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ANALYSIS OF THE REGIONAL ECONOMIC RESILIENCE IN LATIN AMERICA AND THE CARIBBEAN FROM 2000 TO 2017

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Monografia apresentada ao Curso de Ciências Econômicas do Instituto de Ciências Sociais Aplicadas (ICSA) da Universidade Federal de Ouro Preto (UFOP) como requisito à obtenção do grau de Bacharel em Ciências Econômicas.

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Curso de Ciências Econômicas – UFOP

Analysis of the regional economic resilience in Latin America and the Caribbean from 2000 to 2017

Trabalho apresentado ao Curso de Ciências Econômicas do Instituto de Ciências Sociais Aplicadas (ICSA) da Universidade Federal de Ouro Preto como requisito para a obtenção do grau de Bacharel em Ciências Econômicas, sob orientação do Prof. Dr. Heder Carlos de Oliveira.

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(...)
Y así a lo largo de tu cuerpo,
pequeña América adorada,
las tierras y los pueblos
interrumpen mis besos
y tu belleza entonces
no sólo enciende el fuego
que arde sin consumirse entre nosotros,
sino que con tu amor me está llamando
y a través de tu vida
me está dando la vida que me falta
y al sabor de tu amor se agrega el barro,
el beso de la tierra que me aguarda.

Pablo Neruda (La Pequeña América)

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LIST OF ABBREVIATIONS AND ACRONYMS

CEPAL	Comisión Económica para América Latina y el Caribe (Mexico)
CGE	Dynamic Computable General Equilibrium
DER	Dynamic Economic Resilience
DSER	Direct Static Economic Resilience
ECLAC	Economic Commission for Latin America and the Caribbean (United States)
ILO	International Labour Organization
ILOSTAT	International Labour Organization Statistics
IILS	International Institute for Labour Studies
IMF	International Monetary Fund
OECD	Organization for Economic Co-operation and Development
SER	Static Economic Resilience
TSER	Total Static Economic Resilience
UN	The United Nations
UNSD	The United Nations Statistics Division
WDI	World Bank's World Development Indicators

ABSTRACT

The Economic Resilience analysis has gained attention and space within the theory of Regional Economic Development. Even so, after decades of research, some authors considers that the knowledge about the subject appears to be disperse, and somewhat polarized. The first contribution of this work is, therefore, a literature review on the subject of Economic Resilience, but focusing specifically on its concepts and empirical methodologies. After this initial research, a Dynamic Static Economic Resilience (DSER) based model was adopted, using employment data of 45 economies of the Latin America and Caribbean from 2000 to 2017, based on this same literature. This model was then used in the calculation of two metrics to assess the Regional Economic Resilience, creating a two-dimensional index that measures both the resistance and recoverability of the countries in relation to the geographical region where they are found. These metrics were then used in the investigation of the degree of Regional Economic Resilience of Latin America and Caribbean, on which it was verified that one of the most resilient countries in the region during the period was Mexico, and the least resilient the Paraguay. Moreover, it is noticed that the region experienced a period of economic development in terms of performance (positive average GDP growth in the majority of its countries, achievement of controlled levels of inflation and positive average investment inflows), but it has kept a level of stagnation in terms of economic resilience since 2000.

Keywords: Regional Economic Resilience; Dynamic Static Economic Resilience; Latin America and Caribbean; Economic Performance.

