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Persistence of Labor Precariousness in Mexico: a PANIC Approach

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Mexican labor conditions have deteriorated as a consequence of the advance of precariousness exhibited in the last years; the previous situation demands the development of an effective policy, seeking the strengthening of labor market. This research analyses specifically income precariousness throughout the Poverty Labor Trend Index (ITLP) within the application of the Panel Analysis of Non-Stationarity in Idiosyncratic and Common Components Method (PANIC) among the thirty-two states of Mexico. The results suggest the existence of a non-stationary behavior among the common components as well as for nine states of the country.

Keywords: Labor market, ITLP, poverty, working poor, precariousness, unit root.

1. Introduction

The study of labor market has turned into a principal component in every political agenda of most of the countries in the world due to the enormous relevance in the development of social variables. In this way: poverty, violence, migration, and even economic growth are related to the strength of the employment conditions (Doyle, Ahmed, & Horn, 1999) (Sampson & Raudenbush, 1999) (Crutchfield et all, 2006). Thus, it is noteworthy the deep understanding of the forces interacting among the labor market in order to achieve higher levels of economic development.

Few years ago, the main matter was the creation of jobs for the population to work-in. Nowadays; the concern is centered not only in the creation of new labor opportunities, but also in the quality of those jobs. In this way, labor precariousness has become a common point of debate as the rise of shadow economy undermines labor market conditions.

Furthermore, poor labor conditions are related not only to underdeveloped economies, but they are present as a common factor in almost all labor markets of the world. As a result, its

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effects are causing the deterioration of social wellbeing as well as the rise of new social issues.

In this way, Mexico is not an exception as a consequence of the enormous detriment exhibited by the labor market: precariousness increase, hysteresis over unemployment rate, poor labor conditions, and significant increase of the shadow economy (De la Cruz, Marín, & Alcántara, 2012) (González, Torres Medina, & Jiménez, 2008). Unfortunately, there are few indicators and data providing information related to the labor market conditions. Nonetheless, The National Council for the Evaluation of Social Development Policy (CONEVAL) provides an accurate approximation to measure the poor working trend: the Poverty Labor Trend Index (ITLP, for its initials in Spanish) is an indicator that shows the trend of the proportion of people who cannot afford the basic food basket with their labor income for the 32 states of Mexico including the Federal District. It is elaborated using the National Survey of Employment and Occupation (ENOE for its initials in Spanish) quarterly since 2005 (CONEVAL, 2010).

Hence, this paper analyses the persistence of labor precariousness over Mexican labor market. This is a critical situation because weak labor conditions may explain the poverty increase exhibited in the recent years, as well as the deterioration of national wellbeing across Mexican territory. In this way, it is important to analyze the behavior of such indicator, seeking for the elaboration of an adequate public policy aiming the improvement of labor conditions and a higher economic development. For this purpose, we use the Panel Analysis of Non-Stationarity in Idiosyncratic and Common Components (PANIC) method proposed by Bai & Ng (2004) which, allows the identification of a national, as well as a state component, affecting the conditions exhibited by the national and local labor market.

This paper is organized as follows: section two includes a literature review of labor market and its impact over the development of social variables. Section three provides an analysis of the ITLP and labor conditions in Mexico; the next section presents PANIC methodology and section five provides empirical evidence regarding the persistence of labor precariousness over Mexican labor market among the common components as well as for the idiosyncratic errors; finally concluding remarks.

2. Labor market, precariousness and poverty

Labor markets have been analyzed long time ago as a consequence of their impact in the national wellbeing. In this way, the deterioration of labor conditions is becoming a worldwide major concern because of the relevance over social circumstances. Kalleberg (2009) explains that this situation has spread to all the sectors of the economy becoming much more pervasive and generalized: professional and managerial jobs are also precarious nowadays.

The precariousness is a social concept that has been evolving and it has not been defined in a unique and definitive way in the literature. Scholars recognize the huge heterogeneity of the concept derived from its severity and persistence in some countries.

For example, Rubio Campos (2010) suggests an integral measurement including four dimensions: insecurity, vulnerability, low wages and low labor protection. In this sense, Tucker (2002) also explains precariousness by four big characteristics: short time horizons, low control of working conditions, protection throughout law or any collective organization and low income.

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The definition given by Gallie & Paugman (2002) includes not only job security in short term, but also with longer-term sources of stability that will ensure professional development and improvement of skills, which will safeguard workers´ futures.

On the other hand, International Labor Organization (1999) defines decent working places as productive jobs in sufficient liberty condition, in which the rights of the workers are protected, adequate incomes are generated and an appropriate social security is obtained.

A new wave of studies try to capture the growing phenomenon of the outsourcing, the rise of new labor forms and the involvement of new stakeholders in the hiring process, inside an innovative and wider precariousness concept. According to a report presented by the Economic Commission for Latin America (ECLA) (2001) the insufficient generation of formal employment as well as the boom of the financial, real state, and retail sectors has led to the evolution of outsourcing. This situation, allows the deterioration of the labor market as well as the rise of new atypical labor forms, which in some cases can be related to precarious jobs as mentioned by De la Garza (2010).

Following Huesca & Camberos (2009) labor precariousness is commonly related with the underdeveloped countries due to the existence of structural failures over the economic system. Hence, the informal sector rises as an alternative, absorbing productive activities that are not attached to the legal and structured economy.

De Oliveira (2006) argues the existence of precariousness conditions among different social classes and also in all levels of education, indeed, in Mexico the data reveals that a high percentage of the workers on precariousness conditions corresponds to people with medium or higher education and even with more labor experience (De la Cruz & Veintimilla, 2011). Thus, nowadays, poor labor conditions are not just attached to a low value added job.

For the specific Mexican case, it is possible to observe an important deterioration of labor market conditions boosting precariousness. On the one side, shadow economy has grown considerably: from 11.4 million people on the first quarter of 2005 to 13.5 million on the last quarter of 2012. Same behavior is exhibited by the number of employees working without formal contract (12.7 millions to 15.9 million for the same period), for employment benefits and social security (10.2 millions to 13.4 millions and 11.6 millions to 15.8 millions, respectively).

