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Complement and Substitution Effects of Internal Migration on Foundational Competitiveness in Mexico

Efectos complemento y sustitución de la migración interna en la competitividad fundacional en México

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Amilcar Orlian Fernández Domínguez
Universidad Autónoma de Chihuahua (México)
afernand@uach.mx
https://orcid.org/0000-0003-4209-9056

Michael Demmler
Universidad Autónoma de Querétaro
michael.demmler@uaq.mx (México)
http://orcid.org/0000-0002-1629-5814

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ABSTRACT

This study analyzes how internal migration among Mexican states relates to their competitiveness level. The methodology employs longitudinal panel data from 2010 to 2020 to assess how migration influences a state's foundational competitiveness. The study's main results are as follows: First of all, the foundational competitiveness of Mexican states, on average, increased in 2015. However, despite this increase, competitiveness in 2020 was below the 2010 level, showing a general decline experienced in the most recent years of the study sample. Secondly, the econometric results of the present study suggest that greater involvement of a highly educated migrant labor force positively affects foundational competitiveness. Furthermore, findings imply that an influx of working-age migrants may potentially contribute to the economic competitiveness of the destination state depending on differences in education levels of migrants and natives, i.e., whether immigrant human capital complements or substitutes that of the native population.

Keywords: Human capital; labor migration; economic development.

JEL code: O15, O10.

RESUMEN

Este estudio analiza cómo los flujos de migración interna entre las entidades federativas de México se relacionan con su nivel de competitividad. Se contribuye a la literatura sobre el tema al evaluar un concepto reciente de competitividad – la competitividad fundacional – que de acuerdo con los autores refleja mejor el bienestar de la población de una economía, así como estimando un modelo econométrico basado en la teoría macroeconómica de crecimiento endógeno y capital humano. La metodología emplea datos de panel longitudinal de 2010 a 2020 para evaluar cómo influye la inmigración en la competitividad fundacional de un estado. Los principales resultados del estudio son los siguientes: En primer lugar, la competitividad fundamental de las entidades federativas mexicanas, en promedio, aumentó en 2015. Sin embargo, a pesar de este incremento, la competitividad en 2020 se situó por debajo del nivel de 2010, mostrando un retroceso general experimentado en los últimos años de la muestra. En segundo lugar, los resultados econométricos del presente estudio sugieren que una mayor participación de una fuerza laboral migrante altamente calificada afecta positivamente la competitividad fundamental. Además, los resultados implican que el flujo de migrantes en edad de trabajar puede contribuir potencialmente a la competitividad económica del estado destino dependiendo de las diferencias en los niveles de educación de inmigrantes y población nativa, es decir, si el capital humano de los inmigrantes funge como complemento o sustituto del de la población nativa.

Palabras clave: Capital humano; migración de trabajo; desarrollo económico.

Código O15, O10.

INTRODUCTION

Mexico's development agenda aims to enhance its population's welfare by increasing competitiveness, as the National Development Plan 2019-2024 outlines. However, this may pose a challenge, considering this country shows significant economic disparities across some regions. Still, the literature (OECD, 2022) highlights the relevant role of migration in driving regional competitiveness through various mechanisms. For instance, migration can boost a region's economic performance by influencing regional income convergence (Ozgen et al., 2010), innovation (Pinate et al., 2022; Aldieri et al., 2020), the labor force (Privara et al., 2023), and productivity (Ferragina et al., 2021). However, the impact varies depending on immigrants' regional characteristics and skill levels (Oliinyk et al., 2021; Fratesi & Percoco, 2013). Thus, examining how internal migration has influenced Mexico's regional competitiveness is convenient for better assessing economic development for the 2024-2030 national development agenda.

