

PROYECTO DE INVESTIGACIÓN INTERNOS SIN FINANCIAMIENTO O AUTOGESTIONADOS

ANEXO 1 - DATOS INFORMATIVOS

Fecha de presentación (dd/mm/aa): 12/11/2019

Título del proyecto: *(Revisar la guía para la presentación de las propuestas de los proyectos de investigación)*

Do trade and financial globalization affect to macro-financial stability of South American countries?

TIPOS DE INVESTIGACIÓN

Investigación básica

Investigación Aplicada

DEPARTAMENTO(S) Y/O INSTITUTO(S):

1. Departamento de Economía Cuantitativa
- 2.

LÍNEA(S) DE INVESTIGACIÓN (verificable en el SAEW):

1. Política económica
- 2.

RESUMEN DE INFORMACIÓN DEL DIRECTOR Y COLABORADORES

Director

Apellidos y nombres	No. de Cédula	HSS	Departamento	Título de mayor nivel y mención.
Guachamín Guerra Marcela Elizabeth	1712635620	12	Departamento de Economía Cuantitativa	Master Monnaie Finance Gouvernance

Colaborador(es)

Apellidos y nombres	No. de Cédula	HSS	Departamento	Título de mayor nivel y mención.

Colaboradores Externos

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

* HSS = Horas Semana Semestre

**PROYECTO DE INVESTIGACIÓN INTERNOS SIN
FINANCIAMIENTO O AUTOGESTIONADOS**
ANEXO 2 – DETALLES DE LA PROPUESTA

Investigación Básica <input type="checkbox"/>	Investigación Aplicada <input checked="" type="checkbox"/>
DEPARTAMENTO(S) Y/O INSTITUTO(S):	
1. Departamento de Economía Cuantitativa	
2.	
LINEA(S) DE INVESTIGACIÓN:	
1. Política Económica	
2.	

DISCIPLINA CIENTÍFICA (Marque X, solamente una opción)	
Ciencias Naturales y Exactas;	
Ingeniería y Tecnologías;	
Ciencias Médicas;	
Ciencias Agrícolas;	
Ciencias Sociales;	
Humanidades	X

OBJETIVO SOCIOECONÓMICO (Marque X, solamente una opción)	
Exploración y explotación del medio terrestre;	
Ambiente;	
Exploración y Explotación del espacio;	
Transporte, telecomunicaciones y otras infraestructuras;	
Energía;	
Producción y tecnología industrial;	
Salud;	
Agricultura;	
Educación;	
Cultura, ocio, religión y medios de comunicación;	
Sistemas políticos y sociales, estructuras y procesos;	X
Defensa;	
Avance general del conocimiento: I+D financiada con los Fondos Generales de Universidades (FGU);	
Avance general del conocimiento: I+D financiados con otras fuentes.	



1 Proyecto de Investigación
Título: Do trade and financial globalization affect to macro-financial stability of South American countries?
Resumen del proyecto (máximo 200 palabras) The macro-financial vulnerability events in the world have increased as consequence of rising financial market disturbances, monetary problems and external shocks ¹ , which can expand over from one country to another simultaneously. In particular, South American region is highly macro-financial vulnerability generated by the capital flows, terms of trade volatility, official exchange rate volatility, commodity prices volatility and indebtedness (See, Caballero (2000) and Cárcamo - Díaz and Pineda-Salazar (2014)). In view of the fact that this research aims to examine if trade and financial globalization are drivers of macro-financial systemic risk and detects if there is a macro-financial contagion risk through the interconnection of country's economic cycle synchronization, bilateral trade and trade agreement linkages among 10 South American countries for the 1978-2014 period, using spatial econometric techniques. These ones will allow monitor the macro-financial stability and encourage corrective macro-prudential policies in order to reduce uncertainty from a regional perspective.
Palabras clave (4-6): Trade Globalization, Financial Globalization, Macroeconomic-Financial Risk, Spatial Models

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

2.1 Objetivos

2.1.1 Objetivo General

To identify the role of trade and financial globalization as factors of macro-financial contagion risk among countries of the South American region, considering three transmission channels: economic cycle synchronization, bilateral trade flows and trade agreements.

2.1.2 Objetivos Específicos

- a. To analyze the impact of trade and financial openness on macro-financial stability and macroeconomic volatility.
- b. To identify the propagation of macro-financial contagion risk from one country to another, using spatial models, which evaluate the cross-country interconnections linkages by bilateral trade flows, economic cycle synchronization and economic agreements that can determine possible cross-country shocks.
- c. To identify if there is spatial interactions to determine a possible systematic risk transmission among South American economies.
- d. To evaluate and discuss the contagion risk implications in South America region according to the results.

