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Exogenous or Endogenous Economic Growth: A Mexican States Convergence Research

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Abstract: In this paper we study β-convergence absolute and conditional, also σ convergence. Solow's Model (1956) exogenous development and Lucas' endogenous growth Model (1988) are used as theoretic foundation. To prove convergence hypothesis in Mexico case and the 32 states who conform it, and also to answer the question: Solow or Lucas economic growth explication? an econometric OLS and panel models are taken account. We found the β-convergence and the expected negative sign when annual data series long term is considered in a first regression, but the result is not statistically reliable; if it is estimated for decades periods, second regression, only 1960-1970 show absolute convergence, a third regression including population growth rate and physical capital investment per capita, variables as considered by Solow and estimate including human capital index (HCI), human development index (HDI 2) such as in Lucas model, it confirm no-absolute β-convergence, till outliers were eliminated. When panel heteroskedastic is considerate, convergence is observed, but 48 years path, suggesting includes proxy variables which capture the political effects and explore conditional convergence in a next research. Finally Mexican economic growth Lucas style is proved.

Key words: convergence; human capital; regional economics
JEL codes: O10, R11

1. Introduction

Answer what forces guide economic growth towards a steady state? Developed a fruitful debate that has prevailed for the last three decades. In this framework Lucas (1988) propose Convergence hypothesis and introduce in the Cobb-Douglas function production, human capital, as the most important factor toward convergence economic growth. Then Barro and Sala-i-Martin Model echoes questioned whether poor countries or regions tend to grow faster than rich ones. Are there automatic forces that lead to convergence over time in the levels of per capita income and product? (Barro & Sala-i-Martin, 1992). Decomposition is possible in 2 parts: the first one known as the absolute convergence hypothesis or beta convergence (β); the second part is related with conditional convergence. Both Lucas, and Barro and Sala-i-Martin insight is related to the foundation of the Endogenous Economic Growth Modern Theory.

All models are mainly based on Cobb-Douglas function; econometric methods such as ordinary least squares (OLS) cross-section and panel data are used to measure convergence, which will be described in the methodology

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section and when doing its application. Barro and Sala-i-Martin (1992) estimates found absolute convergence for the 1880-1988 period, β = 0.0175, and for any nine period β values interval [0.0119-0.0.0373], correct sign, value significance statistic and errors below 5%, except 1920-1930 decade β = -0.0122 value meaning divergence. When other explicative variables are included (9 economic sectors) model estimates are mixtures: before 1920-1930 decades, divergence is observed, and convergence on later decades. Authors argument that this unstable pattern of β across periods can reflect aggregate disturbances that have differential effects on state income as represented by term $\phi_i S_t$ that catch sectorial composition.

Necessary is spotlight that this Barro-Salai-Martin outcomes, i.e., near valor β = 0.02, has been reference for the most next researching. Hypothesis has been tested for counties and states in the United States (Barro & Sala-i-Martin, 1992; Sachs & Warner, 1996; Rodrik, 2014), European Union countries (Dobrinsky & Havlik, 2014; Dvorokova, 2014); OECD (Arnold et al., 2010); New European Union Members (Sikic, 2013; Oblath et al., 2015; Mathur, 2005); counties in America (Young et al., 2008); Mexican case (Camberos & Bracamontes, 2016; Diaz-Bautista, 2000).

In Mexican states the economic growth low and inequality registered during the last four decades, show concern about development path, for which it is necessary to review economic growth factors that have guided the Mexican state development into failure. In this context, the hypothesis is testing β-convergence and σ-convergence over specific regions in Mexico's Federated States in a long term, and the objective is answer the question whether Mexican states economic growth is Solow or Lucas style.

The next step in this paper's strategy is to make a discussion about the convergence basic theory foundation and methodological approach, after showing some Mexico's federated states economic growth stylized facts during the last 70 years, followed by the results analysis and conclusions at last.

2. Theory and Models

It is possible to distinguish three concepts. It is possible to distinguish three concepts of convergence. Two β-convergence: absolute and conditional convergence, and at last, σ-convergence. Barro and Sala-i-Martin (1992) define original convergence as a process of long term growth income speed of the developing countries in comparison to the rich ones towards a steady state. Also β convergence implies that developing countries grow faster than rich ones steadily to an estimated rate of 2% (Barro& Sala-i-Martin, 1992).