The importance of guaranteeing quality workplaces is concentrated in many positive effects for workers and even for enterprises. The International Labor Organization (1999), assured that a safe workplace not only satisfies the human vital needs but also increases productivity and enhances firm's growth and prosperity; for that reason, the final objective should not be the indiscriminate creation of workplaces but the creation of numerous quality workplaces. In addition, the poor terms of employment bound the development capacity of the internal market.

Following Gallie & Paugman (2002), the quality employment is the best way to eliminate poverty, because labor precariousness affects social elements and it is produced in a context in which employments does not worry about social security, and for that reason it is not possible the strengthening of stable standards of living in which people may be able to control present and also plan the future (De la Cruz & Veintimilla, 2011).

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However, the economic, productive and institutional Latin American structure has not been capable of generate quality employments necessary to reduce poverty (Weller, 2011). In a context of high poverty levels and absence of unemployment insurance, as the case of the Mexican economy, the economically active population generates "its own" employment, in which conditions of lack of social benefits, underdeveloped activities and uncertainty, because the absence of contracts, are highly present. In this way, the seeking of labor stability trends to be more appreciated than higher wages (Huesca & Camberos, 2009).

It is important to bear in mind that labor market dynamics impacts directly into poverty: if salaries and employment reduces then food and asset poverty increases (CONEVAL, 2010). Even though this index is not a poverty measurement, the behavior of labor incomes compared with the minimum welfare lines gives us useful information about the economic dimension of the poverty measurement.

Furthermore, in this setting of quality jobs shortage, that promotes deregulation of labor conditions the young labor force are exposed to extremely precarious labor environments because its condition of disadvantages for being a heterogeneous and inexperienced group. Following Oliveira (2006) and Weller (2011) the importance of focusing policies to attack precariousness is that the inequalities existing for young people contribute to the intergenerational transmission of these. Quality jobs are the main aspect affecting personal and professional skills and the security needed to construct coherent life plans.

Also, higher labor flexibility threatens to increase income instability for workers and is related to higher labor precariousness. However, Latin-American countries can not and should not be against globalization process itself, but rather they have to generate mechanisms to protect workers from a high volatile market taking into account that labor stability could hardly be the key instrument (Weller, 2011).

This investigation focuses on the study of one dimension of precariousness: low-income. The importance of the study of this dimension rests in a social-economic aspect; workers are unable to cover minimum needs of food, health, education, and housing to achieve a higher welfare level.

Studies such as Devereux (2002) using the Panel Study of Income Dynamics for United States found that getting a low-income job may lead the individuals to obtain this kind of jobs for the rest of their work life, turning this into a difficult exit process, because it could stigmatize workers and inhibit them to obtain high wages in the future.

Additionally, the overwhelming Mexican informal sector is linked to a pervasive and perpetual low-income pattern. Rodríguez-Oreggia (2007) concludes, using the National Survey of Urban Employment, that for low-income households, the mobility between formal and informal sector is higher. The former inhibits the possibility to access quality jobs and therefore reach a higher wellbeing.

In addition, the literature had established that the best form of increasing the probability that a household exit from a poverty situation is increasing the earnings of a house member (Bane & Ellwood, 1986) (Abufhele & Puentes, 2011), (Oxley, Dang, & Antolín, 2000), though for the Mexican case according to Bayón (2006) the low-income levels and the intense presence of labor precariousness casts doubt on the efficacy of increasing the number of workers in the household as a mechanism to avoid poverty. The same conclusion is found on Beccaria et al.

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(2010) for five countries in Latin America. For these reasons it is of extreme importance to analyze the low income dimension of precariousness and establish a path to mitigate it.

3. Labor market in Mexico and poverty

Mexican labor market has shown an heterogeneous performance over the last period. In this way, the significant increase exhibited by the informal economy, the poor productivity attributed to the domestic market, low wages paid by employers and the lack of social benefits limits the wellbeing of the growing working poor class.

According to Acemoglu (2001), the existence of unemployment insurance and a minimum wage, drives to the creation of high-wage jobs, increase of productivity and therefore, a higher welfare. Nonetheless, firms tend to create more low-wage jobs (Pissarides, 1990). In this way, labor deterioration exhibited in the last years, is a consequence of the poor development of the minimum wage conducting to the increase of the number of employers receiving less that one minimum wage, with no social benefits, and growing informal economy (World Bank, 2005).

The ITLP shows a historical increase since the second quarter of 2008. This situation affects in a major way the urban sector; meanwhile the rural is stable on its trend (Graph 1). This situation is due to the greater reliance of the urban Mexican population to a quality labor market as a source of family income (World Bank, 2005).