¹ According to Guillaumont (2009), Briguglio et al (2009) and Essers (2013), the macro-financial vulnerability increases by the nature of the perturbations, the size of the opening economy, the level of impact on the economy growth and the country's ability to react appropriately by available policy and resources



2.2 Detalle de los resultados esperados (con relación a los objetivos)

- a. Several studies have evaluated the impact of trade or financial openness on macroeconomic volatility and have found that the relationship could be causal or ambiguous (not stable over time). The causal relationship could be mixed in some cases, i.e., the effects can be positive or/and negative, depending on the nature of the shocks according to the income level of the countries or regions (See, Kose et al., (2003), Karras, (2006), Drion and Adema (2011) and Sahoo et al., (2019)). Empirical literature have reported that trade openness has a positive effect on growth volatility due to the fact that the economies studied are exposed to greater external shocks (See, Kose et al., (2003) and Ahmed and Suardi, (2009)). On the contrary, some studies show a negative relationship because some economies have diversified their export basket or have increased their exports, thus reducing the production costs ex post of the crises (See, Cavallo (2007), Calderón and Schmidt-Hebbel (2008) and Sahoo et al., (2019)). On the other hand, other studies confirm that there is a positive relationship between the financial openness and macroeconomic volatility, since the capital flows volatility is concentrated on a specialized production, which shows volatile prices (See, Bejan et al., (2006) and Eozenou, (2008)).
- b. The spatial econometric models allow determining the interdependence and spillover effects by cross-sectional dependence that captures the interconnection among individuals. In the case of this research, the interconnection among countries will be evaluate by the bilateral trade concentration, economic cycle correlation and trade agreements. The impacts of these cross-country shocks on macro-financial vulnerability index (MSF) (index obtained in a previously study) allow to determine if there is a macro-financial contagion risk.
- c. We could find that financial globalization is a channel of transmission of macro-financial systemic risk, since financial openness has a significant positive effect on the MSF vulnerability index; due to the fact, the most of foreign investments are concentrated on a specialized production as commodities, which have high volatility prices. On the other hand, we also verify that trade openness is also a factor of macro-financial systemic risk, since it has a negative and significant impact on the MSF index, i.e., trade openness leads to a decrease of the macro-financial risk level. This could attribute to the reduction of production costs due to the fact of the increased diversification of its export basket, which have smoothed the ex-post shocks. A difference the other studies, we confirm that a variation in bilateral-trade, economic cycle or trade agreements of a country i may affect the MSF vulnerability index of this country and the other country j , i.e., these interconnection leads to macro-financial contagion risk.
- d. This study contributes to the debate on monitoring macro-financial risk through transmission analysis. This contagion risk study for ten South American countries identifies the effects of economic and financial globalization according to the behavior of cross-country connection of economic cycle synchronization, bilateral trade and trade agreements. These ones allow monitor the macro-financial stability and encourage corrective macro-prudential policies in order to reduce uncertainty from a regional perspective.

3	Relevancia de la propuesta de investigación y su relación con la(s) líneas de investigación
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The aim of this study is to analyze if there is a contagion risk among ten South American countries, identifying the effects of trade and financial globalization according to the behavior of cross-country connection of economic cycle synchronization, bilateral trade and trade agreements. This will be of great use for the Central Banks of the South American countries, since this study allow monitor the macro-financial stability and encourage corrective macro-prudential policies in order to reduce uncertainty from a regional perspective. Therefore, this system of monitoring proposed allow also determine possible systemic contagion risk, which will contribute as a tool for the regulation and correct execution of trade agreements.



4 Productos esperados (marcar con una “X” al menos uno de los productos no señalados)

Tipo de Producto:	Marcar con una “X”
a. Disertación a la Comunidad Politécnica (obligatorio);	X
b. Presentación de un artículo en formato de la Revista Politécnica (obligatorio)	X
c. Proyecto de Titulación;	
d. Aplicación tecnológica construida o implementada;	
e. Patente presentada;	
f. Perfil de proyecto de mayor impacto científico, técnico, pedagógico o de innovación.	
g. Publicaciones científicas indexada en SCIMAGO-SCOPUS/WoS/SCIELO/Latindex Catálogo o un artículo en congreso indexado en SCOPUS.	X

5 Descripción y metodología y diseño del proyecto

5.1 Descripción, metodología y diseño del proyecto (Máximo dos carillas)

The macro-financial risk has been coupled with the evolution of globalization in several South American countries, reflected by the expansion of cross-border trade and capital flows since the mid-1980s following the great external debt. At the beginning, this trade and financial integration was accompanied by a low-tariff exporting model, which generated an increase in economic growth of the region.