Conditional, opposite to absolute convergence, postulates that convergence-β is based on endogenous factors, implies that developing countries grow faster than rich ones steadily to an estimated rate of 2% promoted by economic policies such as: investment in human capital and infrastructure, in addition to capital equipment; economic liberalization and money exchange policies (Lucas, 1988; Sachs, 1996; Young et al., 2008; Rodrik, 2014); savings, life expectancy, foreign inversion, financial dependency and government consumption (Sachs 1995; Rodrik, 2014; Dobrinsky & Havlik, 2014) regarding state intervention all together in order to achieve faster speed of convergence. Conditional convergence relates towards different steady states. Implies that different countries achieve different income levels while get in a steady state.

In this framework, Barro and Sala-i-Martin (1992) suggested sigma convergence (σ) concept, defined as income dispersion reduction during convergence period; not always observed through the process. This kind of convergence is very important in the Mexican case study, for economic differences of development levels among regions and states have been persistent along its modern economic history; moreover, has been recognized in the

world by its economic and social inequality, and requires a long term research with solid statistic foundations. In this paper convergence σ is estimated.

Neoclassical concept of long-term economic growth (Dvorokova, 2014), is the standard convergence theory foundation, that proposes two problems to solve: (1) Solovian (Solow, 1955) per capita income growth to constant rate in the long term assuming capital free access, labor and another external factors integrated in the Cobb-Douglas production function, including Solow residual, known as Exogenous Development Model and (2) Lucasian (Lucas, 1988) and his concern to include some endogenous factors such as human capital and technological innovation, named endogenous development model, this because the human capital makes the difference (Camberos & Bracamontes, 2016).

However convergence is not an ineluctable fact; by the time, dissident authors as Romer, (cited by Sachs 1996) noted that his theoretical [Solow] model with increasing returns to scale seemed to be broadly consistent with cross-country growth experience of the postwar era, in which there was no discernible trend of poorer nation to converge with the richer nations. In the same line of thought Baumol (1994, Sachs cited) suggested that only countries with an adequate initial level of human capital endowments could take advantage of modern technology to enjoy the possibility to convergent growth.

After thirty years of discussion about convergence, several questions may arise from this initial observation: (1) What growth rate guarantees convergence to steady state? (2) Does Convergence guarantees income dispersion reduction of the poorest in relation to the richest countries?

2.1 Models

Barro and Sala-i-Martin model analyses questions and propose the average growth rate of Y over the interval between dates 0 and T:

$$\frac{1}{T}\cdot\log\left[\frac{Y(T)}{Y(0)}\right]=x+\frac{1-e^{-\beta T}}{T}\cdot\log\left[\frac{\hat{Y}^{*}}{\hat{Y}(0)}\right] \tag{1}$$

Where Y = income, $\hat{Y}$ = income growth rate, $\hat{Y}$* = steady state income growth rate, T = years, β = parameter measure convergence rate and X = progress technological exogenous.

Special interest represents β parameter, in which its negative sign demonstrates if convergence really exists, and its value, growth rate, to steady state. In this point of analysis most authors refuse Solow model of convergence as a natural result of economic growth and exogenous factors, and prefer to include endogenous factors (Lucas, 1988; Barro & Sala-i-Martin, 1992), economic and social policies (Sach, 1996; Rodrik, 2014).

In relation to the second question, Dvorokova (2014), based on a recent European Union research, claims that it is not entirely clear that β-convergence guarantees income dispersion reduction. On the other hand, Young et al. (2008) claims that despite literature emphasizes on β-convergence, economists have acknowledged that is not a sufficient condition for σ-convergence. Quah (1996, following the author, suggest that σ-convergence is most interest because it directly tells whether distribution of income that tie economic growth across economies, is becoming more equitable or not; while Barro and Sala-i-Martin (1992) explain that β-convergence do not necessarily implies that the cross -sectional dispersion of log (y_{it}) decline over time. The effect of β-convergence, which tends to reduce dispersion, is balanced by random shocks, which tend to increase this dispersion.