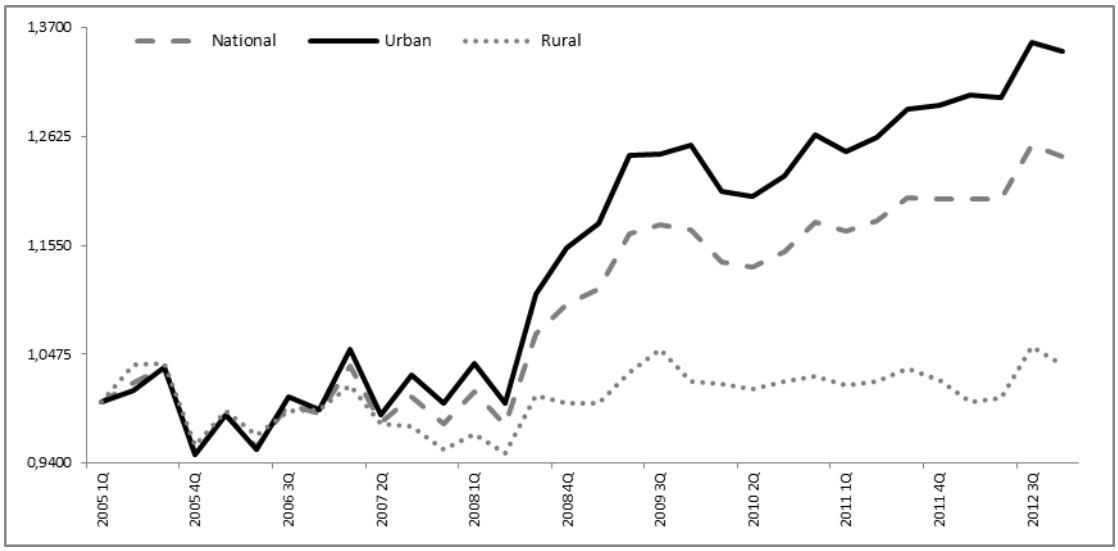

Figure1: Poverty Labor Trend Index, fourth quarter 2012
Source: CONEVAL.

An important factor to be analyzed is the evolution of the minimum real wage (Graph 2). Nowadays it represents the 25% in comparison to the seventies. This situation implies a significant lost of the purchase power despite the increase in the minimum welfare line (De la Cruz Gallegos & Veintimilla, 2011). The correlation between these two variables is strong (-0.72) and shows the importance of a quality job (fair wage, job security and high temporality).

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Figure 2: Real Minimum Wage Vs. ITLP
Source: CONEVAL and Secretaría del Tabajo y Previsión Social.

One explanation can be provided because of the use of the minimum wage as an inflation control variable more than a strategic policy used to boost the domestic market. The same situation could be observed for the case of the per capita labor income deflated by the price of basic basket; the increase exhibited by basic products bounds the wellbeing of the Mexican population (Graph 3). It is also important to bear in mind, that despite the fact of the lax measurement of the wellbeing lines, the ITLP exhibits an important rise on its trend.

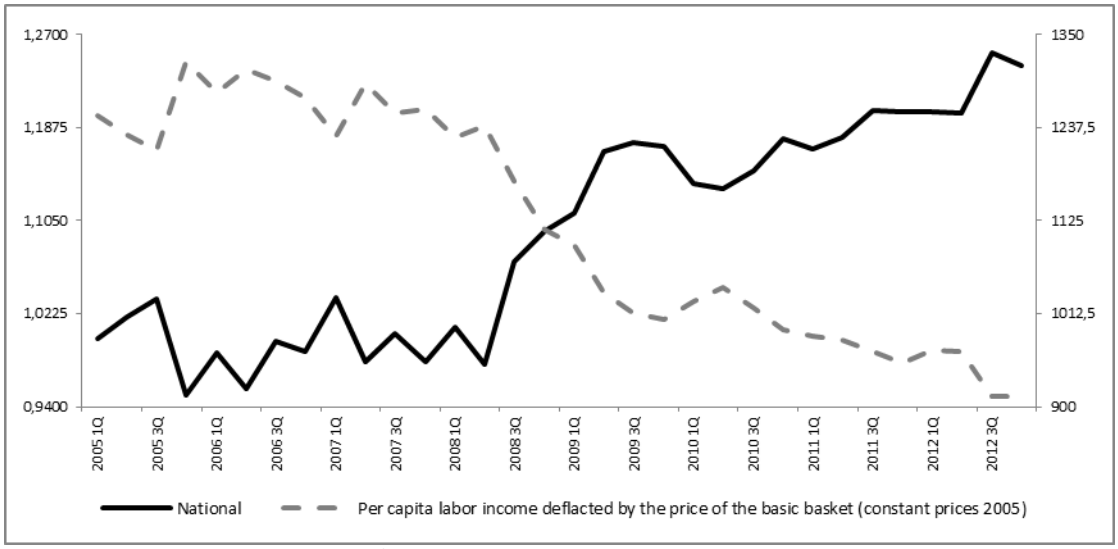

Figure3: ITLP Vs. per capita labor income, fourth quarter 2012
Source: CONEVAL.

Other factor to take into consideration is the type of enterprises established throughout Mexican territory, out of the 4.4 million enterprises, 4.1 million employs less than 10 people, this means 94% of the enterprises are incorporated into a micro-business frame, which in most of the cases, is attached to a low value added work and production. This situation is strongly related with the lack of a well-paid job and the important increase of the shadow economy exhibited in the last period as part of the Mexican labor market reality (Graph 4).

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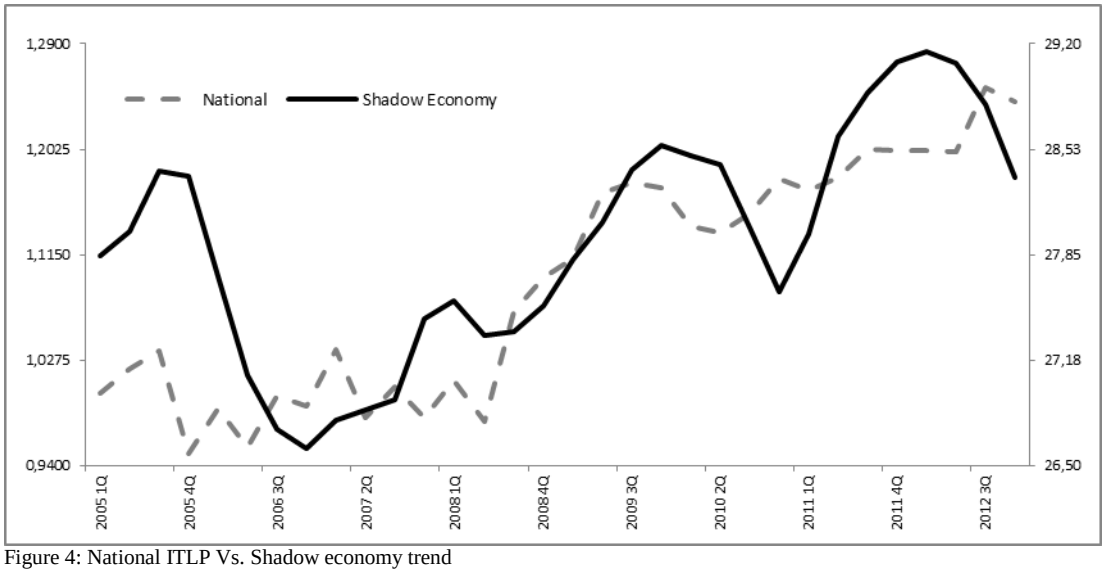

Figure 4: National ITLP Vs. Shadow economy trend
Source: CONEVAL and INEGI.

