

PROYECTO DE INVESTIGACIÓN INTERNOS SIN
FINANCIAMIENTO O AUTOGESTIONADOS
ANEXO 1 - DATOS INFORMATIVOS

Fecha de presentación (16/01/2019):

Título del proyecto:

Regional effects on productivity in Ecuador

TIPOS DE INVESTIGACIÓN

Investigación básica

Investigación aplicada

DEPARTAMENTO(S):

1. Economía cuantitativa

LINEA(S) DE INVESTIGACIÓN:

1. Economía Industrial

RESUMEN DE INFORMACIÓN DEL DIRECTOR Y COLABORADORES

Director

Apellidos y nombres	No. de Cédula	HSS	Departamento	Título de mayor nivel y mención.
Guevara Rosero Grace Carolina	1721403689	10h	Economía cuantitativa	Doctora en economía

Colaborador(es)

Apellidos y nombres	No. de Cédula	HSS	Departamento	Título de mayor nivel y mención.
Bonilla Bolaños Andrea Gabriela	1714774096	4HSS	Economía cuantitativa	Doctora en economía

Colaboradores Externos

Apellidos y nombres	No. de identificación	HSS	Institución	Título de mayor nivel y mención.

Nota: Las condiciones institucionales de los colaboradores externos están por definirse. De momento están laborando en el sector público y somos un equipo de trabajo que lleva adelante proyectos de investigación.

* HSS = Horas Semana Semestre

PROYECTO DE INVESTIGACIÓN

Proyecto Interno Proyecto Semilla Proyecto Junior Proyecto Multi e Inter Disciplinario

Investigación Básica Investigación Aplicada Investigación Pedagógica Innovación

DEPARTAMENTO(S):

1. Economía cuantitativa

LINEA(S) DE INVESTIGACIÓN:

1. Economía industrial

1 Proyecto de Investigación

Título: Regional effects on productivity in Ecuador

Resumen del proyecto

There is some evidence about the fact that firms' performance is given not only by their own specific characteristics but also by specific market characteristics and the geographical environment surrounding them (Dosi, 1982; Nelson & Winter, 2009). In fact, locational and industrial conditions are very likely to influence on the productivity level of firms: the quality of infrastructure, services, educational institutions are key factors that allow firms to operate and their efficiency depends on the conditions of those amenities (Vernon Henderson et al. 2001; Rodriguez-Pose, 2009; Ottaviano, 2008). Then, the main aim of this study is to identify the degree at which the heterogeneity of firms' productivity is explained by the individual firm heterogeneity and by the industry and location conditions. The focus of this study is on the latter. As the output of firms tends to be more similar within a specific level, namely industry or region (citation required), the multilevel approach is appropriate to study how different level variables influence on the productivity of firms. Indeed, a multilevel approach allows (i) to capture simultaneously the effects of the predictors of group level and individual level, (ii) to consider the independence of the observations within the groups, (iii) to disentangle and examine the inter-individual and inter-group variation (De Leeuw and E. Meijer, 2008). So, the multilevel method allows to measure the variance percentage of industry and regional effects (Burststein et al. 2011). Moreover, this methodology acknowledges the hierarchical structure of the productivity, i.e. firms' productivity responds to a higher level, industry or region (Fiazo and Piacentino, 2009).

This research proposal intends to estimate a multilevel productivity model using firm-level data from the Economic Census of 2010 (EC2010) for answering the research question mentioned above. The EC2010 database accounts for information of 311.000 firms. The higher level information is built based on the individual data and from other information sources such as the National Accounts.

Palabras clave (4-6): Ecuador, firms' productivity, multilevel analysis, regional economics

2 Objetivos, relevancia, productos y resultados esperados de esta propuesta de investigación



2.1 Objetivos

2.1.1 Objetivo General

1. To determine the cantonal and industrial effects on the total factor productivity of Ecuadorian firms.

2.1.2 Objetivos Específicos

1. To distinguish between the effects corresponding to the firm level variables and those from the aggregate level variables

2.2 Detalle de los resultados esperados

There exist a vast literature emphasizing on the importance of the macroeconomic factors that influence the performance of firms. The quality of institutions, the regulatory framework, the level of competitiveness of a country, the governance, among others, are the factors that have been analyzed (Kaufmann et al., 1999; Porter et al. 2003; Djankov et al., 2004 and Levine and Zervos, 1998). In general, these variables reflect the business environment. However, many of these studies stay at a national level of aggregation which entails low degree of variation over time and industrial and regional effects are overlooked. On the other hand, in studies using firm-level data, industry and spatial effects are not systematically considered. For developing countries, the conditions of a benchmark country is assumed which is a disadvantage for modeling (Commander et al. 2008). Considering these issues, the present study seeks to analyze spatial and individual factors simultaneously by using a multilevel approach. This methodology has been increasingly used by a large number of scholars due to its advantage to manage complex data that accounts for firm-structure and industrial-spatial structures (McGahan and Porter, 1997; Hough, 2006; Burstein et al. 2011).