RESUMO

O tema da Resiliência Econômica tem ganhado atenção e espaço em meio à teoria do Desenvolvimento Econômico Regional. Mesmo assim, depois de décadas de pesquisas, alguns autores afirmam que o conhecimento sobre o tema se encontra de certo modo disperso e polarizado. A primeira contribuição deste trabalho, portanto, uma revisão de literatura sobre o tema da Resiliência Econômica, mas focando especialmente em seus conceitos e metodologias empíricas. Após esta pesquisa inicial, um modelo baseado na Resiliência Econômica Estática Dinâmica (REED) foi adotado, utilizando dados de emprego de 45 economias da América Latina e Caribe entre 2000 e 2017, baseado nessa mesma literatura. Este modelo foi então usado nos cálculos de duas métricas para a avaliação da Resiliência Econômica Regional, criando um índice bidimensional que mede ambas a resistência e recuperabilidade dos países com relação à região na qual eles se encontram. Estas métricas foram então utilizadas na investigação do grau de Resiliência Econômica Regional da América Latina e Caribe, no qual averiguou-se que um dos países mais resilientes da região durante o período foi o México, e o menos resiliente foi o Paraguai. Além disso, notou-se que a região experimentou um período de desenvolvimento econômico em termos de performance (média positiva de crescimento do PIB na maioria de seus países, conquista de níveis controlados de inflação e fluxos médios de entrada de investimentos positivos), mas manteve um nível de estagnação em termos de resiliência econômica desde 2000.

Palavras-Chave: Resiliência Econômica Regional; Resiliência Econômica Estática Dinâmica; América Latina e Caribe; Performance Econômica.

INTRODUCTION

During the last decades, the term Economic Resilience has been gaining the attention of researchers, economists and policymakers in many fields of study. From the establishment of adequate policies and measures to the formulation of models that allows a better comprehension of economic shocks and disruptions, it has conquered space and recognition as a source of theoretical and empirical insights in the avoidance and recovery of these kinds of events.

The term resilience is already used since 1973, in the seminal texts of Crawford Holling, an ecologist scholar that defended the idea of resilience as being the capacity of a system to bounce back to its initial level of functionality when exposed to failures and some above-mentioned disruption (SIMMIE and MARTIN, 2010). In Economics, the term also receives a special connotation, of the ability of an economic agent to resist, recover, reorient or renew from or to a given shock, either of natural (hurricanes, floods, etc) or man-made origin (wars, crises, terrorist attacks, etc) (ROSE and KRAUSMANN, 2013; ROSE, 2017a). In other words, Economic Resilience is the capacity of a local or regional economy to self-restore its previous growth path after being impacted by a shock, absorbing it or adapting to the conditions of the new economic environment that resulted from them (MARTIN and SUNLEY, 2015).

In the last two decades, it has been promoted as a possibility for enhance our understanding of how economic shocks can impact local, regional, national and international communities across the world (ROSE, 2017b). Moreover, the subject aroused even more attention after the events of the 2007-2008 global financial crisis, on why and how these crises happens and what are their consequences in the long run (MAZUREK and MIELCOVÁ, 2013).

Considering again the historical context of the last decades, it is worth to notice that the global economy suffered at least three major crises: the market-crashes of the 1980s, the dot-com bubble of the early 2000s, and the already-mentioned global financial crisis, one of the greatest economic disruptions of all time. Not arbitrarily, the study of Economic Resilience has experienced a boom after this last significant disruption, with significant works trying to assess the causes, consequences and mechanisms in which the crisis went real through the lenses of the resilience theory (ROSE, 2017b; CARO and FRATESI, 2018).

As any theory, it also has some critics, and some pros within the literature. From the side of those that defends the economic resilience as a valid subject (PIKE, DAWLEY and

TOMANEY, 2010; ROSE and KRAUSMANN, 2013; MARTIN and SUNLEY, 2015; MARTIN *et al.*, 2016) we can see arguments, for instance, like that significant contributions could be made by it to the determination of interesting variables, metrics, guidelines and politics to avoid unnecessary risks, to diminish the probability of bad shocks and to create more stable economic systems, promoting economic development for the communities that adopt them.

On the critics, however, it has been said that the use of the term 'resilience' would be an inappropriate metaphor, because there would be no theory of economic resilience yet (and the subject would be nothing more than an alternative interpretation of the neoliberalism) (DAVOUDI *et al.*, 2012). A second critic is that the subject of Economic Resilience is in some parts ‘depoliticized’, because it does not fully consider the degree of relevance of political institutions and relations in the construction of resilience (LANG, 2012; EVANS and KARECHA, 2014), and another point is that would be no relevant contributions on the part of the ‘Theory of Economic Resilience’ to the notions of sustainability or competitiveness (HASSINK, 2010; MacKINNON and DERICKSON, 2013). For this body of criticism, the study of resilience can even be relevant “to identify how regions and localities have been impacted by shocks, and then, second, precisely to explain the findings in terms of the various factors and processes involved” (MARTIN and SUNLEY, 2015), but in practice it would be nothing more than a group of notions and insights that would denote more a neoliberal theory of equilibrium than a proper, separate theory of resilience (MARTIN and SUNLEY, 2015).