In this way, the positive trend showed by the number of employees is not related to the creation of quality jobs linked with the consolidation of strong industry and value added products (Graph 5). This behavior explains the lack of opportunities in the Mexican labor market, which oriented citizens to open primarily services business to avoid a poverty reality.

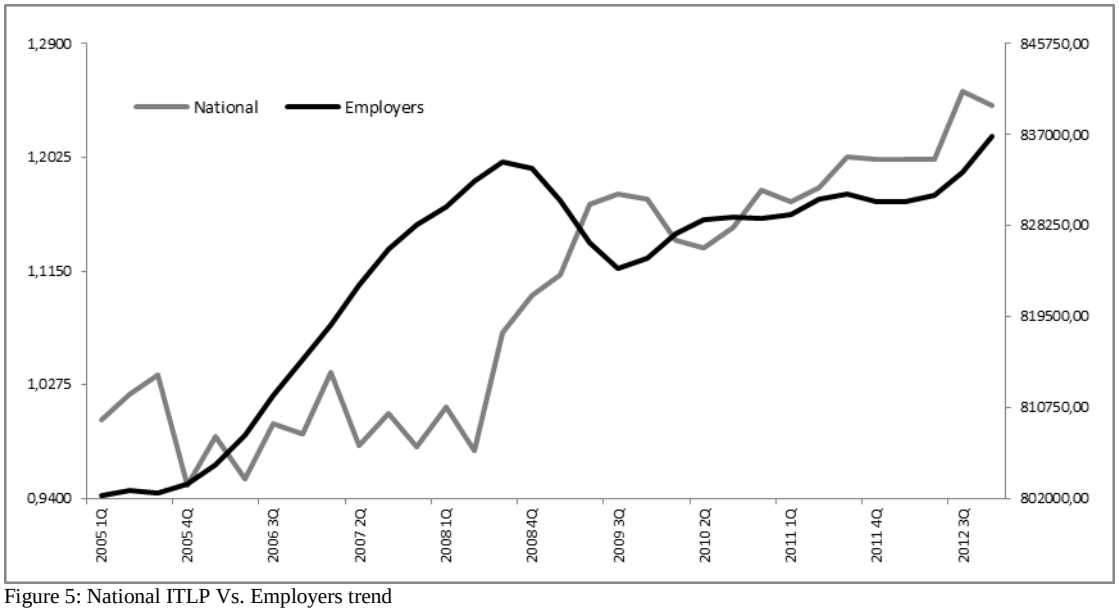

Figure 5: National ITLP Vs. Employers trend
Source: CONEVAL and INEGI.

Thus, it is possible to observe, that labor conditions among Mexican territory are exhibiting an enormous weakening. This situation is related to a national reality as a consequence of the important increase of informal economy, as well as the economic scenario, which has lead to the consolidation of a strong export market at the expense of the intern market deterioration.

4. Methodology

The conventional empiric evidence uses standard methods for the identification of unit roots with the main purpose of capturing unstable patterns in the macroeconomic series; nonetheless, these statistics are less reliable when is worked with such complex variables in

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the structure. Also, when using data panel for having a bigger sample, the first generation tests are not consistent when the time series are correlated due to the existence of a bias that tend to reject the hypothesis (Bai & Ng, 2004).

The present study uses a unit root analysis to determine the existence of unit roots in the Mexican ITLP by state. For the accomplishment of such purpose it is used the PANIC (*Panel Analysis of non stationarity in idiosyncratic and common components*) method proposed by Bai & Ng in 2004. Such technique involves the calculation of common factors for the panel by using the Principal Components Method (PCM) as well as the determination of an idiosyncratic term for each state.

If $u_{i,t}$ represents the ITLP for the *i* state in *t* time $\forall i \in [1, N]$, $t \in [1, T]$. Then the stochastic form for expressing ITLP is given by the equation:

$$\Delta u_{i,t} = \kappa_i - \lambda_i u_{i,t-1} + \sum_{j=1}^{k} \alpha_{i,j} \Delta u_{i,t-j} + e_{i,t} \qquad (1)$$

From (1) the stationarity hypothesis can be contrasted from the data panel bearing in mind the restrictions of the conventional unit root tests for small data samples. The analysis over the panel data is an appropriate alternative to study the stability of the series over time considering that $e_{i,t}$ is not correlated for any *i* term in any time. However, in the presence of cross-section dependence, the first-generation statistics test rejects the non-stationarity hypothesis too often.

Pesaran (2007) propose a statistic to test the existence of correlation between different levels of a panel data through the next equation:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i-1}^{N} \hat{\rho}_{i,j} \right) \qquad (2)$$

Where $\hat{\rho}_{i,j}$ is the coefficient two by two of the error correlation, estimated in the conventional ADF test.