For this task, assessing an appropriate definition of competitiveness is essential since public policy efficiency depends on adequate measurement (OECD, 2014). Competitiveness is a multifaceted concept central to economic development and is generally regarded as a region's ability to achieve sustained economic performance while enhancing the quality of life of its inhabitants (Rajnoha & Lesnikova, 2022; García-Sánchez et al., 2018; Porter, 1990). However, despite widespread agreement on its desirability, there is no universally accepted definition since it depends on specific goals and purposes. For instance, definitions may focus on the role of institutional structure (WEF, 2014), innovation and industry-specific advantages (Porter, 1990), international economics (Durand et al., 1992), or the capability to attract and retain investments (IMCO, 2024).

Delgado et al. (2012) propose the concept of foundational competitiveness as the expected production level per potential worker, which they argue is a better determinant of a nation's prosperity and quality of life than other indicators. The present study analyzes the effect of migration on foundational competitiveness in Mexico on a state level through an econometric model based on the theoretical foundations of economic growth and migration.

The remainder of this paper is structured as follows. After this introductory section, a literature review will outline in more detail the definition of competitiveness and, specifically, foundational competitiveness proposed by Delgado et al. (2012). Under the characteristics of this concept, the theory of endogenous economic growth is addressed, i.e. an extended growth model of Solow, as well as the theory regarding the effects of migratory flows (specifically state migration in Mexico), to establish a theoretical model that serves as a basis for the econometric model to be estimated (Methodology section). Subsequently,

results are presented, and the empirical evidence is discussed. Finally, the paper presents some concluding remarks.

LITERATURE REVIEW

Assessment of Competitiveness

The concept of competitiveness can be seen and analyzed from different perspectives. In an economic context, one usually refers to the competitiveness of a specific firm, an industry, or a whole geographical area. Concerning geographical regions, some studies analyze competitiveness on a national scale (e.g., Marti & Puertas, 2023; Porter, 1990) or a sub-national (i.e. regional) level (e.g., Grassia et al., 2024; Kouskoura et al., 2024; Carpio et al., 2023). According to the WEF (2001), the general objective of economic development is to increase the standard of living of a nation´s population. In this regard, the literature exposes that greater competitiveness in a locality or region will improve the quality of life of its inhabitants (Rajnoha & Lesnikova, 2022; García-Sánchez et al., 2018; Delgado et al., 2012; Porter, 1990). However, although there exists agreement on the general desirability of increasing competitiveness, there is no uniformly established and accepted concept of competitiveness and its determinants (e.g., Alaimo et al., 2024; Karman et al., 2023), as different organizations propose different definitions.

The Global Competitiveness Report 2014-2015 (WEF, 2014) defines sustainable competitiveness as the combination of institutions, policies, and factors that make a nation productive in the long term while ensuring social and environmental sustainability. From this definition, the concept of competitiveness is linked to greater productivity. In the 2001 report (WEF, 2001), the authors mention that although the most intuitive definition refers to the economic participation of a country in the world market, its implication regarding a zero-sum game does not apply to the economic concept of prosperity. Hence, relating competitiveness to productivity and specialization seems more reasonable, though some authors question the construction of WEF´s Global Competitiveness Index (Benitez-Marquez et al., 2022).

Porter (1990) explains that competitiveness depends on a nation's ability to innovate and improve its industries. In other words, competitiveness depends on a nation's characteristics to create and maintain a competitive advantage in certain industrial sectors. This ultimately translates into greater productivity of labor and capital and, therefore, implies an improvement in the standard of living of the nation's population.

The OECD competitiveness indicator emphasizes international economics. According to Durand et al. (1992), the concept of international competitiveness is related to specific outstanding characteristics (such as productivity and technological innovation) that impact

macroeconomic performance and, therefore, explain a country's trade flows with its trading partners.

Moreover, the Mexican Institute for Competitiveness (IMCO, by its Spanish acronym) defines competitiveness as the ability of a region to attract and retain investments. In other words, an area is competitive whether it offers comprehensive, internationally acceptable conditions that allow, on the one hand, to maximize the socioeconomic potential of the companies and the population and, on the other hand, sustainably increase their level of well-being (IMCO, 2024).

