Iranian Journal of Economic Studies
Vol. 1, No. 2, Fall 2012, 49-67

Wage Inequality in Developing Countries: An Examination of New Economic Geography Theory

Saeed Rasekhi*
Department of Economics,
University of Mazandaran,
Babolsar, Iran
srasekhi@umz.ac.ir

Marzieh Dindar Rostami
University of Mazandaran,
Babolsar, Iran
marzieh.dindar@gmail.com

Abstract

The purpose of this study is to investigate the factors affecting the manufacturing industry wage among selected developing countries based on new economic geography theory. More specifically, we use a panel data model to study the spatial structure of wages in 136 countries for the period 1998-2007**.** The results indicate that this theory provides a good description of the spatial structure of wages. We find that the market size and the distance-weighted have positive relationships with wage. However, the price of non-tradable goods has a negative effect on the spatial structure of wages. The result shows that the conditions governing the labor market is more important in explaining wage inequalities than the characteristics of labor or labor productivity.

Keywords: New Economic Geography, Spatial Structure of Wage, Centralization, Transport Costs, Developing Countries.
JEL Classification: R12, R30, F1, F12

1. Introduction

Wage of labor force is of concern to policy makers from different social and economic dimensions. The wage is also important because it determines the economic situation of the vast majority of society.

Received: 18/12/2011 Accepted: 5/8/2012
* Corresponding Author

Therefore all factors must be evaluated for policy makers to make the best decisions (Kazerooni and Mohammadi, 2007).

In developing countries, especially in metropolitan regions, concentration is very high and alarming (Puga, 1998). In addition to positive consequences of concentration, such as its effects on GDP and population, it has negative consequences of excessive spatial concentration, such as low productivity, social dissatisfaction, negative externalities and high levels of regional inflation, among others (Henderson, 2003).

Developing countries are mainly exporters of natural resources (a type of non-human endowment). Thus, on the one hand, developing countries show warning levels of spatial concentration, the explanation of which is the main objective of the NEG[1]. On the other hand, developing countries present wage differentials communicated with the existence of natural resources, a source left out by the NEG. This paradox raises the question of whether the NEG can replicate the spatial distribution of wages in countries where several sources of wage disparities are mixed (Paredes, 2011).

The goal of this study is to offer an analysis of the effects of agglomeration and dispersion economies on the patterns of regional economic development in selected developing countries. It investigates the factors affecting the manufacturing industry wage, between the Selected Developing countries by the new economic geography model. We examine whether there is a relationship between economic geography characteristics such as size of market, prices of non-traded goods and transportation costs and wages in developing countries.

This study is different from other empirical studies for different reasons. These include the subject (wage gap), surveyed countries (developing countries), an experimental model (considering all important variables such as labor market ones), and the large number of observations.

The paper is organized as follows. The following section outlines the theoretical framework. Section 3 renders the empirical studies. Section 4 is devoted to the data and model estimation. Section 5 concludes.

2. Theoretical Framework

Over the last two decades, the uneven distribution of economic

activities across space has been presented with the "new economic geography" literature following Krugman (1991) (Redding, 2010). Whereas traditional neoclassical explanations for the distribution of economic activity across space emphasize "first-nature geography" (the physical geography of climate, topology and resource endowments), this new infrastructure of research emphasizes instead the role of "second nature geography" (the location of economic agents relative to one another in space) (Bosker, 2008). Based on the latter literature, economic activities tend to concentrate across space both in international and intra-national contexts. This concentration usually leads to wage disparities across countries or regions within a country. Wages are higher in core countries or regions where economic activities agglomerate, than other peripheral ones (kiso, 2005).

So-called "wage equation" is one central suggestion of NEG theory. It explains the importance of proximity to the consumers market. In consumers market nominal wages are modeled as a function of a region's market access that is usually defined as the distance-weighted sum of the market capacity of surrounding locations.

The main idea is that firms located in farther locations pay higher trade costs on both their sales to final markets and their purchases of intermediate inputs. Thus, they earn lower net revenues from export sales (Hering and Poncet, 2009).

Various models are introduced in the field of spatial structure of wages such as Krugman (1991), Krugman and Venables (1995), Venables (1996), Helpman (1998), Puga (1999) and Fujita, Krugman and Venables (1999). We will briefly review some of them.