These critics have otherwise being constantly reviewed and explained in the literature, and after weighting all points, one can consider that the Economic Resilience is today a proper, organized field of the applied social sciences, with relevant contributions being pointed throughout the last years (SIMMIE and MARTIN, 2010; MARTIN and SUNLEY, 2015), not forgetting, obviously, the appropriate caution in not using the term as a mere reflex or rereading of the concepts of economic performance and development (MARTIN and SUNLEY, 2015).

When observing the production of knowledge in this field of study, however, it is also generally accepted that there are three particularly relevant needs to be addressed by the literature, therefore configuring plausible deficits of the research: the lack of empirical studies in models and methods for calculating Economic Resilience (ROSE, 2017b), the lack of regional studies on the Latin America and the Caribbean (GONZALEZ ANDRADE and AYALA, 2017) and the lack of advanced literature reviews to capture the current literature on the notions about either the concepts and methods for measuring Economic Resilience (OECD, 2017; ROSE, 2017b), reflecting the actual polarity on the research.

As the study of resilience in Economics gained the aforementioned space and attention, the literature became too much disperse, and the condensation of it in a document that could serve as a "checkpoint" for future research became a priority, accordingly the authors (ROSE and KRAUSMANN, 2013; HERMANSEN and ROHN, 2015; ROSE, 2017a).

From this specific matter, so, the first part of the research question that inspired this work became what is the recent contributions in the subject of Economic Resilience, and most important, in terms of concepts, measurements and methodologies? Trying to answer this question, an initial research was performed with the goal of finding relevant studies that could bring light to the degree of development and maturity of Economic Resilience as a science, therefore assessing the abovementioned contributions in this field.

After reviewing the subject, however, it was found another relevant question: how can we apply these concepts and measurements in practice, therefore assessing the degree of resilience in which a specific country has performed, or it is the present? To answer this question, it was also performed another line of research, but reviewing the current production of knowledge in practical applications of the Economic Resilience. A curious thing is that one can easily find studies addressing the resilience of the European community (DAVIES, 2011; WILLIAMS and VORLEY, 2014; D'LIMA and MEDDA, 2015; DIODATO and WETERINGS, 2015; ĐOKIĆ, FRÖHLICH and BAKARIĆ, 2015; MARTIN *et al.*, 2016; SENSIER, BRISTOW and HEALY, 2016; FAGGIAN *et al.*, 2018; HOLTERMANN, PUDELKO and HUNDT, 2018), of Asian countries and regions (LAUTIER, 2016; TAN *et al.*, 2017; OLIVA and LAZZERETTI, 2018; XIE *et al.*, 2018), and of emerging economies at all (DIDIER, HEVIA and SCHMUKLER, 2012; KENÇ, ERDEM and ÜNALMIŞ, 2016), but the production of academic research in Latin America and the Caribbean is generally less extensive than the European, with a few working papers from major international organizations (GREGORIO, 2013; BUSTILLO *et al.*, 2018) or exceptional works for specific countries like Brazil (SILVA, 2018; TUPY, CROCCO and SILVA, 2018), only to cite some works.

Because of it, it was decided that the main object of this study would be the Regional Economic Resilience of the Latin America and the Caribbean, and the research question that guided the work became "what is the current stage and the time-path performance of the Regional Economic Resilience of the Latin America and the Caribbean in the last two decades?"

The main goal of the entire work, so, became to evaluate the past and current degree of development of Latin America and the Caribbean in terms of Regional Economic Resilience from 2000 to 2017, by calculating an index and applying it.

To achieve this goal, it was decided that the work should (1) systematically review the most recent literature to define some of the concepts and methods of analysis of the Economic Resilience; (2) formulate a new index from which the stage of resilience in Latin America and Caribbean could be assessed; (3) apply this index to the analysis of both economic performance and resilience of the region, building a better understanding of its dynamics.