Delgado et al. (2012) propose a definition that refers to the expected production level per individual of working age (potential worker) based on a country´s total quality as a place to do business. This concept relates to macroeconomic (social infrastructure and political institutions; fiscal and monetary policy) and microeconomic (quality of the national business environment; state of cluster development; sophistication of operations and business strategies) factors. Likewise, the concept of foundational competitiveness is a better indicator related to the prosperity of an economy since it originates from its ability to achieve high productivity as well as to mobilize a considerable percentage of the available labor force (Delgado et al., 2012; Gkypali et al., 2019; Ketels, 2017).

Relation to Economic Growth Theory

According to Romer (2006), the endogenous growth and human capital model helps explain differences among economies. Although the Solow model states that physical capital is vital in explaining national GDP variations, it fails to explain these differences among countries based on variations in levels of capital stock (Mankiw et al., 1992). Models that incorporate a microeconomic component to describe the behavior of macroeconomic variables, such as the Ramsey-Cass-Koopman model and the Diamond model, also lack an explanation for the differences in production between countries since they attribute an important role in explaining growth to the exogenous variable "labor efficiency" a specific importance in the explanation of growth (Romer, 2006). The models of endogenous growth and the accumulation of knowledge (reflected in technology) fall short since technology is not exclusive. Therefore, all nations could take advantage of it to achieve output growth.

In this way, following Romer (2006), the endogenous growth model that incorporates human capital (Equation 1) extends the Solow model.so that the product (Y) at time t is a function of physical capital (K), the effectiveness of work (A) and the productive services provided by the workforce (H):

$$Y(t) = K(t)^{\alpha}[A(t)H(t)]^{\beta} \quad \alpha + \beta = 1 \qquad (1)$$

The relevant aspect in Equation 1 is the inclusion of human capital as the variable *H* (the behavior of *K* and *A* is the same as in the Solow model), which incorporates both the capabilities and acquired abilities of individuals and their behavior. For simplicity, the model first assumes that the human capital variable (*G*) is a function of the years of education invested (*E*). However, it also allows the incorporation of other variables (such as physical capital and human capital of existing workers). Hence, assuming that investment in education is homogeneous among workers, the function of productive services per job can be expressed as in Equation 2:

$$H(t) = L(t)G(E), \quad G' > 0 \tag{2}$$

In equation 2, *L* is the number of workers, and *G(E)* is the human capital per worker. As mentioned previously, human capital is a function of the years of education (which is why it is called the production function of human capital), which assumes an increasing behavior as in Equation 3:

$$G(E) = e^{\phi E}, \quad \phi > 0 \tag{3}$$

According to the model shown by Romer (2006), production per worker follows Equation 4:

$$\frac{Y}{L} = AG(E)y \tag{4}$$

That is, an increase in the years of education per worker—which comprises both natives and immigrants—increments the level of production per worker and, hence, foundational competitiveness in the path of sustained growth, which explains differences in GDP growth between various countries.

Migration

Migration is significant due to its direct relationship with a country's and region's economic development (Vîrjan et al., 2023; Tacoli et al., 2014; He, 2013; Baas & Brücker, 2012). It is relevant for both the government and society due to its impact on income, remittances, provision of public services, demographic dynamics, and knowledge diffusion, among other aspects (Morrison, 2023; OECD, 2022).

Neoclassical theory explains that due to more workers in a locality (due to labor immigration), the marginal product of labor decreases, and, with it, the general salary level. Under the same reasoning, the opposite result happens in a locality where workers emigrate. From this observation, migration analysis can be divided into two aspects: determinants of migration and its effects. In this regard, most existent studies focus on the determinants of

migration, especially international migration to the United States of America (e.g., Pries et al., 2024; Holding et al., 2024).