Authors demonstrate by means of this formulation:

$$\sigma_t^2 = \left(e^{-2\beta}\right)\sigma_{t-1}^2 + \sigma_\mu^2 \tag{2}$$

$$\sigma_t^2 = \frac{\sigma_\mu^2}{1-e^{-2\beta}} + \left(\sigma_0^2 - \frac{\sigma_\mu^2}{1-e^{-2\beta}}\right)e^{-2\beta t} \tag{3}$$

As it is observed in both equations σ_t^2 monotonically approaches the steady state value, which rises with σ_μ^2 but decline with β. Sigma convergence has been converted now day in important subject, regarded as one of relevant problems because the inequality has reached high levels within, as between world countries (Stiglitz, 2012; WEF, 2017) in consequence, Mexican States' inequality is very important researching case.

3. Methodology and Data

In this part, steps to measure β and σ convergence will be explained. Econometric methods have been used to operate the economic growth and per capita income relation to measure convergence, principal cross-section, pooled and panel models, therefore will review it.

3.1 Econometric Model to Test Mexican States ß-convergence

To operate the econometric model and estimate β-convergence, a cross-state regression is used. It is necessary to prove both, exogenous and endogenous models according to the next proceeding:

1) General model of convergence, following Barro and Sala-i-Martin (1992) and Dvorokova (2014):

$$\frac{1}{T}\log\left[\frac{y_{i,t}}{y_{i,0}}\right] = \alpha + \beta\log\left(y_{i,0}\right) + \varepsilon_i \tag{4}$$

Where β parameter to measure convergence, α is a constant parameter, ε_i is the errors index of the Mexican states (32 states registered for this paper), 0 and T are the indexes for the time (0 = 1960, T = 2013).

2) Convergence exogenous as Solow Model:

$$\frac{1}{T}\ln\frac{y_{i,t}}{y_{i,t-T}} = \alpha - \frac{1-e^{-\beta T}}{T}\cdot\ln y_{i,t-T} + \phi X_{i,t} + u_{it} \tag{5}$$

With variables defined as:

The dependent variable is the average rate of growth for a country *i*, *T* is interval of years, added $X_{i,t}$, that include a group of 2 new variables: *k* (capital per capita) and *n* (population growth rate) and ϕ_{it} is a set of unknown coefficients.

3) Convergence endogenous model, like Lucas Model, add to (5), a group of variables $Z_{i,t}$:

$$\frac{1}{T}\ln\frac{y_{i,t}}{y_{i,t-T}} = \alpha - \frac{1-e^{-\beta T}}{T}\cdot\ln y_{i,t} + \phi X_{i,t} + \theta Z_{i,t} + u_{it} \tag{6}$$

defined as *l* (labor returns originating from human capital) and h (human capital index composed of education and health.

In this paper is assumed, as Barro and Sala-i-Martin (1992), that the coefficient *α* is the same for all i; that is, they assume that the steady-state value, $\hat{y}_i^*$ and the rate of technological progress do not differ across Mexican states. Hypothesis β-convergence is tested through OLS regression cross-sectional data of the states; while Solow

and Lucas-Barro models are performance by using panel analysis method. Bayesian information criterion to define Mexican States development style is applied. Sigma convergence is measured by mean standard deviation σ as in Eq. (6). Finally speed convergence is estimated by using the following formula:

$$T = \ln(2)/\beta \tag{7}$$

variables are defined as above.

3.2 Data

Indicators and indexes that describes the growth convergence and development in Mexican States for the 1940-2013 period, specifically the annual average rates of population growth, gross domestic product (GDP) per capita and capital formation, the human capital index (HCI) and the human development index (HDI 2) are registered on Tables 1 and 2, devised and constructed in order to obtain long-term statistics series homogeneous and comparable (German-Soto, 2005; German-Soto, 2008; German-Soto et al., 2013).