Consequently, the current work is divided into specific chapters and sections. The Chapter 1 introduces a literature review on concepts and measurements of Economic Resilience, therefore contributing as an initial review on the recent contributions of the subject.

Chapter 2 discusses the methodology that was used in the calculation of the two metrics for the assessment of Regional Economic Resilience: resistance and recoverability. These metrics was calculated by a model that was based on the Dynamic Static Economic Resilience (DSER) approach, as described in the literature (ROSE, 2007) and applied in regional economic resilience studies (MARTIN *et al.*, 2016).

The calculated metrics otherwise served as a basis for the discussion of the current degree of Economic Performance (in terms of GDP, inflation and investment inflows) and Economic Resilience of Latin America and Caribbean (Chapter 3). Lastly, a brief discussion of possible steps for future research is given in Chapter 4 (Conclusions).

The data used to calculate the Regional Economic Resilience Index in Latin America and Caribbean countries was the employment levels of 45 economies from 2000 to 2017, originating two different panels for both the resistance and recoverability metrics of economic resilience (annexes B to F). Summing up, this work tries to contribute to the study of Economic Resilience by (1) providing a literature review on its concepts and measurements; (2) suggesting a Regional Economic Resilience Index for Latin America and Caribbean from 2000 to 2017; and (3) discussing some insights about the economic performance and the resilience of the region during the same period.

1. SOME CONCEPTS AND MEASUREMENTS ON ECONOMIC RESILIENCE

Resilience is a word that derives from the Latin *resilire*, what means to leap back, to bounce back (SIMMIE and MARTIN, 2010). It is the capacity to recover quickly from difficulties, in the sense of toughness, and the ability of a substance or object to spring back into shape, in the sense of elasticity. Summing up, it is the capacity of a subject, substance, material, environment and/or system of to spring back into its original shape or condition after a disturbance caused by physical, chemical, or another nature of shock or influence.

The resilience approach in the Economic Sciences has been considered over the last decades as a way in which we can understand, measure, and create policies to address the subject of the negative effects of economic shocks. Since them, many researchers have tried to rigorously define the concept of economic resilience, its measurability, efficiency, and to establish meaningful indexes on the theme (ROSE, 2017b), gaining attention of areas like economic geography, regional studies and many other fields (MARTIN *et al.*, 2016).

The current chapter, then, is organized as follows: section 1.1 is responsible for the conceptualization of Economic Resilience, either in discussing the ideas, dimensions and justifications for its study and by other hand discussing the critics and determinants that makes a micro, meso, or macroeconomic agent resilient.

Similarly, section 1.2 discusses the methodologies and models used to assess the empirical calculation of Economic Resilience and is a review of some of the most used models in the literature today. Together, these two sections provides an initial approach to the recent contributions of some of the concepts and methods of measurements for the subject.

1.1 Conceptualizing the Economic Resilience

The bridge between the concepts of resilience and adaptability remounts to the decade of 1970 with the works of Crawford Holling (HOLLING, 1973) on ecological resilience, therefore adapted to other sciences since them (SIMMIE and MARTIN, 2010). In the case of Economic Resilience, it can be considered as a broad term associated with economic shocks that can somehow impact a specific system, with these shocks being caused by either natural disasters (hurricanes, floods, earthquakes, etc) and by man (energy, water, economic and

financial crisis, terrorist events, conflicts, etc) (ROSE and KRAUSMANN, 2013). All these exogenous shocks can harm the economy both in short and long-term perspectives, and what basically defines a resilient agent is the fact that it can support, adapt and recover from events like these, including its collateral damages (ROSE, 2017b).

Economic disruptions can therefore affect the economy in one or more of the following levels: Microeconomic (individual businesses, households or local areas, for instance); Mesoeconomic (individual industries or markets); and Macroeconomic (combination of all economic entities and their interactions, like countries or regions, for instance) (ROSE and KRAUSMANN, 2013; ROSE, 2017b). In practice, this mean that economic shocks can be not only harmful to local communities, but to regional, national, or international ones too.