Regarding the analysis of effects, migration has positive and negative effects on both the place of origin and the destination (Vasyltsiv et al., 2021; Casillas, 2020; Lamy et al., 2019; Loayza-Alarico, 2019; Peri, 2012; Boustan et al., 2010; Ortega & Peri, 2009). For instance, Peri (2012) finds that immigration strongly impacts total factor productivity. Ortega & Peri (2009) demonstrate that immigration positively influences employment but find no evidence of substitution effects, i.e., the authors do not find displacement of natives. Moreover, they find that in the short run, immigration positively influences total GDP of the destination country, with no evidence of adverse effects on average wages and average income per capita. This result is also confirmed by Boustan et al. (2010) concerning the hourly earnings of existing residents. Nevertheless, their study covered the Great Depression and found an effect of immigration on residents who decided to move away or lost weeks of work.

Some studies show that migration influences a region's competitiveness through different mechanisms, mainly by affecting the local labor force. For instance, Oliinyk et al. (2021) show that immigration of highly skilled workers significantly strengthens a country's competitiveness. Also, Tanrikulu (2020) argues that international migration influences a region's competitiveness by fostering innovation and patents and increasing a competitive business environment. Chowdhury (2021) evaluates the potential adverse effects of migration on a city's urban resources but finds that the positive effects exceed by enriching competitiveness in its labor market. These studies suggest that decisions – taken by all economic actors (government, companies, among others) – regarding aspects of competitiveness in a society should consider migration.

For the Mexican case, some studies examine various mechanisms of how migration impacts the country´s competitiveness, especially in the agricultural sector and in economic development in general. For instance, international migration to the United States of America translates into a reduction of the available force in Mexican rural areas, affecting agricultural production and the sector's competitiveness (Navarro & Ayvar, 2009). However, migration also has positive effects through remittances and the contribution to the economic well-being of the households receiving them (García & Cuecuecha, 2020), as these remittances may later translate into investments in machinery and improvements in agricultural production (Navarro & Ayvar, 2009). Also, migrants often return with new knowledge and skills (Wassink, 2020), which can improve the competitiveness of the business and agricultural sector in the long term.

METHOD

Base model

This paper analyzes the relationship between foundational competitiveness and internal migration within Mexico, so the methodology relies on the definition of foundational competitiveness reviewed in section 2.1. Likewise, since this concept of competitiveness relates to an economy's GDP, we base our econometric approach on a general theoretical model, the endogenous growth model presented in section 2.2. Thus, we specify a suitable econometric model to assess the effect of migration on the variable that captures the productive services of the workforce in Equation 2.

Delgado et al. (2012) argue that the best indicator that captures the concept of foundational competitiveness is GDP per working-age worker, so we express this indicator for a Mexican state *i* as Equation 5:

$$FC_i = \frac{Y_i}{WAP_i} \quad (5)$$

FC represents the Mexican state's foundational competitiveness, *Y* is its GDP, and *WAP* is its working-age population. The characteristics of *Y* are similar to those in the endogenous growth and human capital model (Equation 1). However, now, the productive services function of the labor force (Equation 2) considers the specific participation of the migrant labor force. Thus, the working-age population (*WAP*) at time *t* comprises both native (local) and migrant workers, as expressed in Equation 6:

$$WAP_{it} = L_{nt} + L_{mt} \quad (6)$$

Since the literature emphasizes that the migrant force takes advantage of the productive capacities of the place where they arrive, we assume there is an interaction between the productive services of local and immigrant labor, i.e., these services are not independent due to two likely circumstances: At first, migrants primarily move their productive services for labor, so the capital and technology available in economy *pr* are to some extent rival since a given unit of capital or technology can be used by either local or immigrant labor. Secondly, there may be interaction effects from the combination of local and non-local human capital (also assuming that there is immigration of workers with somewhat different levels of human capital). Thus, it is assumed that the function in Equation 2 can be expressed as in Equation 7:

$$H_i(t) = \left(\frac{WAP_m}{WAP_n}\right)^{\gamma} e^{\phi(E_n - E_m)} \quad (7)$$

Equation 7 shows the participation of the migrant labor force relative to the native workforce in the productive labor services in Mexican state *i*. This function is later decomposed in the econometric model to estimate separate effects of resident and migrant *WAP* and their education levels, i.e., the average years of schooling of migrant and native individuals, represented by E_m and E_n, respectively.