Krugman (1991), as a pioneer in NEG, has presented the first model of the spatial structure of wages. By studying the relationships between agglomeration, increasing returns and market access, he endogenously determines wages in a province as a function of wages and income in other provinces. He tests the spatial distribution of economic activities through the estimation of several structural parameters including elasticity of substitution, trade costs and share of income spent on industrial and manufactured goods (Farmanesh, 2009). Krugman's final equation of the spatial structure of wages is as follows:

$$\log(w_i) = \theta + \sigma^{-1} \log\left(\sum_j Y_j w_j^{\frac{\sigma-1}{\mu}} e^{-\tau(\sigma-1)d_{ij}} \right) \quad (1)$$

Where, Y_j, w_j and d_{ij} indicate market size, wage and transportation costs among the regions respectively.

Krugman and Venables (1995) have presented an international model with labor which is immobile across countries. Industries may then concentrate in a country or group of countries, and this concentration may lead to international wage differences. In this model, firms produce final and intermediate goods. At very high trade costs, firms operate in each country to supply their goods to local consumers and in this case, there is no clustering.

As trade costs fall, the possibility of supplying consumer goods through trade rather than local production develops and clustering forces become relatively more important (Ottaviano and Puga, 1998, Amitiand and Cameron, 2004).

Helpman (1998) model is a two-good, two-factor, two-region model that closely resembles the well-known core-periphery model of Krugman (1991). In both cases, there is an IRS[2] manufacturing sector which produces a differentiated product under monopolistic competition by using an inter-regionally mobile labor. Workers/consumers move from one region to another according to differences in real wages, while firms look for high profitable locations. However, while in Krugman (1991) model, the other good is homogeneous, freely tradable and producible under CRS[3] by using a sector specific immobile labor (farmer), in Helpman (1998) model it is instead a non-tradable good (like housing services) that is produced under CRS by an exogenously distributed sector specific capital. As to the distribution of capital ownership, in Helpman (1998) this factor is supposed to be public, i.e., each individual mobile worker/consumer owns an equal share of the total capital/housing stock *H*. Equilibrium real wage is equalized across regions unless some areas become empty. Contrary to Krugman (1991), this is, however, a very unlikely outcome because it implies that in abandoned regions the price of housing is zero. Therefore, locations where manufacturing activities agglomerate are characterized by high housing prices, and this acts as

a dispersion force against the tendency for firms to concentrate close to big markets (the so-called market access effect)(Mion, 2004; kiso, 2005; Pires, 2006). Helpman' s (1998) final equation of the spatial structure of wages is as follows:

$$\log w_i = A' + \frac{1}{\sigma}\log\left(\sum_j y_j w_j^{\frac{\sigma-1}{\mu}} q_j^{\frac{(\mu-1)(\sigma-1)}{\mu}} d_{ij}^{\tau(1-\sigma)}\right) \qquad (2)$$

Where, the main variables of the model are market size (y_j), wage of other regions (y_j), the non-traded goods price (q_j) and transportation costs (d_{ij}) among the regions.

The Puga (1999) model encompasses the two most important NEG models: the Krugman (1991) model with inter-regional labor mobility, and the Krugman and Venables (1995) model without inter-regional labor mobility. The model without inter-regional labor mobility is considered to be more relevant, because it is a stylized fact that labor is less mobile across than within countries. Economic integration could stimulate international labor mobility (Brakman and et al, 2005, 2006; Bosker and et al, 2010). The Puga (1999) model of the spatial structure of wages is as follows:

$$W_j = Const\,(I_j)^{-\mu/(1-\mu)}\left[\sum_j Y_j I_j^{\varepsilon-1} T_{ij}^{(1-\varepsilon)}\right]^{1/\varepsilon(1-\mu)} \qquad (3)$$

Where, y_j, I_j and T_{ij} indicate market size, the price index of manufactured goods and transportation costs between the regions, respectively.

An increase in the market size raises agglomeration, and then increases the wage (Krugman (1991), Farmanesh (2009), Brakman et al. (2004) and Roberts et al. (2010)). In addition, the firm distance to market (as a proxy for transportation costs) raises the wage (Krugman (1991), Puga (1999) and Hanson (1998)). The price of non-traded goods in Helpman (1998) model, acts as the spreading force and decreases agglomeration. Consequently, it is expected to reduce the wage (Berkman and et al., 2005).