In general, the assumption of independence in different levels of cross-section panel data analysis has shown to be inconsistent in empirical studies of macroeconomic variables. In this way, the first generation tests turn out to be little appropriate in presence of a high correlation between variables. Bai & Ng (2004) proposed an innovative methodology that considers and incorporates such restrictions, allowing more robust results of stationarity and cointegration tests. The PANIC method is based on the decomposition on the information in its common and idiosyncratic components. For these purposes we consider the next factorial model:

$$X_{it} = D_{it} + \lambda_i' F_t + e_{it} \qquad (3)$$

Where D_{it} represents a polynomial trend function of order *p*, F_t corresponds to a $R \times 1$ vector of common factors, λ_i' is a factor-loading vector and finally e_{it} represents an idiosyncratic variable. F_t as well as e_{it} (i=1,…,N; t=1,…,T) are assumed to be generated by:

$$(I - L)F_t = C(L)u_t \qquad (4)$$

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$$(1-\rho_i L)e_{it} = D_i(L)\epsilon_{it}$$

Where $C(L) = \sum_{j=0}^{\infty} C_j L^j$ and $D_i(L) = \sum_{j=0}^{\infty} D_{ij} L^j$. In this way, the idiosyncratic error is stationary if $|\rho_i| < 1$, and the rank of C(1) is r_1, the number of common stochastic trends.

The objective of Bai & Ng (2002) is to determine r_1 and to test if $|\rho_i| < 1$ when neither the factor nor the idiosyncratic components are observed and they imply that despite the integration order of the two elements in equation 3, they preserve their consistency. The estimation of the factors and loadings is determined by applying the PCM to the first order differentiated data to solve the problems that PANIC dealt with.

In such way, the model in first difference is represented by equation (5):

$$x_{it} = \lambda'_i f_t + z_{it} \qquad (5)$$

Where $x_{it} = \Delta X_{it}, z_{it} = \Delta e_{it}, f_t = \Delta F_{it}$. Thus applying PCM to *x* yields *r* common factors $\hat{f}_t$, the corresponding loadings $\hat{\lambda}_i$, and the estimated idiosyncratic component given by: $\hat{z}_{it} = x_{it} - \hat{\lambda}'_i \hat{f}_t$. Re-accumulating the estimated factors and errors for avoiding the problems of over differentiation, for t=2, … , T and i=1,…,N, it is obtained:

$$\hat{F}_t = \sum_{s=2}^{t} \hat{f}_s \qquad \hat{e}_{it} = \sum_{s=2}^{t} \hat{z}_{it} \qquad (6)$$

The optimum number of factors, *r*, to be used in this analysis is obtained by the information criteria proposed by Bai & Ng (2002).

In this way, let F^k be a matrix of *k* factors, and V(k, F^k) be the sum of squared residuals from time-series regressions of X_i on the *k* factors for all *i*, expressed in equation (7):

$$V(k,F^k) = \min_{\Lambda} \frac{1}{NT} \sum_{i=1}^{N} \sum_{t=1}^{T} \left(X_{it} - \lambda_i^{k\prime} F_t^k\right)^2 \qquad (7)$$

The essential element in a consistent estimation of *r* is a penalty factor that vanishes at an appropriate rate such that under and over-parameterized models will not be chosen. So, let *g(N,T)* be the penalty function for over fitting the estimation of *r*, and in that way and following Bai & Ng (2002) a loss function arises:

$$V(k,F^k) + kg(N,T) \qquad (8)$$

The mentioned paper establishes that the existing information criteria such as Bayesian or Akaike with its penalty functions $g(N,T) = \frac{\ln(T)}{T}$ and $g(N,T) = \frac{2}{T}$, respectively, perform well when the factors are observed, because the penalty factor does not need to take into account the sample size in the cross-section dimension.

However, this is not the case in the present study because factors are estimated, so the objective is to find penalty functions such that the criteria of the form $PC(k) = V\left(k,\hat{F}^k\right) + kg(N,T)$ or $IC(k) = ln\left(V\left(k,\hat{F}^k\right)\right) + kg(N,T)$ can consistent estimate *r*. Where $V\left(k,\hat{F}^k\right)$ represents the variance when *k* factors are estimated (equation 9).

 ISSN 1927-033X

$$V(k,\hat{F}^k) = \min_{\Lambda} \frac{1}{NT}\sum_{i=1}^{N}\sum_{t=1}^{T}\left(X_{it} - \lambda_i^{k\prime}\hat{F}_t^k\right)^2 \qquad (9)$$

The authors proposed a specific formulation and stated that on applications, *k* could be replaced with *kmax*, an integer decided for this study in 4. It is concluded that the criteria that better performs in a panel with several proposed configurations are expressed as follows:

$$PC_{p1}(k) = V(k,\hat{F}^k) + k\hat{\sigma}^2\left(\frac{N+T}{NT}\right) ln\left(\frac{NT}{N+T}\right) \qquad (10)$$

$$PC_{p2}(k) = V(k,\hat{F}^k) + k\hat{\sigma}^2\left(\frac{N+T}{NT}\right) ln\left[\min\{N,T\}\right]$$

$$IC_{p1}(k) = ln\left[V(k,\hat{F}^k)\right] + k\left(\frac{N+T}{NT}\right) ln\left(\frac{NT}{N+T}\right)$$

$$IC_{p2}(k) = V(k,\hat{F}^k) + k\left(\frac{N+T}{NT}\right) ln\left[\min\{N,T\}\right]$$

Furthermore, a panel data with *N* variables have *N* idiosyncratic errors and a small number of common factors. Whenever there is only one common factor the identification of stationarity hypothesis is based on the use of the conventional unit root tests on the two components: idiosyncratic errors and common factors.

If there is more than one common factor, as in this case, the method applied to common factors is modified in order to provide a robust estimation of the number of common trends, since individually testing each of the factors for the presence of a unit root will, in general, overstate it.

Consequently, it will be determined *r1*, the number of independent stochastic trends underlying the *r* common factors, considering the MQ_f, and MQ_c statistics proposed by Bai & Ng (2004).

The first one, filters the factor under the assumption that it has a finite order VAR representation, and the second one corrects for serial correlation of arbitrary form by non-parametrically estimating the error parameters of a VAR(1) process. Both statistics are modifications of those proposed by Stock and Watson (1988) designed to test if the real part of the smallest eigenvalue of an autoregressive coefficient matrix is unity.