Similarly, these local businesses and communities, regions, nations or international systems can present an inherent resilience (specific and intern aspects of the agent that allows it to resist or rebound to or from a shock) or an adaptive resilience (general aspects that contributes to the adaptation and recovery of a system after disrupted) (see section 1.1.1).

These two definitions can also gain complexity by considering the four dimensions in which an economic agent or system can be resilient: resistance, recovery, reorientation and renewal, which create a wide set of policies and measurements to enhance the degree of resilience of these units of analysis, as will be discussed later.

The goal of this section, so, is to discuss some of the concepts behind Economic Resilience, and why this term became a buzzword in the last years.

In general, what one can conclude by observing the literature on the concepts is that, in few words, the Economic Resilience can be understood as the capacity of a micro, meso or macroeconomic system to avoid, treat, minimize or recover from a specific shock. Based on the analyzed literature, it tries to assess the amount of damages and disturbances that a system can support, to the modern definitions of static and dynamic resilience.

To better illustrate some of the most used citations of Economic Resilience, the table 1 below was compiled with 6 of these conceptualizations. The idea is to create mechanisms in which the economy can become less vulnerable, more adaptable, more resistant to the negative effects of disruption or more capable of renewing its structure throughout the time (SIMMIE and MARTIN, 2010; ROSE and KRAUSMANN, 2013).

It can be noticed that the conceptualization of the Economic Resilience gained a certain myriad of definitions, in many different areas and aspects.

Table 1 – Concepts of General and Economic Resilience

Terminology	Citation	Definition
Economic Resilience	(HILL, WIAL and WOLMAN, 2008)	"The ability of a regional economy to maintain a pre-existing state (typically assumed to be an equilibrium state) in the presence of some type of exogenous shock"
Regional Economic Resilience	(HILL, WIAL and WOLMAN, 2008)	"The ability of a regional economy to avoid becoming locked-into such a low-level equilibrium or, if in one, to transition quickly to a 'better' equilibrium"
Economic Resilience	(BRIGUGLIO *et al.*, 2009)	"The 'nurtured' ability of an economy to recover from or adjust to the effects of adverse shocks to which it may be inherently exposed"
Economic Resilience	(PIKE, DAWLEY and TOMANEY, 2010)	"The ability of nation states to avoid disturbance of their equilibrium position through avoiding, withstanding or dampening the effects of shocks by diversification and/or macro- economic stability"
Macroeconomic Resilience	(HALLEGATTE, 2014)	"The ability to maintain aggregated consumption losses as small as possible, for a given amount of capital losses.
Microeconomic Resilience	(HALLEGATTE, 2014)	"The ability of an economy and society to minimize household welfare losses for a given level of aggregate consumption losses"
Regional Economic Resilience	(MARTIN and SUNLEY, 2015)	"The capacity of a regional or local economy to withstand or recover from market, competitive and environmental shocks to its developmental growth path, if necessary by undergoing adaptive changes to its economic structures and its social and institutional arrangements, so as to maintain or restore its previous developmental path, or transit to a new sustainable path characterized by a fuller and more productive use of its physical, human and environmental resources"
Economic Resilience	(CALDERA-SÁNCHEZ *et al.*, 2017)	"The capacity of an economy to reduce vulnerabilities, to resist to shocks and to recover quickly"

Source: Elaborated by the author.

However, the idea behind it can be understood as the overall capacity of a micro, meso or macroeconomic agent to resist, recover, renew or readapt to negative disruptions in its initial

growth path. In the following subsections, some of the aspects that contributes to the abovementioned concepts of Economic Resilience are discussed with more details.