3. Empirical Studies

Some researchers have examined the NEG model. Specifically, Hansen (1998, 2005) tested the Helpman (1998) model for 25 States

of U.S. in 1970, 1980 and 1990 by using the method of Nonlinear Least Squares (NLS) and Generalized Method of Moments (GMM). The results show that the NEG model explains the spatial distribution of wages among the states.

Mion (2004) investigated the spatial structure of wages in Italy by using NLS and GMM method during period 1991-1998. He studied the role of market linkages in shaping the spatial distribution of earnings. According to the results, final demand linkages influence the location of economic activities and contrary to the previous findings, their spread over space is not negligible.

Berkman and et al (2004), based on the Helpman (1998) model, examined the spatial structure of wages of the German district by using NLS and WLS[4] methods in 1995. This model provides an intuitively appealing spreading force that allows for less extreme agglomeration patterns than those were predicted by a bulk of new economic geography models. They also analyzed implications of the spatial distribution of wages once the assumption of real wage equalization was dropped.

Pires (2006) tested the economic geography model using data from the Spanish regions for the periods of 1981-1983, 1988-1990 and 1990-1993 by employing NLS method. The econometric framework of this study endogenously determines wages in a region as a function of income and wages in other regions. This study also examined the relationship between the agglomeration of economic activities, increasing returns and market access. Based on the results, the Spanish economy exhibits a spatial wage structure. Also, wages in a region are positively determined by income and wages in neighboring regions. Furthermore, the importance of scale economies and transport costs in shaping the Spanish economic geography are verified.

Herring and Pancet (2010) studied the effect of geography on wages across 56 Chinese cities by using ordinary least squares (OLS). They presented a simple new economic geography model that linked wages to individual characteristics and market access. After controlling for individual skills and local factor endowments, they found that a significant fraction of the inter-individual differences in labor returns could be explained by the geography of market access. They also found greater wage sensitivity to market access for highly skilled workers and for workers in private and particularly foreign-

owned firms.

Fally et al (2010) examined the impact of market and supplier access on wage using OLS method across Brazilian states in 1995 after incorporating the control for individual characteristics into the new economic geography methodology. The results show that there is a strong correlation between market access and wage differentials, even after controlling for individual characteristics, market access level (international, national or local), and using instrumental variables.

Faina and et al (2010) studied the link between wage disparities and market access for 42 Romanian regions in 2006. The paper reports two main results: 1) market access is statistically significant and quantitatively important in explaining cross-region variation in Romanian wages, 2) incentives for human capital accumulation and innovation activities arising from market access size are also affecting on the shaping of county wages in Romania.

Fallah et al (2011) investigated the distributional aspect of market access using the NEG model for U.S. metropolitan areas in 1990. They derived a spatial skill demand equation that positively linked skill premiums to market access. Based on the results, average wages are positively related to the market access in the metropolitan areas. But at the same time, wage differentials are unequally distributed across the areas. Further assessment indicated that market potential is favorably associated with the shares of high-skilled workers. The analysis provided further rationale for the much-observed positive relationship between the metropolitan area's share of high-skilled workers and its skilled-worker wage premium.

4. Data and Model Estimation

We have studied 17 selected developing countries which are member of WTO[5] and used annual data during period 1998-2007. The countries are Armenia, Bulgaria, Chile, China, Colombia, Egypt, Georgia, Hungary, India, Iran, Kyrgyzstan, Latvia, Mexico, Poland, Romania, South Africa and Ukraine. So, the number of observations used in this study is 1360.

In order to test empirically the factors affecting on industrial wages' gap in the selected developing countries, we have employed a panel data model as follows:

$$\Delta \ln W_{rs} = \alpha + \beta_0 \Delta \ln Y_{rs} + \beta_1 \Delta \ln D_{weight_{rs}} + \beta_2 \Delta \ln q_{rs} + \beta_3 \Delta \ln B_{rs} + \beta_4 \Delta \ln OPEN_{rs} \quad (4)$$

Variables in this equation, defined between two countries r and s, are; relative difference in real wages ($\Delta \ln W_{rs}$), relative difference in market size ($\Delta \ln Y_{rs}$), relative difference in weighted distance ($\Delta \ln D_{weight_{rs}}$), relative difference in non-traded goods price ($\Delta \ln q_{rs}$), relative difference in productivity ($\Delta \ln B_{rs}$), relative difference in openness index ($\Delta \ln OPEN_{rs}$).