The process of estimating both statistics following Bai & Ng (2004) starts by defining $\widehat{F_t^c}$ by demeaning the estimated re-accumulated factors.

$$\hat{F}_t^c = \hat{F}_t - \hat{\bar{F}}_t \qquad (11)$$

Define the number of common stochastic trends to be proved as m=r. And let $\hat{\beta}_\perp$ be the *m* eigenvectors associated with the *m* largest eigenvalues of: $T^{-2}F_t^{c\prime}F_t^c$. Such as $Y_t^c = \hat{\beta}_\perp{}'F_t^c$ is obtained.

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On the first hand, for the case of MQc statistic, let K(j) be the truncature lag constructed as K(j)=1-j/(J+1), j=0,1,…,J. Obtain $\hat{\xi}_t^c$ defined as the residuals from estimating a first order VAR in Y_t^c. Set $v_c^c(m)$ as the smallest eigenvalue of:

$$\widehat{\Phi_c^c}(m) = 0.5\left[\sum_{t=2}^{T}\left(\hat{Y}_t^c\hat{Y}_{t-1}^{c\prime} + \hat{Y}_{t-1}^c\hat{Y}_t^{c\prime}\right) - T\left(\hat{\Sigma}_1^c + \hat{\Sigma}_1^{c\prime}\right)\right]\left(\sum_{t=2}^{T}\hat{Y}_{t-1}^c\hat{Y}_{t-1}^{c\prime}\right)^{-1} \quad (12)$$

where,

$$\hat{\Sigma}_1^c = \sum_{j=1}^{J}K(j)\left(T^{-1}\sum_{t=2}^{T}\hat{\xi}_{t-j}^c\hat{\xi}_t^{c\prime}\right) \quad (13)$$

Finally, $MQ_c^c(m) = T[\hat{v}_c^c(m) - 1]$.

On the other hand, for estimating MQ_f, estimate a VAR of order p in $\Delta\hat{Y}_t^c$ for obtaining $\hat{\Pi}(L) = I_m - \hat{\Pi}_1 L - \cdots - \hat{\Pi}_p L^p$. Filter $\hat{Y}_t^c$ by $\hat{\Pi}(L)$ to get $\hat{y}_t^c = \hat{\Pi}(L)\hat{Y}_t^c$.

Let $\hat{v}_f^c(m)$ be the smallest eigenvalue of

$$\widehat{\Phi_f^c}(m) = 0.5\left[\sum_{t=2}^{T}\left(\hat{y}_t^c\hat{y}_{t-1}^{c\prime} + \hat{y}_{t-1}^c\hat{y}_t^{c\prime}\right)\right]\left(\sum_{t=2}^{T}\hat{y}_{t-1}^c\hat{y}_{t-1}^{c\prime}\right)^{-1} \quad (14)$$

Such that $MQ_f^c(m) = T\left[\hat{v}_f^c(m) - 1\right]$.

For both cases, if the null hypothesis of *r1=m*, i.e. the presence of *m* stochastic trends, is rejected; set m=m-1 and redo the previous processes. If it is not rejected, the test ends, indicating the existence of *m* stochastic trends.

5. Results

The analysis of the ITLP covers historical quarterly data published by CONEVAL, from the first quarter of 2005 to the fourth quarter of 2012. The study contains the thirty-two states of Mexico, including Mexico City. The cross sectional independence test – CD test – reflects the existence of correlation among the sample states (Pesaran 2007)(Table 1).

Table 1: Cross Section Independence Test CD Pesaran's Test

Statistic	47.786
P-Value	0.000
Average	0.388

Therefore, it is appropriate to proceed with the estimation of the common factors from the differentiated and normalized data due to the dependence among them. For this purpose we use the PCM. According to the Eigen Value Method there are eight common factors, which jointly explain over the eighty percent of the variance. Nonetheless, the optimum number of factors determined by the Bai & Ng Method (2002) indicates the existence of one or two common factors that independently explains the fourteen percent, respectively (Table 2). In this way, idiosyncratic components represent the seventy-two percent of the variance,

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indicating an important incidence of the particular state labor market reality over the income precariousness.

Table 2: Optimum number of number of common factors

	PC1 (k)	PC2(k)	IC1(k)	IC2(k)
$k = 1$	0.6404	0.6562	**-0.3759**	**-0.3329**
$k = 2$	**0.6138**	**0.6453**	-0.3720	-0.2859
$k = 3$	0.6143	0.6616	-0.3370	-0.2080
$k = 4$	0.6220	0.6849	-0.3054	-0.1333

Due to the existence of more than one common factor, we proceed to identify the values of the MQ_c and MQ_f tests proposed also by Bai & Ng (2004); these statistics determined the presence of *2* stochastic trends among the common factors. On the one hand, the MQ_c test at a 1% significance level indicates that there are two stochastic trends but none with 5 or 10% significance level. On the other hand, the MQ_f reaches the same conclusion at any level, meaning the existence of a non-stationary component among the common factors (Table 3).

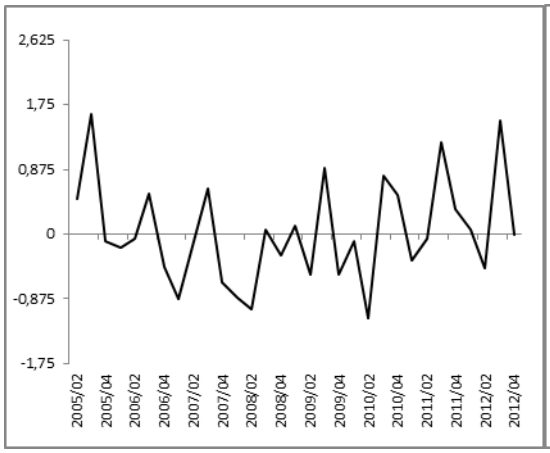
Table 3: Joint test for stochastic trends over the common factors

Criteria	Stochastic trends	Value	Critical Value		
			1%	5%	10%
MQ_c	2	-28.7448*	-31.6210	-23.5350	-19.9230
	1	-35.3313	-20.151	-13.7300	-11.0220
MQ_f	2	-5.5255*	-38.6190	-31.3560	-27.4350
	1	-13.3678*	-29.2460	-21.3130	-17.8290

(*) H_0= m stochastic trends is not rejected at a 1% significance level.