Table 1 México Economic Development Statistic 1940-2013

	1940-1950	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2013
TMCA Population	2.41	2.76	3.06	2.88	1.81	1.79	1.51
TMCA GDP/Percápita	2.81	2.72	2.93	2.78	-0.58	0.71	0.71
GDP/Percápita[1]	4,671.70	6,226.51	8,353.05	11,259.01	13,427.34	13,436.17	22,067.24
TMCA Stock/Percápita	nd	nd	4.91	4.61	8.78	-0.86	0.12
Stock/Percápita[1]	nd	nd	11,491.74	19,815.46	48,686.95	74,545.06	63,252.19
Labor-Income and HCI	nd	3.52	2.75	3.67	4.52	6.69	8.56
HDI(2)	nd	0.582	0.655	0.739	0.811	0.867	0.883
[1] Both amounts are in Mexican pesos, based 1993.							
Source. Own estimates based on:							
1. Germán-Soto, Vicente (2005): "Generación del producto interno bruto mexicano por entidad federativa, 1940-1992", El *Trimestre Económico*, Vol. 72, No. 3, pp. 617-653.							
2. Germán-Soto, Vicente (2008): "El stock de capital industrial medido a través de la relación inversión-empleo: estimaciones para los estados mexicanos", *Ensayos*, Vol. 27, No. 1, pp. 53-80.							
3. German-Soto, Vicente; Reyna E. Rodríguez Pérez and Carmen N. Escamilla Jiménez. 2013. "Acumulación y desigualdad del capital humano entre los estados mexicanos durante 1960-2008", *Paradigma Económico*, Revista de Economía Regional y Sectorial, Vol. 5, No. 2, pp. 5-31.							
4. Germán-Soto, Vicente (2015): "Population Statistics by Mexican federal entity", from the Selected Works of Vicente German-Soto.							

4. Mexican States Economic Growth 1940-2013: Stylized Facts

Growth rates of GDP per capita help to identify two stages on the path of Mexican economic growth. The first stage comprises boom era and the process of import substitution industrialization (Blanco, 1979; Huerta, 1986), which covers the four decades (1940-1980), where the economic growth remains at relatively high rates: 2.81%, 2.72%, 2.93% and 2.78%.

Second stage includes the last 3 periods of analysis (1980-2013), which comprises for a significant drop in the rate of national economic growth 1980's decade -0.58% and near of zero next decades. This stage is characterized as periodical economic crisis, poverty increasing (Camberos & Bracamontes, 2015a) and Mexican Peso devaluation (Ros, 1987; Huerta, 1986), fall off employment and reduction of Mexican workers real salary (Camberos & Bracamontes, 2015b); worsened in the enclosed states: Chiapas, Guerrero and Oaxaca, which for

the last period of analysis showed growth rates of -0.14 %, 0.26% and 0.67%, respectively (see Table 2), whereby this long term period is named the lost decade of economic dynamics in Mexico.

In reference of capital, on the one hand, stock per capita accumulated continuous process of less capitalization of the Mexican States in long term, can be seen as cause of low economic growth, which shows a process of divergence rather than economic convergence.

On the other hand, human capital index based on labor income (HCI) measures the skills and abilities of people involved in production, generating income for themselves and the economy as a whole (IMF, 2015). For example, job training or experience contribute to human capital, most these characteristics are incorporated into wages, more easily they are captured by Labor-Income based HCI (German-Soto et al., 2008). Data analysis evidence a significant improvement in performance of long term human capita in the country, as it went from a 3.52 HCI in the early 1950's an ICH 8.56 for the last decade. In this regard, only nine states exceed the national long term HCI: Campeche, Chiapas, Mexico City, Nuevo Leon, Oaxaca, Queretaro, Tabasco, Tamaulipas and Veracruz; whereas states with the lowest HCI were Guerrero and Yucatan, followed by Tlaxcala, Nayarit, Michoacán, Durango, Guanajuato and Colima (see Table 2).

Another important Index combined education and health, the basic methodology (HDI 2) lay on the United Nations Development Programme (UNDP), is based on the measurement educational performance with the following data: a) adult literacy b) school attendance rate and life expectancy at birth as a proxy variable for health (German-Soto et al., 2013). It can be seen that in the country this measure steadily increases and does not decreases, from 0.582 in the early 1950s to 0.883 in the last decade.

It is noticeable that Federal District stands out with the highest combined index, followed by states that are mainly located in the northern border region: Baja California, Baja California Sur, Nuevo Leon, Sonora, Coahuila and Chihuahua; on the contrary, the southern states of Guerrero, Oaxaca, Chiapas, Hidalgo, Puebla and Michoacán (see Table 2) remain the lowest composite index.