To measure the dependent variable ($\Delta \ln W_{rs}$), the annual wages and salaries (in national currency) of the selected countries have been converted to US dollar and then, the real manufacturing wage in constant prices of the year 2005 has been calculated using the Consumer Price Index (CPI).

To calculate the market size, GDP[6] has been used in constant prices of 2005.

We have measured the transportation cost, similar to Berekman and et al (2004, 2005) study, based on the weighted distance between the 17 developing countries as follows:

$$D_{weight_{rs}} = weight_s \times D_{rs} \qquad weight_s = Y_s \Big/ \sum_j Y_j \quad (5)$$

Where $D_{weight_{rs}}$ represents the weighted distance between countries r and s, $\sum_j Y_j$ is total countries GDP and D_{rs} indicates the distance between countries r and s.

Following Vegh (2007) and Betts (2008), we have measured the non-traded goods price as follows:

$$q_s = \frac{eP_t^*}{P_s} \quad (6)$$

Where, q_s is the real exchange rate as a measure of non-traded goods price, e indicates the nominal exchange rate of countries against to U.S. Dollar, P_t^* and P_s represent CPI of USA and other selected countries respectively.

To Measure the Industrial productivity, similar to Berekman

and et al (2005) study, the industrial value added per capita for each country has been calculated as follows:

$$B_s = \frac{MPL_s}{MPL_j} = \frac{VA_s / L_s}{VA_j / L_j} \quad (7)$$

Where $\frac{MPL_s}{MPL_j}$ indicates the relative marginal productivity of labor in industry, VA_s is the value added of industry in country s, VA_j is the total value added of the selected developing countries' industry, L_s and L_j are labor force of industry in the country s and total labor force of industry in selected developing countries, respectively.

Finally, the ratio of imports to GDP has been used for measuring the openness index.

Table 1 shows average of variables in selected developing countries during period 1998-2007.

Table 1: Average of Variables in Selected Developing Countries during Period 1998-2007*

Country	Wage (constant 2005 US$)[a]	GDP (constant 2005 Billion US$)[b]	Non-tradable price[c]	Industrial productivity[d]	openness index[e]
Armenia	6438.71**	3925372389	76.30	0.78	0.71
Bulgaria	15.68	25581689465	2352.53***	0.90	1.14
Chile	50.68	11+e1.07124	572.14	3.5	0.67
China	15.78	12+e1.87228	7.91	0.67	0.53
Colombia	41.17	11+e1.35867	2460.4***	1.93	0.357
Egypt	106.86	97115771804	5.05	0.8	0.493
Georgia	11.39	5558870198	2.07	0.8	0.73
Hungary	71.29	99226404900	252.34	2.18	1.38
India	4.3	11+e7.19157	46.05	2.40	0.33
Iran	106.87	11+e1.70937	6879.38****	1.63	0.47
Kyrgyzestan	22.09	2266940340	23.76	0.74	0.96
Latvia	40.58	13645502224	0.59	1.05	0.99
Mexico	46.53	11+e8.02867	10.95	2.81	0.58
Poland	69.17	11+e2.82666	3.73	1.9	0.67
Romania	39.31	88646835735	3.63	0.97	0.71
South Africa	102.88	11+e2.26395	7.52	3.04	0.55
Ukrine	15.94	74250247099	6.16	0.46	1.044

* Source: a: Key Indicators of the Labour Market (KILM), www.ilo.org. b: World Development Indicators (WDI), databank.wold bank.org. c: www.fx.sauder.ubc and www.oanda.com. (Georgia's exchange rate has been extracted from www.nbg.ge and china information taken from www.Stats. gove.cn). d and e: World Development Indicators (WDI), databank.wold bank.org.