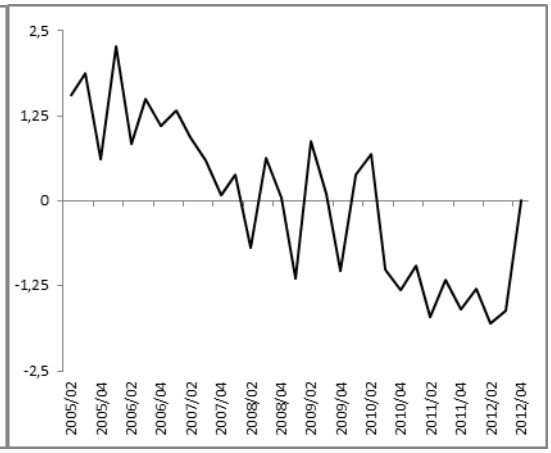
An individual stationarity analysis over the common factors (following the proposition of Bai & Ng, 2005) indicates the existence of a unit root over the first component using the Augmented Dickey-Fuller test (1979).

Factor 1



Graph 6

Factor 2



Graph 7

According to the above, the idiosyncratic errors were calculated using two common factors -since the Bai & Ng criteria -. The errors were re-accumulated for determining the existence of a unit root by the Augmented Dickey-Fuller and Phillips-Perron test. The results from the Augmented Dickey-Fuller and Phillips-Perron test (1988) suggest the existence non-stationarity in fifteen states: Aguascalientes, Baja California, Baja California Sur, Campeche, Chihuahua, Coahuila, Guanajuato, Hidalgo, Jalisco, Morelos, Nuevo Leon, Sonora, Tamaulipas, Tlaxcala, and Veracruz (Table 4).

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Table 4: Idiosyncratic errors stationarity test

Variable	ADF			Phillips-Perron		
	With trend and intercept	With trend	None	With trend and intercept	With trend	None
Aguascalientes	-3.4404**	-	-	-3.4692**	-	-
Baja California	-3.6844*	-	-	-3.6637*	-	-
Baja California Sur	-3.5720*	-	-	-3.5994*	-	-
Campeche	-4.2302*	-	-	-4.0085*	-	-
Chiapas	-7.5388	-	-	-8.3001	-	-
Chihuahua	-3.1727**	-	-	-3.1498**	-	-
Coahuila	-1.9208	-1.4268	-0.8418**	-1.7686	-1.3011	-0.7977**
Colima	-6.0988	-	-	-6.4467	-	-
Mexico City	-6.0104	-	-	-10.2024	-	-
Durango	-4.6854	-	-	-5.1114	-	-
Guanajuato	-3.4433**	-	-	-3.4500**	-	-
Guerrero	-5.1627	-	-	-9.1377	-	-
Hidalgo	-4.1124*	-	-	-4.1343*	-	-
Jalisco	-1.2320	-1.8981	-1.6882**	-4.1646*	-	-
México	-4.9568	-	-	-5.0247	-	-
Michoacan	-5.8267	-	-	-9.1587	-	-
Morelos	-3.3747**	-	-	-3.4643**	-	-
Nayarit	-5.5033	-	-	-6.2157	-	-
Nuevo Leon	-3.5154**	-	-	-3.5711*	-	-
Oaxaca	-4.4838	-	-	-4.4838	-	-
Puebla	-4.5040	-	-	-4.4706	-	-
Querétaro	-4.6505	-	-	-4.5879	-	-
Quintana Roo	-4.8128	-	-	-4.8589	-	-
San Luis Potosi	-4.3304	-	-	-5.6534	-	-
Sinaloa	-5.6162	-	-	-5.6148	-	-
Sonora	-3.8956*	-	-	-3.8439*	-	-
Tabasco	-7.4850	-	-	-13.4942	-	-
Tamaulipas	-4.2298*	-	-	-4.2298*	-	-
Tlaxcala	-2.1987	-1.6346	-0.2151**	-2.1987	-1.6273	-0.0629**
Veracruz	-4.0275*	-	-	-4.0146*	-	-
Yucatán	-4.8272	-	-	-4.8017	-	-
Zacatecas	-4.6276	-	-	-4.5891	-	-
Critical values 1%	-4.1987	-1.6346	-0.2151	-4.2967	-3.6701	-2.6443
Critical values 5%	-3.5683	-2.9639	-1.9524	-3.5683	-2.9639	-1.9524

(*, **) H_0=has a unit root cannot be rejected at a 1 and 5% significance level, respectively. T=32.
Maximum lags 7, optimum lags chose by Schwarz Information Criteria.

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6. Conclusions

This investigation focuses on the study of labor precariousness for Mexico throughout the analysis of ITLP, specifically income precariousness. For this purpose, the PANIC method is implemented due to the richness of the methodology, providing a wider scope and allowing the identification of a national component as well as specific information attributable to the states reality.

The results suggest the presence of a non-statitionary component over the common factors as well as for fifteen states across the Mexican Republic. This situation has a huge impact over the understanding of Mexican labor market since it establishes the necessity of a specific state policy aiming the improvement of local labor conditions.

The presence of a unit root over the common component suggests the existence of a shared state element causing an advance of labor precariousness, hindering the stable behavior over time. Thus, this puts the policy maker into trouble, because in the presence of exogenous shocks, the labor policy has slight impact over the healthy development of the labor market, preventing the return to pre-crisis levels due to the structural inertia of labor precariousness. An example of this was the 2009 crisis that caused a marked deterioration of the economy that impacted on the strength of the labor market, exacerbating precariousness in such way that it has been impossible to return to its original levels.

Also, it is possible to observe a non-stationary behavior among fifteen states of Mexico. In this way, there are two noteworthy aspects: on the first hand, this situation is attributable to the local conditions affecting the labor market such as the kind of employers, type of enterprises established, educational levels of the population, and the economical regional reality.