4.1 Mexican States Convergence Results Analysis

Table 3 register all results described in this section. Firstly relationship economic growth rate and per capita income OLS regression all period is analyzed. By the way, regression 1 estimate absolute convergence ß = -0.435 for all period T, negative sign is the expected, but standard error is higher than 5 percent. Tests *t* and *F* register reduced values and R^2 tends zero; therefore statistic confidence is not proved.

Figure 1 confirms the findings, because tendencies through period is weakly negative, after 265 outliers values growth economic rate > 10 and < 10% were eliminated; even more, if statistic confidence was not considered, economic growth span is estimated as T = ln2/ß = 0.0067 annual, very lower than 2% recommended (Barro & Salai-Martin, 1992), and so convergence is possible in the next 100 year; which constitutes bad news for Mexican States' economic growth.

A second regression 2 (Table 3) estimates no β-convergence to Mexican States, for any given decade using, except for the 1960-1970 decade, by the time named "The Mexican Economic Miracle", as "Mexican Moment" in now days.

The no convergence findings above described, we argument, are caused by States' economic heterogeneity and social characteristic of Mexican development throughout the Twenty Century: North close to The U.S., where economic activity is related to industrial and modern services with employment, and the South tied to poor Central America region sustained on agricultural sectorial economic, artisanal works and low productivity services. Findings reflex an Mexican regional uneven development and also evidence do not work neoclassical assuming

state homogeneity, as it is observed U.S. states (Barro & Sala-i-Martin, 1992; Young et al., 2008), EU members (Dvorokova, 2014) and Western Europe countries (Dobrinsky & Havly, 2014), basic for success and speed convergence process.

Table 3 Estimates of β and σ Convergence for Federal States of Mexico

	Period	β-regress 1	β-regress 2	β-regress 3	β-regress 4	σ
lngdppercap						
	1940-2013	-0.435				0.677
		(-0.432)				
	1940-1949					0.612
	1950-1959		0.240			0.563
			(-0.513)			
	1960-1969		-3.068			0.506
			(-0.499)			
	1970-1979		5.749			0.437
			(-1.557)			
	1980-1989		7.096			0.439
			(-1.969)			
	1990-1999		0.663			0.424
			(-0.696)			
	2000-2013		0.484			0.441
			(-0.391)			
	1960-2013			3.098	3.713	
				(-0.615)	(-0.616)	
Capit per cap				-2.096	-1.408	
				(-0.258)	(-0.285)	
Growth population				-0.047	-0.424	
				(-0.154)	(-0.171)	
Human capital index (ICH)					-0.095	
					(-0.111)	
Human development index (HDI 2)					-16.288	
					(-3.483)	

Nota. La cifra entre parentesis es el error estándar.

Source. Own estimates based on:

1. Germán-Soto, Vicente (2005): "Generación del producto interno bruto mexicano por entidad federativa, 1940-1992", *El Trimestre Económico*, Vol. 72, No. 3, pp. 617-653.

2. Germán-Soto, Vicente (2008): "El stock de capital industrial medido a través de la relación inversión-empleo: estimaciones para los estados mexicanos", *Ensayos*, Vol. 27, No. 1, pp. 53-80.

3. German-Soto, Vicente; Reyna E. Rodríguez Pérez and Carmen N. Escamilla Jiménez. 2013. "Acumulación y desigualdad del capital humano entre los estados mexicanos durante 1960-2008", *Paradigma Económico*, Revista de Economía Regional y Sectorial, Vol. 5, No. 2, pp. 5-31.

4. Germán-Soto, Vicente (2015): "Population Statistics by Mexican federal entity", from the Selected Works of Vicente German-Soto.

In order to better convergence outcomes, a third regression is running including population growth rate and physical capital investment per capita, variables considered by Solow models. In this case data span 1960-2013. In the same Table 3, ß-convergence parameter has positive signs and higher value; in this way as estimated above, it reports *divergence* and seems to confirm states uneven capital access as previously enounced.

In regression 4, human labor capital index, education and health mixed human capital index are included, coefficients register negative sign, that could mean convergence contribution, but no significance statistic and coefficient ß register positive sign, refuting convergence hypothesis.

4.2 Panel Analysis

Now, data from 32 States is organized as panel analysis heteroskedastic: 2336 observations, 32 groups through 73 years span. Results are registered in Table 4, it shows an important coefficient β = -1.0461, that mean convergence. How long Mexican States will convergence? Path estimate T = ln 2/ ß = 0.0143 = 48.5 years, half years related OLS estimates, for heterogeneous differences among states remain, when Solow and Lucas models are considerate, in spite of heteroskedastic panel balanced is used; hence, reduce economic growth state differences is a necessary condition long term for β-convergence.