** Highest wage in Armenia is because of the way of calculating and converting it to U.S. dollar.

*** High non-traded goods prices in Bulgaria and Colombia are due to the calculation method and high exchange rate in these countries.

**** Highest non-traded goods prices in Iran are due to the method used to compute the index and lower CPI in this country.

The wage data have been obtained from the International Labor Organization (ILO). Also, data for GDP, industrial value added, import and consumer price index have been collected from World Bank (WB). The geographical distance data between countries have been based on Atlas software. In addition, the data exchange rate has

been collected from www.fx.sauder.ubc.c and www.oanda.com Website.

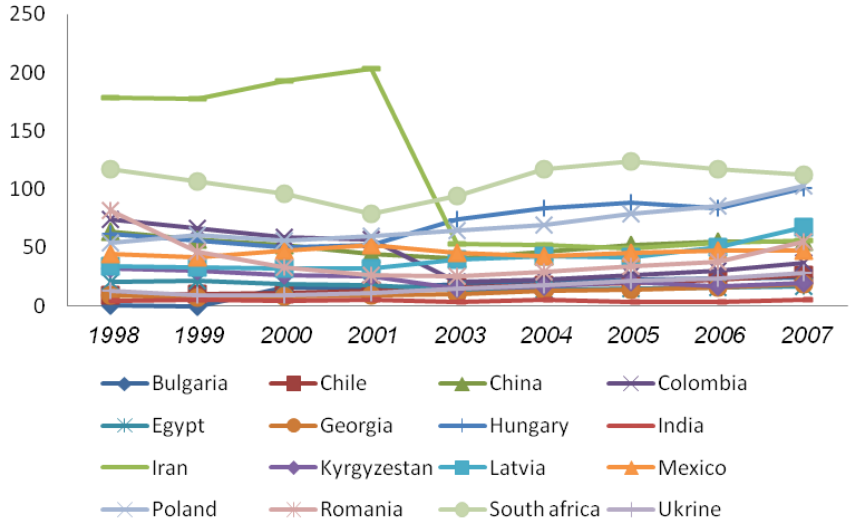


Figure 1: Manufacturing Real Wage in Selected Developing Countries in Constant Prices of 2005 during period 1998-2007

Figure 1 shows manufacturing real wage in selected developing countries in constant prices of 2005 during period 1998-2007.[7] As seen in this figure, Iran[8], South Africa, Hungary and Poland are the countries with the highest wages during the time period. It seems that the high wages in these countries are due to the geographical factors, such as access to the sea, good weather, and access to larger markets. Also, Latvia, Mexico and Romania are rather in middling. Other countries have low wage. Appendix1 shows the spatial distribution of selected developing countries' GDP in 2007 on the world map.

In general, in the market, particularly in the international one, low wage is an advantage for the developing countries such as China in competition with developed countries. For example, besides its attractive workers and success in the labor market, abundance in labor has been one of the main reasons for China's recent success.

To estimate the model, first we have tested heterogeneity between units by F-statistic. If following null hypothesis is not accepted, we use panel data (Ashrafzadeh, 2008):

$$H_0 = \mu_1 = \mu_2 = ... = \mu_N = 0$$
$$H_0 \neq H_1 \qquad (8)$$
$$F = \frac{(RRSS - URSS) / (N-1)}{RRSS / (NT - N - K)} \approx F_{[(N-1),(NT-N-K)]}$$

Where RRSS represents the Restrict Residual sum Squares, URSS is the Unrestricted Residual sum Squares, N and K are numbers of units and Parameters respectively. In order to choose between Fixed Effect (FE) and Random Effect (RE) models, we have used Hausman Test (Ashrafzadeh, 2008):

$$H = \left[(b_s - \beta_s)'(M_1 - M_0)^{-1}(b_s - \beta_s) \right] \approx \chi^2(r) \qquad (9)$$

Where, r is number of parameters, M_1 and M_0 indicate covariance matrix for coefficients of FE and RE models respectively.

In order to investigate the stationarity issue in the panel model, it is first necessary to determine the existence of unit roots in the time series data. For this study, we have chosen the Im, Pesaran and Shin (IPS), which is based on the well-known Dickey-Fuller. This test combines information of the time series dimension with those of the cross section one. So, rather short time period is needed for doing the test.