On the other hand, states with the presence of a unit root do not correspond to the historical poorest entities in Mexico; nonetheless they represent the states with the largest increase of the ITLP, in which the precariousness has exhibited an important rise.

The previous scenario shows the deterioration exhibited by the Mexican labor market, which has conduct to an increase in labor precariousness. It is important to bear in mind that labor market is strongly correlated with a national economic reality; thus, the kind of enterprises, the added value generated by these ones, population educational level, among others, have an enormous impact over the labor conditions. In this way, this problem demands not only the implementation of a national policy, but also a local strategy focused on the regional employment reality with a systemic vision aiming the improvement of all the prior variables interacting with labor market.

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References

Abufhele, A., Puentes, E. 2011. Poverty Transitions: Evidence for Income and Multidimensional Indicators. *Documentos de Trabajo*, 1-63.

Acemoglu, D. 2001. Good Jobs versus Bad Jobs. *Journal of Labor Economics*.

Bai, J., Ng, S. 2004. A PANIC Attack on Unit Roots and Cointegration. *Econometrica* 1127-1177.

Bai, J., Ng, S. 2002. Determining the Number of Factors in Approximate Factor Models. *Econometrica* 191-221.

Bane, M., Ellwood, D. 1986. Slipping into and out of Poverty: The Dynamics of Spells. *Journal of Human Resources* 1-23.

Bayón, C. 2006. Social precarity: in Mexico and Argentina. *CEPAL Review* 125-143.

Beccaria, L., Fernández, A., Maurizio, R., Monsalvo, P., Álvarez, M. 2010. *Dynamics of poverty, labor market, and public policies in Latin America.* PEP PMMA .

CONEVAL. 2010. Poverty Labor Trend Index (ITLP). Retrieved February 06, 2013, from http://web.coneval.gob.mx/Medicion/Paginas/Indice-de-la-tendencia-laboral-de-la-pobreza-(ITLP).aspx

Crutchfield, R. D., Matsueda, R. L., Drakulich, K., Peterson, R. D., Krivo, L. J., Hagan, J. 2006. *Race, labor markets, and neighborhood violence*. In R. D. Peterson, L. J. Krivo, J. Hagan, The Many Colors of Crime: Inequalities of Race, Ethnicity, and Crime in America (pp. 199 - 220. New York: New York University Press.

De la Cruz, J., Veintimilla, V. 2011. *Informalidad y Empleo Precario: Barreras del Bienestar Económico.* In A. Mendieta, E. Esquivel, Más allá de la República Informal 47-71. Mexico City: Limusa.

De la Cruz, J.L., Marín, C.A., Alcántara, J.Á. 2012. Hysteresis in Mexico: a PANIC Approach. *International Journal of Business, Humanities and Technology* 22-30.

De Oliveira, O. 2006. Jóvenes y precariedad laboral en México. *Papeles de Población* 37-73.

Devereux, P. 2002. The importance of obtaining a high paying job. Retrieved March 13, 2013, from http://www.ucd.ie/economics/staff/devereux/stigma2002%20-%20Paper.pdf

Dickey, D., Fuller, W. 1979. Distribution of the Estimators for Autorregresive Time Series With a Unit Root. *Journal of American Statistical Association* 427-431.

Doyle, J.M., Ahmed, E., Horn, R.N. 1999. The Effects of Labor Markets and Income Inequality on Crime: Evidence from Panel Data. *Southern Economic Journal* 717-738.

ECLAC. 2001. Una Década de Luces y Sombras: América Latina y el Caribe. Bogotá: Alfaomega.

 ISSN 1927-033X

Esquivel, E., González, M., Torres Medina, J., Jiménez, O. 2008. *La República Informal, El ambulantaje en la Ciudad de México.* México: Tecnológico de Monterrey y Porrúa.

Gallie, D., Paugman, S. 2002. Social Precarity and Social Integration. *Eurobarometer* 1-150.

Guadarrama, R., Hualde, A., López, S. 2012. Precariedad Laboral y Heterogeneidad Ocupacional: una Propuesta Teórico Metodológica. *Revista Mexicana de Sociología* 213-243.

Huesca, L., Camberos, M. 2009. El mercado laboral mexicano 1992-2002. Un análisis contrafactual de los cambios en la informalidad. *Economía Mexicana; Nueva época* 5-43.

International Labour Organization. 1999. Memoria del Director General: Trabajo decente. Retrieved February 05, 2013, from http://www.ilo.org/public/spanish/standards/relm/ilc/ilc87/rep-i.htm

Kalleberg, A. 2009. Precarious Work, Insecure Workers: Employment Relations in Transition. *American Sociological Review* 1-22.

Phillips, P., Perron, P. 1988. Testing for a unit root in time series regression. *Biometrical* 335-346.

Pissarides, C. 1990. *Equilibrium Unemployment Theory.* Cambridge: Basil Blackwell.

Rodríguez-Oreggia, E. 2007. The Informal Sector in Mexico: Characteristics and Dynamics. *Social Perspectives* 89-175.

Rubio Campos, J. 2010. Precarierdad Laboral en México: Una propuesta de medición integral. *Revista Enfoques* 77-87.

Sampson, R. J., Raudenbush, S. W. 1999. Systematic Social Observation of Public Spaces: A New Look at Disorder in Urban Neighborhoods. *American Journal of Sociology* 602-651.

Oxley, H., Dang, T., Antolín, P. 2000. Poverty Dynamics in six OECD Countries. *OECD Economics Studies* 7-51.

Tucker, D. 2002. Precarious' Non-Standard Employment – A Review of the Literature. Retrieved February 13, 2013, from http://www.dol.govt.nz/pdfs/PrecariousNSWorkLitReview.pdf

Weller, J. 2011. Panorama de las condiciones de trabajo en América Latina. *Nueva Sociedad* 32-49.

World Bank. 2005. *Generación de Ingresos y Protección Social para los Pobres*. Washington: World Bank.

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