Econometric model

As expressed before, the econometric approach does not aim to analyze the microeconomic and macroeconomic determinants of foundational competitiveness in Mexican states, as Delgado et al. (2012) suggested. However, it identifies differences within Mexico regarding the relationship between internal immigration and production. Thus, from Equations 1 to 7, the econometric base model in Equation 8 is established:

$$\ell CF_{it} = \alpha + \beta \ell K_{it} + \gamma \ell \frac{WAP_{mt}}{WAP_{nt}} + \phi(E_{nt} - E_{mt}) + \delta \ell \mathrm{A} + v_{it} \quad (8)$$

ℓCF_{it} is the natural logarithm of the foundational competitiveness indicator of Mexican state *i* in period *t* – real GDP data of the sectors considered in the National Economic Censuses are used to construct this indicator (Equation 8). ℓK_{it} is the natural logarithm of the Gross Fixed Capital Formation of Mexican state *i* in period *t*. $\ell \frac{WAP_{mt}}{WAP_{nt}}$ is the natural logarithm of the ratio of immigrant to native working-age populations (*WAP*) in period *t*. E_{nt} and E_{mt} are cumulative schooling averages of native and immigrant individuals in Mexican state *i* in period *t*. According to the literature on technological progress, it can be assumed that the last term (ℓA) can be depicted by spatial or temporal – fixed or random – effects since it does not change significantly in time and may be regarded as exogenously determined. Moreover, a set of fixed effects captures the effect of unobserved factors (others from technology) that affect output, given the stock of capital and labor. Following Hall and Jones, cited by Romer (2006), we estimate the labor productive services variable *H* considering years of education only, so the variable follows the behavior of Equation 3.

Data

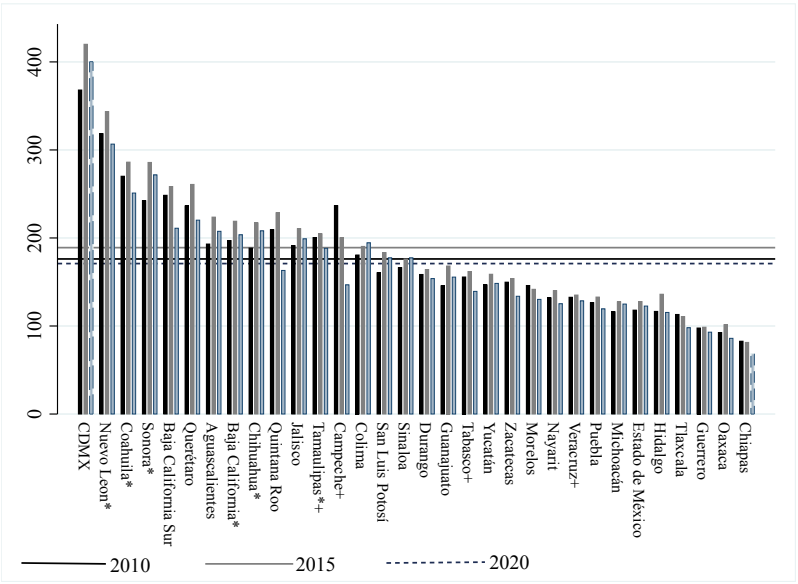
We use state-level longitudinal data for 2010, 2015, and 2020 due to the availability of internal migration data provided by the Mexican National Institute of Statistics and Geography (INEGI by its acronym in Spanish) through censuses (2010 and 2020) and the 2015 intercensal survey. Capital data is obtained from INEGI's economic censuses; we use Gross Fixed Capital Formation (GFCF) data closest to the analysis year. Real GDP data is taken from INEGI's Economic Information Data Bank. Data regarding the average education

and working-age population (individuals between 15 and 64) is taken from the censuses, as mentioned earlier, as well as intercensal surveys. Dichotomous variables are added in the models for the years 2015 and 2020 (temporal fixed effects), as well as indicators for Mexican states that share a border with the U.S. (Tamaulipas, Nuevo Leon, Coahuila, Chihuahua, Sonora and Baja California), or whether it is considered a principal oil producer (Tamaulipas, Veracruz, Tabasco and Campeche).