Table 2 presents the results of panel unit root test by using the IPS. These results indicate that some variables are stationary at level (I(0)) and some other are stationary at first order difference (I(1)). These results clearly show that the null hypothesis of the panel unit root can be rejected.

Table 2: Panel Unit Root Test by Using Im, Pesaran and Shin (IPS)

Variable	Level		First order difference	
	Statesties	Prob.	Statesties	Prob.
Wage	-196.026	0.0000	-----	-----
Market Size	6.37867	1.0000	-7.91059	0.0000
Weighted Distance	2.87792	0.9980	-2.64792	0.0040
Non-Traceable Price	-84.6687	0.0000	-----	-----
Productivity	-8.13078	0.0000	-----	-----
Openness	0.51219	0.6957	-4.00532	0.0000

Source: Present study calculations using Eviews 6.

Also, the Jarque–Bera (JB) has been used to test for Normality. This is a goodness-of-fit test to make sure the sample data have the skewness and kurtosis matching a normal distribution. The JB results are indicative of normal residuals in this study.

To cope with some problems such as heteroskedasticity, Generalized Least Squares (GLS) method has been used in this research. The GLS correction for panel heteroskedasticity is to estimate σ_i^2 from the residuals in the obvious way and then use those estimates in a weighted least squares procedure.

Table3 presents GLS panel model estimation results of the spatial structure of wages in selected developing countries during period 1998-2007. As shown in this table, coefficients estimated from RE[9] and FE models have the same significance and show the same relationship between the explanatory variables and the dependent variable. So it seems that the results are robust.[10]

According to this table, the estimated equation has overall significance and consistent with the theory. Also, Chow's F verifies a panel technique. Furthermore, we have used RE method based on Husman test (1980).

Based on table 3, determination coefficient (R^2) shows that the variables can explain 96 percent of the dependent variable and the F test indicates that total regression is significant.

Also, the estimated coefficient of market size is positive and significant. This is in line with the previous research. Thus, increase in the market size raises the agglomeration, and then increases the wage in selected developing countries. Coefficient of weighted distance

between countries is significant and has a positive sign. Therefore, distance also seems to effect on wages, as they tend to be higher in regions which are closer to larger markets. The coefficient of the non-traded goods price is negative and significant. This is according to new economic geography theory. Based on this theory, the price acts as a centrifugal force and therefore reduces agglomeration and wages too. The coefficient of the productivity is positive and significant. Finally, Coefficient of openness index is significant and has a positive sign. Therefore, the openness increases employment opportunities and the wages.

Table 3: GLS Panel Model Estimation Results of the Spatial Structure of Wages in Selected Developing Countries during Period 1998-2007

	Fix Effects			Random Effects		
Variables	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
Constant	1.503093	45.09937	0.0000	1.515456	4.642320	0.0000
$\Delta \ln Y_{rs}$	0.300191	3.541479	0.0004	0.268806	3.615846	0.0000
$\Delta \ln D_{weight_{rs}}$	0.005992	2.458166	0.0141	0.005934	2.260660	0.0233
$\Delta \ln q_{rs}$	-0.974051	-236.5217	0.0000	-0.971480	-218.3681	0.0000
$\Delta \ln B_{rs}$	0.237951	8.547045	0.0000	0.247268	8.937822	0.0000
$\Delta \ln OPEN_{rs}$	0.102528	2.222765	0.0264	0.118430	2.447885	0.0145
Observations	1360	------	------	1360	------	------
R^2	0.98	------	------	0.96	------	------
$\bar{R}^2$	0.98	------	------	0.96	------	------
F-statistic	685.4200	------	0.0000	7018.434	------	0.0000
F_{test}	2927.610	------	0.0000	------	------	------
Hausman Test	------	------	------	0.000000	------	1.0000

Source: Present study calculations using Eviews 6.

5. Conclusions

The main purpose of this study is to investigate the factors affecting the manufacturing industry wage among the selected developing countries by using the new economic geography model. More specifically, we use a panel data model to study the spatial structure of wages in 136 countries for the period 1998-2008**.**

Data from the selected developing countries showed generally a good fit for new economic geography models. Furthermore, the overall result of this study confirms the centralization in developing countries. Specifically, industries, trade, and workers all have incentives to agglomerate in larger countries to benefit from economies of scale in the form of higher wages and profits. From the policy perspective, this suggests that there will be higher levels of wage disparities in the future because agglomeration is a stable equilibrium. With this evidence, higher levels of agglomeration can be expected, consistent with a developing country.