1.1.1 Inherent and adaptative economic resilience

The assumption of collateral damages and permanent effects of economic shocks leaves us with the first characteristic that can be considered when defining an agent's economic resilience: if it has an inherent and/or an adaptive resilience (ROSE and KRAUSMANN, 2013). The first, Inherent Resilience, refers to aspects of resilience included into the systems, while the other, Adaptive Resilience, refers to behavioral considerations in the aftermath of disruptive events "through ingenuity and extra effort" (D'LIMA and MEDDA, 2015; ROSE, 2017a)

In other words, the inherent context treats the aspects that were created or incorporated into the system, like the availability of inventories, excess capacity, substitutability between inputs and contractual arrangements that could help that system to become resilient "from the inside" (ROSE, 2017a). By another hand, the adaptive viewpoint treats the aspects that helps a system to adapt to negative effects of shocks through the improvisation under stress, like the capability of making changes in the way that goods are produced, and services are offered, for instance (ROSE, 2017a). Furthermore, economic resilience can be defined as "the capacity of an economy to reduce vulnerabilities, to resist to shocks and to recover quickly" (CALDERA-SÁNCHEZ *et al.*, 2017) and, moreover, as "the policy-induced ability of an economy to withstand or recover from the effects of such shocks" (BRIGUGLIO *et al.*, 2009).

1.1.2 Dimensions of economic resilience

The Economic Resilience can also be applied to four dimensions of analysis: Resistance, linked to the depth of reaction to shocks; Recovery, connected to the post-shock development pathway; Reorientation (Adaptability), associated to the extent and nature of adjustment to the shock; and Renewal, related to the extent to which the economy renews its pre-shock growth path, or alternatively shift to another plausible path (MARTIN *et al.*, 2016).

These dimensions, resistance, recovery, reorientation, and renewal, can be understood

as four aspects in which the theory of Economic Resilience is used to generate valuable insights about economic shocks, what is their dynamics, and how to avoid, minimize, or treat them (PIKE, DAWLEY and TOMANEY, 2010; SIMMIE and MARTIN, 2010).

1.1.3 Why to study economic resilience?

According to the literature (SIMMIE and MARTIN, 2010), the concept of economic resilience has been addressed as a possible way to enhance the capacity of economic agents such companies, industries, cities, states or even nations of to avoid or to treat the negative effects of unpredictable shocks like natural phenomenon (hurricanes, floods, earthquakes, etc), or human-made disasters (terrorism, economic changes and instabilities, crises and others).

The interest on the subject is also growing with the succession of major global events, raising the attention of authorities in how shocks can affect local communities and small sectors of society (most of them generally disorganized and vulnerable to these shocks). This first concern can also be illustrated by the rise on the number of papers published to address local and regional cases of resilience applied to disasters (MARTIN and SUNLEY, 2015).

Similarly, another reason generally used in arguments defending the study of economic resilience is that there is a "more general belief that we live in more risk-prone world (economic change and instability, global economic crises, climate change, terrorism, etc)", suggesting that the effects of globalization can have a double-faced effect: by one hand helping to connect the world, but on another creating the reality of more spread risks throughout wider systems (MARTIN and SUNLEY, 2015; CARO and FRATESI, 2018).

Summing up, the study of Economic Resilience can help local communities, regions, nations or even international communities (1) to become less prone to critical disruptions when affected by a shock or becoming more resistant to them; (2) to recover its economy to the initial level of function more quickly from shocks when their effects could not be avoided; (3) to enhance its capacity of reorientation of the economy when affected by shocks; and (4) to renew the economic path of these communities in the medium-to-long run, therefore also enhancing its capacity to overwhelm negative shocks (ROSE and KRAUSMANN, 2013; ROSE, 2017b).

1.1.4 Criticism of resilience

As whatever theory, there are many critics on the recent contributions of Economic Resilience as a field of study, mainly inside the Economic Sciences. Ron Martin, from the University of Cambridge, generally enumerates nine of those critics to the Economic Resilience made by the literature, being (1) that resilience would be an inappropriate metaphor; (2) that there is no distinct theory of resilience; (3) it privileges the idea of "return to normal", at the same time that it ignores the "perverse" resilience, more associated with the Schumpeter's idea of creative destruction; (4) this idea of resilience is too associated with the idea of equilibrium; (5) it emphasizes holistic systems' ontology, and ignores micro-level agency; (6) the notion of Economic Resilience is depoliticized; (7) it suggests local resilience is determined endogenously; (8) it adds no considerable contributions to the notions of sustainability and competitiveness; and (9) the notion of Economic Resilience could be easily captured by neoliberal ideology, not needing a separate field for it (MARTIN and SUNLEY, 2015).