RESULTS

Figure 1 shows that foundational competitiveness (FC) varies substantially among Mexican states and to a lesser extent in time. Comparisons along temporal and spatial dimensions are informative since real GDP data is used. In this regard, it is interesting to note that only Colima and Sinaloa showed sustained growth in FC in 2010, 2015, and 2020. Still, most of the Mexican states presented an increase in 2015 and then a fall in 2020, possibly reflecting the effect of the COVID-19 pandemic.

Figure 1
Foundational competitiveness ranking by Mexican state and year (2010, 2015, 2020).



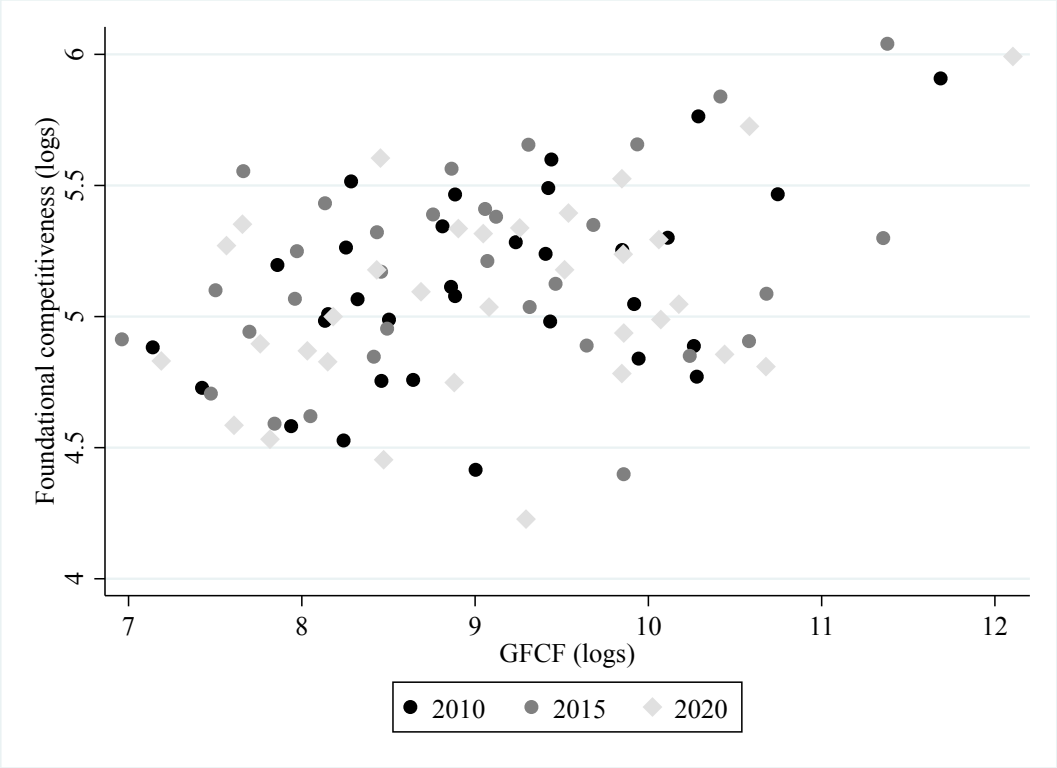
Notes: Horizontal lines refer to national averages for corresponding years. For each state, vertical bars show yearly foundational competitiveness in ascending order. * indicates Mexican states that share a border with the U.S.; + indicates oil producers.
Source: own elaboration.

Figure 1 also shows that national averages did not vary significantly between 2010 and 2020 – they show a slight decline – and only 13 states underwent an increase in foundational

competitiveness. Finally, the figure reflects the renowned regional inequality in the country – since the group of states above the average includes Mexico City, Jalisco, Queretaro, and those that share borders with the U.S. – similar to the ranking shown by other, more complex measures of competitiveness.