In view of the fact that globalization promotes the development of mechanisms and policies of trade and financial openness, it is important to evaluate the benefits and risks that these would generate in the countries' economies. Several studies have evaluated the impact of trade or financial openness on macroeconomic volatility and have found that the relationship could be causal or ambiguous (not stable over time). The causal relationship could be mixed in some cases, i.e., the effects can be positive or/and negative, depending on the nature of the shocks according to the income level of the countries or regions (See, Kose et al., (2003), Karras (2006), Drion and Adema (2011) and Sahoo et al., (2019)).

Under this scenario, it seems necessary to identify the channels of transmission that could affect the economic and financial stability of South American (SA from now on) countries and, particularly, the role of trade and financial globalization as factors of macro-financial contagion risk among countries of the region. Hence, the main questions that arise in this paper are: i) Are trade and financial globalization the drivers of macro-financial systemic transmission in SA countries? and ii) is there a macro-financial contagion risk through the interconnection of bilateral trade, economic cycle and trade agreements among the SA countries ?.

The main contribution of this paper is to investigate the systemic and contagion risk of trade and financial globalization on the Macro-Social-Financial (MSF) vulnerability index of 10 South American countries (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela) from 1978 to 2014². For this study, we will consider three contagion channels by economic cycle synchronization, trade flows and trade agreements, using spatial models. Contrary to these studies, this research proposes not only to identify the globalization impacts on macroeconomic volatility, but also to analyze if there is a macroeconomic-financial systemic risk

² We use the MSF vulnerability index, which is composed of macroeconomic, solvency, liquidity, market and social development vulnerability sub-indicators. In the data section, we detail the variables that compose this index. For more details, see Guachamin et al., (2019).'



and a contagion of macroeconomic-financial risk driven by trade and financial globalization, using spatial econometric techniques, focusing on the South American region.

We use the Macroeconomic-Social-Financial (MSF) vulnerability index constructed by Guachamin et al. (2019) as the dependent variable in the model proposed. The MSF vulnerability index is composed of macroeconomic, solvency, liquidity, market and social development vulnerability sub-indicators. The independent variables are available in each country's Central Banks database, the World Bank's World Development Indicators Database and the International Financial Statistics (IFS) of the International Monetary Fund (IMF).

We propose two models of robustness. For the first robustness model, we use the same dependent variable (MSF vulnerability index) and the two main exogenous variables mentioned above. In contrast to the main model, we evaluate the impact of other external factors, for which, we consider the following control variables: domestic credit financial sector, trade balance, high-technology exports and oil price. For the second model of robustness, we consider to the GDP per capita volatility as dependent variable, which is used as a measure of macroeconomic vulnerability. In addition, we also use trade openness and financial openness as main control variables and to evaluate the impact of external factors, we introduce the following control variables: financial development, terms of trade volatility, official exchange rate volatility and oil price.

Given that, this spatial econometric incorporates a spatial dependence for that it is important incorporate weight matrices in the model to determine if there is cross-country contagion risk. In order to ensure the robustness of our results, we employ three weight matrices: i) economic cycle synchronization, ii) trade flows and iii) trade agreements.

The first matrix, the economic cycle synchronization expresses the correlation matrix of the economic output-gaps of the 10 SA countries. The Latin American Development Bank, using the Hodrick-Prescott (HP) filtering technique, calculates this indicator³.

The second weight matrix is based on the foreign trade matrix, EQCHANGE, provided by Couharde et al., (2017) through the Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) for the 1976-2016 period. This matrix describes the bilateral export and import values through the following equation:

$$W_{ii,t} = \frac{I_{i,t}}{I_{i,t} + X_{i,t}} * W_{ij,t}^{imp} + \frac{X_{i,t}}{I_{i,t} + X_{i,t}} * W_{ij,t}^{exp} \quad (1)$$

$W_{ij,t}^{imp} = \frac{I_{i,t}^j}{I_{i,t}}$ is partner country j's import weights and $W_{ij,t}^{exp} = \frac{X_{i,t}^j}{X_{i,t}}$ is partner country j's export weights, where and $I_{i,t}^j$ reports import flows and $X_{i,t}^j$ denotes export flows into the country i from country j during period t. Meanwhile, $I_{i,t}$ and $X_{i,t}$ are total imports and total exports of each country i.

The construction of our third weight matrix is based on the existence of an agreement trade and/or economic frontier among the 10 LA countries; if this is the case we consider 1 if not, 0. Finally we proceed to normalize three weight matrices to estimate the spatial models.