To comment all these nine critics would require a more prolonged and detailed discussion, something to be made perhaps in a future research. Otherwise, the first critic appointed by Martin is directly related to the conceptualization of Economic Resilience, and a plausible addendum to the general discussion of the term. This critic is that the term resilience is an inappropriate metaphor (MARTIN and SUNLEY, 2015), or, in other words, that the idea that resilience could be the capacity of an agent to 'bounce back' after an economic shock would not be in fact a valid one. What happens is that, accordingly this body of knowledge, this idea could be interpreted as very similar to the 'plucking model' of economic fluctuations, found in Friedman, Kim and Nelson's works (MARTIN, 2012). This model defends that recessionary shocks would not cause permanent effects in the long-run growth ceiling or growth trend, and so, if a region can 'bounce back' to its pre-shock growth patterns after a period, this would mean that the shock was transitory, and the plucking model would be validated.

So, looking to the term through this viewpoint, the ideas of economic resilience would be nothing more than a mere reinterpretation of the theory of fluctuations (MARTIN, 2012). This argument can also introduce another similar critic that there is no distinct theory of resilience. For some researchers, and despite the wide literature and interest over this theme, the economic resilience would not be satisfactorily organized as a body of theory, like the theory of business cycles, for instance (MARTIN and SUNLEY, 2015). Looking by this point of view, resilience would be only an arm of the neoliberal ideology, rather than a separate field.

Even with a possible belief in the assumption of an equilibrium theory in the place of a relevant individual theory of Regional Economic Resilience, the theory of resilience would still relevant because it discusses practical insights for the provenience of a path to the resistance, recovery, reorientation, and renewal of affected economies. This can also contribute to the idea of economic equilibrium, but without becoming only a mere arm or part of this idea (SIMMIE and MARTIN, 2010; MARTIN *et al.*, 2016; ROSE, 2017a).

In sum, Economic Resilience can yes be considered as a field of study and can contribute to the Economic Theory by offering ways of understanding and treating economic shocks. Nonetheless, as every field of study, it has also been criticized and reviewed by researchers over the last decades. One of the major critics is that it would not even be considered as a valid metaphor, due to a oversimplification of the term resilience. Otherwise, the literature defends it by showing that, whether valid or not, it can contribute with the theory of equilibrium and shed light over the study of economic shocks, its effects, and how to minimize them.

1.1.5 Determinants of economic resilience

The literature on economic resilience provides an extensive list of policies and measures for enhancing the capability of an economic agent to avoid, minimize or treat the effects of negative shocks. Among businesses and industries (micro and mesoeconomic units of analysis), there are two strands of measures that these agents can do to improve resilience: firstly, from the customer-side, a business can adopt measures to (ROSE and KRAUSMANN, 2013):

a) increase or initiate cross-training and succession programs;
b) invest in versatile emergency procedures;
c) promote the flexibility in changing processes and altering product characteristics;
d) sign long-term arrangements preferably;
e) reduce dependence on critical inputs;
f) protect fuel supplies and labor pools;
g) broad the supply chain to improve mutual aid agreements and re-routing of goods and;
h) recycle and adopt automated controls to reduce the non-essential use of relevant inputs.

From the supplier-side, best measures could be (ROSE and KRAUSMANN, 2013):

a) expansion of markets (when possible);

b) re-routing and logistics optimization;

c) strengthening of storage facilities and pooling of resources;

d) arrangements for facilities in advance to move closer to customers and field operations;

e) versatility-enhancement in the adaptation of projects to demand changes;

f) recovery planning, with assistance to family workers and streamline paperwork.

