Wage equations in Guatemala
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Introduction
Wage equations are functional forms oriented to provide insights of the local labor market behaviors, in particular they evaluate the causes of wage variations. The structural form of the wage equation vary depending on what one believe are the determinants in a specific region. For instance, it is possible to discuss about the wage equation that Paul Krugman proposes, and try to see if the pecuniary externalities reflected on imperfect equilibrium, increasing returns and monopolistic competition are the responsible for determining the wages. Also, it is possible to see if other elements such as unemployment rate determine wages in a region as an instrument of threat against employees. In that case, the wage curve of Blanchflower and Oswald would represent another functional form.

The question is which wage equation explains in better way the conditions of wages in a region. There has not been a theoretical discussion about this questioning in literature, excepting the one made by Fingleton and Palombi (2013). In addition to this discussion, the interest of this research is to focus in the labor market of Guatemala— a developing country where such kind of studies are rare or null. So, in order to carry out the objective of the research, the study is going to be divided in two papers: first, to analyze the NEG wage equation in Guatemala, and then the second paper will evaluate the hypothesis of the wage curve in Guatemala. To complete the analysis, there will be a testing between both models to analyze the goodness of each one in contrast to the reality of the country.

Methods
The NEG wage equation uses panel data information of 78 municipalities for the years 2001-2008, where the potential market (the opportunity of doing business successfully) is the key variable. This is a methodology developed by Paul Krugman (1991), which includes some insights of the access market that were elaborated by Harris (1954).

\[
\ln w^M = a_1 \ln P + (a_0) + \psi
\]
(Equation 1)

\[
\ln w^M = \rho W \ln w^M + a_1 (\ln P - \rho W \ln P) + Xb + e
\]
(Equation 2)

Where,
- \(w^M\) is the manufacturing wage in region \(r\),
- \(P\) is the market access or potential market of the region \(r\),
- \(W\) is the weight distance matrix
- \(Xb\) is the vector of control variables (includes education level, public infrastructure investment, and their exogenous spatial lag variables) in region \(r\).
- \(e\) is the error term

The model try to take in consideration the heterogeneity of the regions by accounting with fix effects of regions and time.

The wage curve hypothesis is a negative relationship between wages and unemployment rate. It is considered as an empirical law of economics because most of the studies obtain elasticities around -0.1. Card (1995) The mainstays of the theory rest on the bargaining wage model and efficiency wage model. (Blanchflower and Oswald, 1994; 2005) The following model is considered to be estimated with information of the years 2002-2011 and 22 political divisions (departments):

\[
\ln(w_{irt}) = \beta_0 + \beta_1 \ln(U_{irt}) + \sum_{j=2}^{\infty} \beta_j X_{irt} + f_t + g_t + e_{irt}
\]
(Equation 3)

\[
\ln(w_{irt}) = \beta_0 + \rho(W \ast \ln(w_{irt})) + \beta_1 \ln(U_{irt}) + \theta(W \ast \ln(U_{irt})) + \sum_{j=2}^{\infty} \beta_j X_{irt} + e_{irt}
\]
(Equation 4)

Where,
- \(w\) is the local wage in region \(r\),
- \(U\) is the unemployment rate in the region \(r\),
- \(W\) is the weight distance matrix
- \(X\) is the list of control variables (includes education level, public infrastructure investment, their exogenous spatial lag variables, and an index of agglomeration) in region \(r\). 
- \(e\) is the error term

The model try to take in consideration the spatial heterogeneity by accounting with fix effects of regions and time.

Conclusions
This is an ongoing work in which two wage equations are under evaluation for the Guatemalan case. Each model explains the variation of the wages, but the foundations of each one are oriented to provide a discussion of the determinants of wage rates. While the explanation of the NEG model relies on that favorable economic conditions serve to attract workers for better relative wages, the wage equation justifies unemployment rate as threat to coerce workers of accepting a lower wage. Regardless the result of which equation explains better the wage variations in the Guatemalan case, both models lead to consider policy implications in which the effect of public capital, education, prices and unemployment rate have important role in the economic development of the regions. Therefore, the study will provide evidence of how the spatial economic structure is taking place in Guatemala based on wage behavior analysis.