Endnotes

1. New Economic Geography
2. Increasing Return to Scale (IRS)
3. constant returns to scale (CRS)
4. Weighted Least Squares (WLS)
5. World Trade Organization (WTO)
6. Gross Domestic Product (GDP)
7. Armenia has the highest wage among the selected countries. But because of the large difference from other countries and Showing negligible of countries wage, it has not been included in the figure.
8. Iran's wage has been changed considerably due to switching the fixed exchange rate to floating exchange rate in year 2002.
9. Random and Fixed Effects (RE and FE)
10. De Haan and Sturm (2000) used the same terminology to examine the robustness of the results on the relationship between economic freedom and economic growth.

References

Amiti, M. & Cameron, L. (2004). Economic geography and wages. *CEPR Discussion Papers*, No. 4234.

Ashrafzadeh, H. & Mehregan, N. (2008). *Econometrics of panel data*. Tehran University, Tehran.

Betts, C. M. (2008). Real exchange rate movements and the relative price of non-traded goods. *Staff papers*, Federal Reserve Bank of Minneapolis Research Department, No. 1.

Bosker, M. (2008). *The empirical relevance of geographical economics*. Utrecht University.

Bosker, M., Brakman, S., Garretsen, H., & Schramm, M. (2010). The new economic geography of prefecture cities in China: The relevance of market access and labor mobility for agglomeration. *Seminar participants at the Spatial Economics Research Centre*, London.

Brakman, S., Garretsen, H., & Schramm, M. (2004). The spatial distribution of wages estimating the Helpman-Hanson model for Germany. *Journal of Regional Science*, 44(3): 437-466.

Brakman, S., Garretsen, H., & Schramm, M. (2006). Putting new economic geography to the test: Freeness of trade and agglomeration in the EU regions. *Cesifo Working Paper*, No. 1566.

Brakman, S., Garretsen, H., Gorter, J., Horst, A., & Schramm, M. (2005). New economic geography; Empirics and regional policy. *Netherlands Bureau for Economic Policy Analysis*, CPB Special Publications, No. 56.

Database websites, Retrieved from: www.fx.sauder.ubc.ca, www. oanda. com, www.nbg.ge, www.timeanddate.com, www.bls.gov, www.Stats. gove.cn and www.woldbank.org.

De Haan, J. & Sturm, J.E. (2000). On the relationship between economic freedom and economic growth. *European Journal of Political Economy*, 16, 215-241.

Faina. A., Rodriguez, J., Gabriela, B.C., & Candamioan, L.V. (2010). Income disparities in Romanian regions: The role of market access. *Working Paper*, No. 5-0.

Fallah, B. N., Partridge, M. D., & Olfert, M. R. (2011). New economic geography and US metropolitan wage inequality super. *Journal of Economic Geography*, 11(3): 865-895.

Fally, T., Paillacar, R., & Terra, C. (2010). Economic geography and wages in Brazil: Evidence from micro-data. *Journal of Development Economics*. 91, 155–168.

Farmanesh, A. (2009). Regional dimensions of economic development in Iran; A new economic geography approach. *MPRA Paper*, No. 13580, University of Maryland, College Park.

Fujita, M. Krugman, P. & Venables, A. J. (1999). *The spatial economy: Cities, regions and international trade.* Cambridge, MA: MIT Press.

Hanson, G. H. (1998). Market potential, increasing returns and geographic concentration. *NBER Working Paper*, No. 6429,

National Bureau of Economic Research, Cambridge Massachusetts.

Hanson, G. H. (2005). Market potential, increasing returns, and geographic concentration. *Journal of International Economics,* 67(1): 1-24.

Helpman, E. (1998). The size of regions. In D. Pines, E. Sadka & I. Zilcha (Eds.). *Topics in Public Economics*: *Theoretical and Applied Analysis*, Cambridge, UK: Cambridge University Press.

Henderson, V. (2003). The urbanization process and economic growth: the so-what question. *Journal of Economic Growth*, 8, 47-71.

