a city, that is, when this number is small in a city, then skilled migrants cause a decrease in the number of certified companies, possibly because they contribute to the creation of new companies more than to the certification of them. In the same sense, based on Figure 4, it can be inferred that the threshold is related to the size of the city, thus suggesting that in a small city, skilled migrants have a greater influence in the creation of new companies than on the certification of them. Under this reasoning, corporate isomorphism manifested in the ISO 9000 and ISO 14000 certification is affected by skilled labor migration (normative mechanism); however, this isomorphism should be conceived as a long-term process that is also affected by other coercive, normative, and mimetic isomorphism mechanisms.

Conclusions

This study empirically addresses theoretical argument that the organizations, as open systems, are affected by the environment (and vice versa) through skilled labor migration. On the one hand, the study starts, from the idea that the environment causes organizations to reach homogenization by being pressured by environmental mechanisms; on the other hand, skilled labor migration (as an environmental element) is strongly linked to the company and its search for greater competitiveness.

Thus, two indicators were addressed. These, according to the theory presented by Powell and Di Maggio (1999), can reflect the organizational homogenization or isomorphism process of the business sectors of Mexican cities: the first, related to competitive isomorphism, is the diversity of economic sectors in one city, which is established under the argument that competitive advantages cause the development of clusters or specialized groups of companies that in turn reduces the number of classes of economic sectors. The second indicator, related to institutional isomorphism, is quality certified companies, which is established under the argument that companies seek to “stay in the game”, meaning that they aim to maintain themselves in a level of quality that allows them to compete with other companies, for which they obtain the certifications.

In order to obtain consistent estimators for the isomorphism mechanisms, the empirical analysis is based on a convenient methodology. Thus, the analysis of skilled labor migration and the environmental organizational theory consider the potential endogeneity of migration through the use of instrumental variables. By using other normative, mimetic and coercive isomorphism mechanisms as control variables, the evidence suggests that the effect of skilled labor migration has an effect on both a decrease of the economic sectors and the quality certification of companies. In other words, evidence was found regarding a causal effect of the migrant workforce towards the business sector of Mexican cities. The evidence based on both indicators show, that the relation between isomorphism and skilled labor migration is not linear, but that the levels or ratio of skilled migrants requires the crossing of a threshold to cause isomorphism; therefore, in this case, skilled labor migration is a mechanism that intervenes in isomorphism in the long-term.

Although the results suggest that skilled labor migration causes a greater competitive and institutional isomorphism in the business sectors of the Mexican economies, it is convenient to carry out this analysis for longer periods of time, as well as using more isomorphism indicators to strengthen the findings of this study.

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