On the other hand, Figure 2 shows that the relationship between foundational competitiveness (FC) and real Gross Fixed Capital Formation (GFCF) presents considerable dispersion. The figure suggests a positive correlation, particularly considering the highest values of both variables. However, it raises the possibility that the relationship is more complex, i.e., it may be non-linear.

Figure 2
Foundational competitiveness and real Gross Fixed Capital Formation



Notes: GFCF= Gross Fixed Capital Formation, 2013 prices.
Source: own elaboration.

Considering the longitudinal structure of the data, we proceeded to perform the Hausman test between fixed and random effects to estimators of the base model (Equation 8) and others that incorporate interactive variables, basing the decision of the tests on a 99% confidence level. Column FE1 of Table 1 shows the estimates of the base model, and columns FE2-RE3 show estimates of modified models. Results show that the models are mostly statistically significant at a 99% level. The results of all models show that capital is highly significant, suggesting a U-shaped relationship, i.e., at low levels of GFCF, foundational competitiveness

decreases, but as capital increases, competitiveness increases. Besides, results of the base model (column FE1) suggest that the proportion of immigrants to resident WAP and the education differential between these groups are insignificant (95% level). Thus, there is no evidence that a higher average education or higher participation of immigrants in a state positively affects foundational competitiveness.

However, results vary when controlling for other specifications of WAP ratios and education levels, i.e., when allowing more distinctive, independent effects of covariates on a state's FC. Particularly, modified models may estimate the next: the effects of migrant WAP as a proportion of total WAP in the state, native WAP as a proportion of total WAP in the state, a dichotomous variable equal to 1 if average migrant education is higher than that of the native population; a dichotomous variable equal to 1 if the average education of the native population is higher than migrant education; and interactive variables to capture the possible impact of higher migrant WAP participation that is more or less educated than native WAP.

Table 1
Regression estimates

Variable	FE1	FE2	RE1	RE2	RE3
GFCF	-.3558**	-.3163**	-.3970**	-.3992**	-.3972**
$GFCF^2$	.019**	.017**	.023**	.023**	.023**
Ratio WAP_m/WAP_n	.0571				
Difference $educ_n$-$educ_m$	-.0082	-.0204			
Oil producer			-.0890	-.0913	-.0914
Border with US			.4396**	.4423**	.4448**
Y2015	.0672**	.0473*	.0429	.0408	.0400
Y2020	-.0363	-.0548*	-.0802**	-.0820**	-.0823**
Ratio WAP_m/WAP_i		.1653	.1063	.2356*	.3566
Ratio WAP_n/WAP_i		1.93	2.37	2.47	2.46
Indicator $educ_m > educ_n$			.3660**		
Ratio WAP_m/WAP_i if $educ_m > educ_n$			.1268**		-.1226
Indicator $educ_n > educ_m$				.1684**	.6677
Ratio WAP_n/WAP_i if $educ_n > educ_m$				2.40**	4.39
Chi-sq			159.7**	165.9**	220.1**
F	24.76**	28.48**			
R^2-overall model	.1412	.1313	.4676	.4637	.4629

Notes * p<.05; ** p<.01 (robust standard errors). N=96. GFCF= Gross Fixed Capital Formation. WAP=working-age population. educ= average years of cumulative schooling. Y2015 and Y2020 are dichotomous variables for 2015 and 2020, respectively. Subindexes *i, n*, and *m* indicate the Mexican state *i,* the native population, or the immigrants, respectively. Natural logarithms are used for real GFCF and WAP ratios.

Column FE2 (Table 1) suggests no evidence of the independent effects of migrant or native WAP – as a proportion of total WAP – on fundamental competitiveness. However, this may be caused by collinearity among the variables. Nevertheless, the models that condition for education differences (columns RE1 to RE3) show some interesting findings. On the one hand, although the magnitude of the difference between the average schooling of migrants and natives does not seem to have a direct effect on foundational competitiveness (FE1 and FE2 show that this difference is not statistically significant at a 95% level), a higher average education of migrants has a stronger positive relationship with FC than a higher average education of natives. Likewise, results show interesting evidence that a higher share of migrant WAP (more educated than native WAP) positively affects FC.