Studies using a multilevel approach conclude that that regional factors matter for the productivity growth (Brito, 2008). Indeed, Burstein et al. (2011) evidence that the variance decomposition productivity is explained by country, industry and country-industry effects. These effects explain less than the individual firm characteristics. As in Aiello and Ricotta (2014) and Commander et al. (2008), it is expected that firm-level characteristics explain more of the variance of productivity than the higher level aspects at the industrial or at the cantonal level.

On the other hand, research works that use exclusively national characteristics for explaining firms' performance identify some increasing-productivity country factors, namely, the geographical size and the educational level of the location where the firm operates (Aiello and Ricotta, 2014), urbanization economies rather than localization economies (Brito, 2008), among others. Moreover, the firm specific factors such as the degree of internationalization, size, human capital, innovation, group membership, among others, are significant for firm productivity (Aiello and Ricotta, 2014).

3 Relevancia de la propuesta de investigación y su relación con la(s) líneas de investigación

The results obtained from the productivity analysis using a multilevel approach are potentially interesting for Ecuadorian public policy recommendations because of two main reasons. First, it contributes to measure the relative importance of a regional effect on the level of productivity of firms. Thus, the role of "Gobiernos Autónomos y Descentralizados, GADS" can be determined. If the productivity is largely explained by the cantonal effect, then the action of these entities in terms of infrastructure improvement, public investment, among other actions is crucial. Second, the firm productivity is relevant for regional economic growth (Lin, 2009). Because of this second reason, this investigation is in line with the DEC research axe: Industrial Organization.

4 Productos esperados



a. Publicaciones científicas (obligatorio);	x
b. Disertación a la Comunidad Politécnica;	x
c. Proyecto de Titulación;	x
d. Tesis de Grado (maestría o doctorado);	<input type="checkbox"/>
e. Aplicación tecnológica construida o implementada;	<input type="checkbox"/>
f. Patente presentada;	<input type="checkbox"/>
g. Perfil de proyecto de mayor impacto científico, técnico, pedagógico o de innovación.	<input type="checkbox"/>

5 Descripción y metodología y diseño del proyecto

5.1 Descripción, metodología y diseño del proyecto

From a methodological point of view, most of the studies dealing with the determinants of Ecuadorian firms' performance use one-level models, i.e., include only individual firms' characteristics as the degree of internationalization, size, human capital, innovation, group membership, among others (Aiello and Ricotta, 2014). Despite this modeling approach have successfully identified important firms' performance determinants, some methodological issues regarding the nested structure of microdata from firms' Census need to be considered. More specifically, some firms group each other into specific geographical zones, for instance, within cities, cantons, and provinces. This is relevant for firms' performance because, firms located at the same city or canton may be affected by the same local factors, or there may be spatial and social interdependencies that conventional econometric models do not address (Ballas & Tranmer, 2012). And so, firms that are located in the same region are very likely to have a more similar level of productivity compared to other firms belonging to other regions (Aiello and Ricotta, 2009).

When analyzing the available data assuming that the firms are nested within groups, we have some options: (i) to ignore the fact that the firm belong to a group and to focus only on the individual characteristics, (ii) to exclusively focus on the inter-group variation, i.e., the aggregate characteristics. The issue with the first option is that it does not take into account the importance of attributes at the group level to influence the results at the individual level. Even if the second option eliminates the non-dependency problem of the first option, it ignores the role of individual-level variables. Both of these two options consider exclusively a uni-level approach so ignoring the multi-level data structure. The use of a multi-level approach allows (i) to capture simultaneously the effects of the predictors of the group level and at the individual level, (ii) to consider the independence of the observations within the groups, (iii) to disentangle and examine the inter-individual and inter-group variation (De Leeuw and E. Meijer, 2008).

Since a firm is an economic agent that interacts with other firms within a social and economic context, the multilevel analysis is pertinent. Firms that are located in the same region are very likely to have a more similar level of productivity compared to other firms belonging to other regions (Aiello and Ricotta, 2009). The fact that firms are influenced by the location where they operate can be considered within a multilevel modelling approach. Thus, the effects regarding the regional and the industrial characteristics can be obtained apart from the effects at the firm-level.

To estimate the multilevel model, firm-level data from the Economic Census of 2010 is used. The database contains information on 511.130 firms. The dependent variable is the Total Factor Productivity of firms. The data has a hierarchical structure, being the levels of aggregation, the cantonal and the industrial ones. Due to the possible similarity of firms according to the region/sector, the errors are not independent. The multilevel model solves such a problem. First, a parsimonious random intercept model is estimated. Then, random slope models are going to be estimated according to the significance tests.