Table 4 Estimates of Panel β Convergence Solow and Lucas Models for Mexican States

Ecogrorate	β-Coef.	Std. Err.	z	P > |z|	[95% Conf. Interval]	
Lngdpcap (1)	-1.0461	0.1569	-6.67	0.000	-1.3537	-0.73852
Lucas (2)	2.4031	0.7021	3.42	0.001	-0.8071	-0.046
Solow (3)	0.2878	0.4085	0.70	0.481	-0.5129	1.089
(1) Wald chi2(1) = 44.43		Prob > chi2 = 0.0000				
(2) Wald chi2(1) = 59.41		Prob > chi2 = 0.0000				
(3) Wald chi2(1) = 31.46		Prob > chi2 = 0.0000				
Source: own estimates						

4.3 σ-convergence

The 0.677 sigma value for the entire 1940-2013 period, is larger compared to the United States at its beginning in 1940. Nevertheless, trends are similar (Table 3): decreasing through 1940-1970 period, 0.612 to 0.437. Therefore, convergence inequality was observed during first stages, but throughout the XXI Century, inequality has remain near of σ = 0.440.

Finally, to contribute convergence discussion, is necessary say that in comparative with our finding, Diaz-Bautista (2000) study, estimated ß-convergence 1970-1993 period, model include, as explicative variable, different education levels. The study finds that the annual rate of convergence of human capital per capita in Mexico ranges from 3.55% to 4.58%. It also estimates the convergence of income per capita conditional on human capital variables, but economic growth rate and per capita income relationship, as convergence hypothesis suggest, is not tested, and so our results are not comparative at all.

4.4 Solow or Lucas Mexican States Economic Growth Style

Next challenge is test Solow or Lucas economic growth style. By the way, Bayesian and Akaike Information Criterion (BIC, AIK) were used to choose model with minimum errors estimate. Table 5 outcomes register Lucas Model better fit, therefore Mexican State development style is Lucassian.

Table 5 Akaike and Bayesian Information Criterion

Model	Observ	II(null)	II(Model)	df	AIC	BIC
Lucas	351	-1086.616	1044.983	9	2107.967	2142.714
Solow	351	1086.616	1070.651	5	2151.303	2170.607
Note: N = 351 used in calculating BIC						
Source: own estimates						

5. Conclusions

In this paper supported on Solow and Lucas economic growth theory, and the Barro and Sala-i-Martin model, it was proved for Mexican States is not possible ß-convergence if repeat the same development path. Explanations are of different nature.

First, per capita income data and outcomes of the economic growth dispersion showed very much outliers, which constitutes an obstacle for convergence. Second, the so-called assuming free access to capital for developed countries, does not apply for most of the states in Mexico. Capital access is more expensive, and bound to resources limitation yielding a reduced impact on the income growth per capita, and thereby, non-convergence. Third, neither phisics capital nor human capital seem to affect the economic growth, well when are included do not support β-convergence hypothesis, it could reflect a scarce human capital resource demand. Heteroscedasticity results reflex reality heterogeneous related Mexican States' Economic Growth.

At light of flaws found, is necessary to take into account better data quality and to introduce other proxy variables that catching up policies effects and explore conditional convergence. Important is recommend Lucas economic growth style, not only invest on phisics capital is necessary, but human capital too, invest on the people at higher rates that observed since 50 years ago. At the end is suggested Mexican Government ought to support this challenge to lead speed and equity economic developing.

References

Arnold J., Bassanini A. and Scarpetta S. (2010). "Solow or Lucas? Testing speed of convergence on a panel of OECD countries", IZA Discussion Papers 5261, Institute for the Study of Labor (IZA).

Barro R. J. and Sala-i-Martin X. (1992). "Convergence", *Journal of Political Economy*, Vol. 100, No. 2, pp. 223-251.

Baumol W. J., Nelson R. R. and Wolff E. N. (1994). *Convergence of Productivity*, New York: Oxford University Press.