Hering, L., & Poncet, S. (2009). The impact of economic geography on wages: Disentangling the channels of influence. *China Economic Review*, 20, 1–14.

Hering, L., & Poncet, S. (2010). Market access and individual wages: Evidence from China. *Journal the Review of Economics and Statistics*, 92, 145-159.

International Labor Organization (ILO). *Key Indicators of the Labor Market (KILM),* Sixth edition, Employment-to-population ratio, retrieved from www.ilo.org.

Kazerooni, A. R., & Mohammadi, A. R. (2007). Examine the relationship between productivity and wages in the industrial sector in Iran. *Iranian Journal of Economic Research*, 9(31): 127-150.

Kiso, T. (2005). *Does new economic geography explain the spatial distribution of wages in Japan*? Mimeo, University of Tokyo.

Krugman, P. & Venables, A .J. (1995). Globalization and the inequality of nations. *Quarterly Journal of Economics*, 110, 857-880.

Krugman, P. (1991). Increasing returns and economic geography. *Journal of Political Economy,* 99(3): 483-499.

Mion, G. (2004). Spatial externalities and empirical analysis: the case of Italy. *Journal of Urban Economics*, 56, 97–118.

Ottaviano, G. I. P. & Puga, D. (1998). Agglomeration in the global economy: A survey of the new economic geography. *The World Economy*, 21(6): 707-731.

Paredes, D. (2011). Can NEG explain the spatial distribution of wages of Chile? *Discussion Papers,* Series, No. 2.

Pires, A. J .G. (2006). Estimating Krugman's economic geography model for the Spanish regions. *Spanish Economic Review*, (8), 83–

112.

Puga D. (1998). Urbanisation patterns: European versus less developed countries. *Journal of Regional Science*, 38, 231-252.

Puga, D. (1999). The Rise and fall of regional inequalities. *European Economic Review*, 43, 303-334.

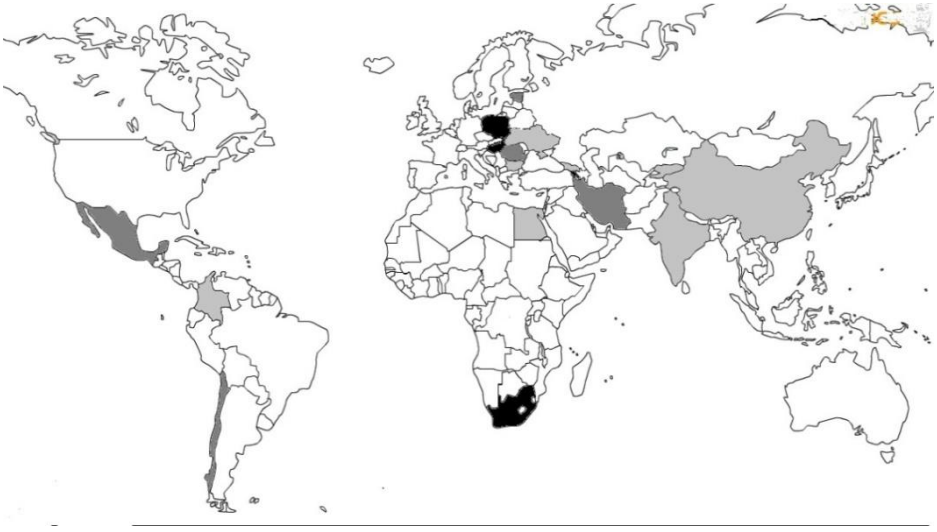
Redding, S. J. (2010). The empirics of new economic geography. *Journal of Regional Science*, 50(1): 297-311.

Roberts, M., Deichmann, U., Fingleton, B., & Shi, T. (2010). On the road to prosperity? The economic geography of China's national expressway network. *Working Paper*, Series No. 5479.

Vegh, C. A. (2007). *Non-traded goods and relative prices*. University of Maryland and NBER.

Venables, A. J. (1996). Equilibrium locations of vertically linked industries. *International Economic Review*, 37(2): 341–359.

Appendix1: Spatial Distribution of Industrial Wages in Selected Developing Countries, 2007



High wages
Average wages
Low wages