The proposed initial specification is as defined in (1).

$$TFP_{ic} = \beta_{0c} + \beta_{1c}X_{ic} + \varepsilon_{ic} \quad (1)$$

where TFP_{ic} is the total factor productivity of firm i in canton c , β_{0c} is the intercept for each canton and β_{1c} is the slope that varies across cantons. The error term is assumed to have a mean zero and a constant variance. The intercept and slope are random coefficients because they are assumed to vary across cantons (Hox, 1995).

As in the case of regions, firms are also influenced by the conditions of the industries to which they belong. As firms from different sectors are located in one region and firms operating in different regions belong to one sector, sectors are not nested in regions nor regions are nested in sectors (Aiello and Ricotta, 2014). For this reason, a different multilevel model is estimated for industries as a second level.

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6.1 Tiempo máximo de dedicación semestral del Director del proyecto, de los docentes participantes y otros colaboradores.

El tiempo de dedicación máximo será de acuerdo al tipo de proyecto:

<i>Proyecto</i>	<i>Director</i>	<i>Colaboradores</i>
<i>PII y PIS</i>	<i>16 HSS</i>	<i>8 HSS</i>
<i>PIJ y PIMI</i>	<i>20 HSS</i>	<i>10 HSS</i>

Nombre	Rol (director o colaborador)	Horas de dedicación	Departamento
Carolina Guevara	Directora	10HSS	Economía Cuantitativa
Andrea Bonilla Bolaños	Colaboradora	4HSS	Economía Cuantitativa

6.2 Infraestructura y equipos

Infraestructura	Equipos	
Laboratorio 3	Computadoras	Edificio Facultad de Ciencias

6.3 Breve justificación del equipo requerido

Se requiere un computador con acceso a internet para la realización de la revisión de la literatura, el manejo de datos y la edición del artículo científico.

6.4 Fondos Adicionales

No aplica.

7 Declaración del Director del Proyecto

Declaro que la presente propuesta es de mi autoría y de los colaboradores mencionados y que no ha sido presentada en ninguna convocatoria de otra institución pública o privada solicitando el financiamiento total del proyecto.



Quito, 16 de enero 2019

DIRECTOR DEL PROYECTO

Nombre: Carolina Guevara

CC: 1721403689

DECLARACIÓN DEL JEFE DE DEPARTAMENTO

Esta propuesta ha sido aprobada por el Consejo del Departamento de Economía Cuantitativa, en sesión del día 15/02/2019... mediante resolución No. 2019-19. Las instalaciones, incluyendo personal, edificios, equipo y recursos financieros están a disposición del proponente y sus colaboradores de acuerdo con las especificaciones que se encuentran en esta propuesta.


 JEFE DEL DEPARTAMENTO
 Nombre: Julio Medina
 CC: 1704195203

Quito, 18 de Feb de 2019

**PROYECTO DE INVESTIGACIÓN INTERNOS SIN
FINANCIAMIENTO O AUTOGESTIONADOS
ANEXO 4 - DECLARACIÓN**

TIPO DE INVESTIGACIÓN

Investigación básica

Investigación aplicada

TÍTULO DEL PROYECTO

Regional effects on productivity in Ecuador

DECLARACIÓN DEL DIRECTOR DEL PROYECTO

El equipo de investigadores, representado por el Director del Proyecto declara lo siguiente:

- Que el presente proyecto es una creación original de mi autoría y del equipo de investigadores, y por tanto asumimos la completa responsabilidad legal en caso de que un tercero alegue la titularidad de los derechos intelectuales del proyecto, exonerando a la EPN de cualquier acción legal que se derive por esta causa.
- Que el presente proyecto no ha sido presentado en ninguna convocatoria de otra institución pública o privada. El incumplimiento será causal para que el proyecto no sea tomado en consideración.
- Que todos los bienes adquiridos en proyecto permanecerán bajo la custodia y responsabilidad del director de proyecto durante la ejecución del mismo.
- Que si el proyecto genera algún producto o procedimiento susceptible de obtener derechos de propiedad intelectual, de los cuales se deriven beneficios, aceptamos que éstos serán compartidos entre los investigadores y la institución o las instituciones participantes en el proyecto, conforme a lo establecido en el COESC.
- Que el equipo de investigadores y/o instituciones participantes se comprometen a mantener la confidencialidad de la información si ésta podría ser susceptible de protección por patentes, y solicitar la valoración de propiedad intelectual respectiva previa a cualquier publicación o difusión.
- Que para el caso de derechos de autor otorgamos una licencia de uso exclusivo con fines académicos para la o las instituciones participantes en el proyecto.



Firma del Director del Proyecto
Nombre: Carolina Guevara Rosero
C.I.: 1721403689