Blanco J. (1979). "Génesis y Desarrollo de la Crisis en México 1962-1979", *Investigación Económica*, Vol. 38, No. 150, pp. 21-88.

Camberos C. M. and Bracamontes N. J. (2016). "Is the economic convergence of the Mexican States possible? Estimates for the 1940-2013 period", *Journal of Reviews on Global Economics*, Vol. 5, pp. 48-58.

Camberos C. M. and Bracamontes N. J. (2015a). "Las crisis económicas y sus efectos en el mercado de trabajo, en la desigualdad y en la pobreza de México", *en revista Contaduría y Administración*, UNAM, Vol. 60, No. S2, pp. 219-249.

Camberos C. M. and Bracamontes N. J. (2015b). "La caída de los salarios en México 1980-2010: la productividad y la informalidad como explicación", *Equilibrio Económico*, Universidad Autónoma de Coahuila (UAdeC), Vol. 11, No. 2, Julio-Diciembre, pp. 169-194.

Diaz-Bautista A. (2000). "Convergence and economic growth in Mexico", *Frontera Norte*, Vol. 13, No. 24, pp. 85-110.

Dobrinsky R. and Havlik P. (2014). "Economic convergence and structural change: The role of transition and EU accession", Wiener Institut für Internationale Wirtschaftsvergleiche, Research Report, No. 395, July, p. 31.

Dvoroková K. (2014). "Sigma versus beta-convergence in EU28: Do they leand to different results?", Mathematical Methods in Finance and Business Administration, in: *Proceedings of the 1st WSEAS International Conference on Pure Mathematics (PUMA '14)*, Tenerife, Spain, January 10-12, 2014, pp. 88-94.

German-Soto V. (2005). "Generación del Producto Interno Bruto Mexicano por Entidad Federativa, 1940-1992", *El Trimestre Económico*, Vol. 72, No. 3, pp. 617-653.

German-Soto V. (2008). "El Stock de Capital Industrial Medido a través de la Relación Inversión-Empleo: Estimaciones para los Estados Mexicanos, *Ensayos*, Vol. 27, No. 1, pp. 53-80.

German-Soto V., Rodríguez R. E. and Escamilla C. N. (2013). "Acumulación y Desigualdad del Capital Humano entre los Estados Mexicanos Durante 1960-2008", *Paradigma Económico, Revista de Economía Regional y Sectorial*, Vol. 5, No. 2, pp. 5-31.

Huerta A. (1986). "Economía Mexicana más allá del Milagro", México: Instituto de Investigaciones Económicas-Ediciones de Cultura Popular, pp. 63-100.

Lucas R. (1988). "On the mechanics of economic development", *Journal of Monetary*, No. 22, pp. 3-42.

Somesh M. (2005). "Economic growth & conditional convergence: Its speed for selected regions for 1961-2001", *Indian Economic Review*, Vol. 40, No. 2, pp. 185-208.

Oblath G., Palócz É., Popper D. and Valentinyi Á. (2015). "Economic convergnce and structure change in the new member states of the European Union", MT-DP 2015/44.

Quah D. (1996). "Empirics for economic growth and convergence", *European Economic Review*, Vol. 40, No. 6, pp. 1353-1375.

Rodrik D. (2014). "The future of economic convergence", Harvard Kennedy School Government Faculty Research Working Paper Series.

Romer P. (1986). "Increasing returns and long-run growth", *Journal of Political Economy*, Vol. 94, No. 5, pp. 1002-1037.

Sachs J. and Warner A. (1995). "Economic convergance and economic policies", NBER Working Paper No. 5039.

Sikic L. (2013). "Long term economic convergence among ten new members states in the light of the economic crisis", *Financial Theory and Practice*, Vol. 37, No. 4, pp. 361-381.

Solow R. (1956). "The production function and the theory of capital", *The Review of Economic Studies*, Vol. 23, No. 2, pp. 101-108.

Stiglitz J. (2012). *Inequality Price*, Taurus, Madrid

World Economic Forum (2017). "Rising inequality threatens world economy", *Annual Global Risk Report*, Davos, January 11.

Young A., Higgins M. and Daniel L. (2008). "Sigma convergence versus beta convegrence: Evidence from U.S. county-lavel data", *Journal of Money, Credit and Bank*, Vol. 40, No. 5, pp. 1083-1093.