On the other hand, when controlling for higher participation of native WAP (more educated than immigrant WAP), there is a positive effect on FC due to a higher ratio of migrant WAP to native WAP. The last model (column RE3) shows that the positive relationship of higher participation of migrant or resident-educated WAP loses significance when controlling for both. Finally, results of the R1 to R3 models indicate that the Mexican states that share a border with the U.S. present, on average, a higher FC than the rest.

CONCLUSIONS

Competitiveness is a multifaceted concept central to economic development. It is generally regarded as a region's ability to achieve sustained economic performance while enhancing the quality of life of its inhabitants. However, despite widespread agreement on its desirability, there is no universally accepted definition since it depends on specific goals and purposes (e.g., Alaimo et al., 2024; Karman et al., 2023). Thus, evaluating the effects of migration on competitiveness might bring diverse results depending on the definition analyzed.

Some organizations offer varying perspectives on competitiveness. The World Economic Forum (WEF) links competitiveness to productivity and sustainability (WEF, 2014), emphasizing the role of institutions, policies, and factors that drive long-term economic performance while safeguarding social and environmental well-being. Porter (1990) aligns with this view, highlighting the importance of innovation and industry-specific advantages for enhancing competitiveness, productivity, and living standards. Nonetheless, the OECD assesses the relationship between competitiveness and international economics by examining how productivity, technological innovation, and macroeconomic performance influence a country's trade balance (Durand et al., 1992). However, the Mexican Institute for Competitiveness (IMCO) adopts a more regional perspective, defining competitiveness as a

region's capability to attract and retain investments by offering favorable conditions for economic and social development (IMCO, 2024).

In line with studies such as, for example, Grassia et al. (2024), Kouskoura et al. (2024) and Carpio et al. (2023), the present paper analyzes competitiveness on a sub-national (Mexican states) instead of a country level. According to the literature review and the econometric evidence of this study, it is clear that migration has positive and negative effects on the places of destination and origin, and this is no exception when it comes to factors related to foundational competitiveness. Based on an endogenous growth model with human capital, econometric estimations were made for the federal states of Mexico regarding the impact of greater participation of working-age migrants with a relatively higher or lower level of education on the foundational competitiveness of the destination entity. The econometric results suggest that greater involvement of a highly educated migrant labor force positively affects foundational competitiveness, which concurs with Oliinyk et al. (2021).

In general, foundational competitiveness has a non-linear relationship with capital, as measured by actual gross physical capital formation. It may reflect the argument that physical capital is not sufficient to increase the competitiveness of Mexican states since some authors (for instance, Vargas-Hernández & Ramírez, 2018; Solleiro & Castañón, 2012; Jiménez-García et al., 2011) argue that other factors related to total factor productivity – e.g., innovation, business structure – should be considered. Likewise, foundational competitiveness, on average, increased in 2015. However, despite this increase, competitiveness in 2020 was below the 2010 level, showing a general decline experienced in previous years, as Jiménez-García et al. (2011) highlighted.

Furthermore, the econometric results suggest that the foundational competitiveness of the states has a positive relationship with greater participation of migrants when their level of education is relatively higher than that of the residents of the destination entity. On the other hand, when residents' educational level is relatively higher than that of migrants, positive effects are also observed when there is a higher proportion of migrants. Assuming that different levels of education reflect different aptitudes and capacities (differences in human capital), these results seem to suggest that the foundational competitiveness of an entity is most beneficial when the capacities or skills of migrants and residents complement each other.

This seems to be supported by the last econometric model estimated in the present study, which suggests no positive effects on foundational competitiveness when there is a higher participation of migrants and residents have a higher educational level. As a recommendation, future research studies could incorporate factors related to innovation or contrast other competitiveness indicators.

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