The spatial econometric model is a linear regression, which adopted the spatial dependence on series or panel data. The principal spatial models are: i) the Spatial Autoregressive Model (SAR) adopts a spatially lag on dependent variables, ii) the Spatial Durbin model (SDM) includes a spatial lag on the independent and dependent variables and /or the spatial error.

This research focus in two spatial models in order to capture the spatial dependencies across countries and select the best ones. We estimate these models by the generalized method of moments (GMM) estimator for solving endogeneity⁴.

According to Lee and Yu (2010), the SAR model for panel data is the following equation:

$$\gamma_{it} = \delta \sum_{j=1}^N W_{ij} Y_{ij} + \varphi G_{it} + \beta X_{it} + \alpha_i + \varepsilon_{it} \quad (2)$$

³ Dell'Erba et al., (2013) uses economic cycle synchronization by the correlation matrix of output gaps

⁴ The GMM method for panel data includes the peer effect terms and differencing efficiently the data leads. See Guido M, and Ingmar R. (2018).



Where γ_{it} is the MSF vulnerability index for each country in each period. δ is the spatial autocorrelation coefficient, which measures of contagion risk through the interaction effect expressed by $\sum_{j=1}^N W_{ij} Y_{jt}$ that reflects the connection between the dependent variables Y_{jt} , which represents the interdependence of country i with the dependent variables of countries j and the spatial weight matrix W_{ij} . In this model the spatial weight matrices W_{ij} describe the correlation of output gap correlation, trade partner flows and trade agreements connections between countries i and j . Meanwhile, G_{it} represents the independent variables of interest (trade and financial openness). X_{it} is the matrix of the control variables. Note that ϕG_{it} and βX_{it} identify the systemic risk and reflects the relationship between each independent variables and macro-financial vulnerability index of country i in period t . Finally, α_i is country-specific fixed effects and ε_{it} is the common error term and it measures the idiosyncratic risk.

On the other hand, LeSage and Pace (2009) demonstrated that the spatial Durbin model is robust since it also allows the covariates in country j to directly or indirectly affect the dependent variable in country i . This model will employ to evaluate financial turbulence transmission by Elhorst et al. (2014 and 2017) and Bara et al. (2016). The SDM model is shown in the following equation:

$$\gamma_{it} = \delta \sum_{j=1}^N W_{ij} Y_{jt} + \phi G_{it} + \theta \sum_{j=1}^N W_{ij} G_{jt} + \beta X_{it} + \alpha_i + \varepsilon_{it} \quad (3)$$

In contrast to the SAR model, the spatial Durbin model adds the spatially lagged independent variables. In Equation (2), θ is the spatial autocorrelation coefficient, which measures of systemic contagion risk through the relationship expressed by $\theta \sum_{j=1}^N W_{ij} G_{jt}$ that reflects the connection between the independent variables of interest G_{jt} , which represents the interdependence of country i with the interest independent variables of countries j and the spatial weight matrix W_{ij} .

The impacts of the control variables on the MSF vulnerability index can be expressed as direct effects, when there is a variation in the globalization control variables of country i that affect its MSF index vulnerability specifically. Conversely, there is an indirect effect if there is a variation in the globalization control variables of country i on all other countries' MSF vulnerability index.

This contagion risk study for ten South American countries will identify the effects of economic and financial globalization according to the behavior of cross-country connection of economic cycle synchronization, bilateral trade and trade agreements. These ones allow monitor the macro-financial stability and encourage corrective macro-prudential policies in order to reduce uncertainty from a regional perspective.

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6	Infraestructura, equipos y fondos adicionales.
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6.1 Infraestructura y equipos

- Indicar la infraestructura y equipos **disponibles** para la ejecución del proyecto, con la ubicación actual de los mismos

Infraestructura	Equipos	
	Nombre del Equipo	Ubicación del Equipo

6.2 Breve justificación del equipo requerido

6.3 Fondos Adicionales

- Otros fondos de otros organismos (si los hubiere)

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

TIPO DE INVESTIGACIÓN

Investigación básica

Investigación aplicada

TÍTULO DEL PROYECTO

Do trade and financial globalization affect to macro-financial stability of South American countries?

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: Marcela Guachamin
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ESCUELA POLITÉCNICA NACIONAL
VICERRECTORADO DE INVESTIGACIÓN Y PROYECCIÓN SOCIAL
Dirección de Investigación y Proyección Social



Esta propuesta ha sido aprobada y avalada por el Consejo del Departamento de Economía Cuantitativa, en sesión del día miércoles 13 de noviembre de 2019. mediante resolución No.CDEC-2019-100

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.

J. Medina

Firma del Jefe del Departamento
Nombre: Julio César Medina Vallejo
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