Now, by considering the social, demographic and macroeconomic variables, the literature addresses many possible factors as resilience-enhancers measures, as for instance:

a) good quality of institutions[1] (POSTAL and OLIVEIRA, 2016; OECD, 2017);

b) life expectancy at birth[2] (BRIGUGLIO *et al.*, 2009; POSTAL and OLIVEIRA, 2016);

c) better sanitation facilities (POSTAL and OLIVEIRA, 2016);

d) more adequate (generally tighter) monetary, exchange rate and fiscal policies, all macroeconomic policies loosely defined (DIDIER, HEVIA and SCHMUKLER, 2012);

e) stronger active labour market programs and other prudential policies (OECD, 2017);

f) higher urbanization[3] (BRAKMAN, MARREWIJK and PARTRIDGE, 2015);

g) good human capital (DIODATO and WETERINGS, 2015);

h) good social (income equality) capital (BRIGUGLIO et al., 2009);

i) greater diversification of economic activities (BRAKMAN, MARREWIJK and PARTRIDGE, 2015);

j) foreign direct investments and equity portion of portfolio investment[4] (OECD, 2017);

[1] The quality of institutions is represented by the Freedom of Corruption (POSTAL and OLIVEIRA, 2016), expressed as freedom of corruption, governance, rule of law, voice and accountability, independence of the law system, and a favorable doing-business environment in (OECD, 2017).

[2] Considering as a measure that indicates the quality and access to public and private health care systems, denoting an important factor for the development of infrastructure.

[3] These studies suggest that more urbanized regions can be more resilient because inhabitants of metropolitan areas tend to be employed at medium-to-high tech companies, improving the general human capital of regions, another important indicator for resilience (BRAKMAN, MARREWIJK and PARTRIDGE, 2015). However, the urbanization can be a concerning factor if we go from economic resilience to the engineering resilience, in the context of nature or human-made tragedies.

[4] While capital flows received via debt mechanisms can be associated with higher crisis risks and vulnerabilities, the FDI and the equity portion of these capital flows can increase the GDP without a significant increase in those same crisis risks and vulnerabilities (OECD, 2017). Examples of imbalances on capital flows that generated a high debt and/or uncontrolled capital inflows are the Nordic crisis of 1991-1993, the Mexican crisis of 1994 and the Brazilian crisis of 1999.

k) lower barriers to trade[5] (OECD, 2017);

l) financial sector's risk-sensitive regulation and supervision (OECD, 2017);

m) good short-time work schemes to protect jobs in crises (OECD, 2017);

Although these are not all the variables that are treated by the current available literature on economic resilience, they are amongst the more relevant and cited ones. In a contrarily way, there are variables that are generally associated with the increase of vulnerabilities and crisis risks, what leads to a lower resilience. Examples of variables are:

a) financial market liberalization[6] (POSTAL and OLIVEIRA, 2016; OECD, 2017);

b) capital flow openness via debt mechanisms (OECD, 2017);

c) rapid growth of private credit (OECD, 2017);

d) imbalances in house market (OECD, 2017);

e) current account imbalances (OECD, 2017);

f) higher banking leverage (OECD, 2017);

As noticed, the literature provides a myriad of possible factors that can enhance or decrease the economic resilience, but one variable has been received a special attention: the relevance of institutions. The major hypothesis in the theoretical axis that defends the role of institutional quality in resilience is that stronger institutions (governance, improved voice and accountability, law enforcement, better control of corruption, and others) can drive the economy to a more propitious scenario to the surge of new businesses, innovation, and other factors that can diversify the economic activity of a country and/or region (OECD, 2017);

In the next section, the two most used operational metrics for measuring the economic resilience (ROSE, 2017b), i.e., Static Economic Resilience (SER) and Dynamic Economic Resilience (DER), are formally presented. It is important to demonstrate the mathematical forms of these two approaches here because one of them, the Static one, was used as basis for the model used in the calculation a new index (see chapter 2).

[5] It can have a favorable impact on average growth through increased trade openness, while it is not proved that it can cause an increase in crisis risks (OECD, 2017).

[6] The financial liberalization movement is associated with higher systemic risks that can cause significant imbalances on banking, investment and other financial activities (OECD, 2017). In this work, examples of post-1990 crisis caused and/or developed because of this variable are the Nordic crisis of 1991-1993, Mexican crisis of 1994, the Brazilian crisis of 1999, and the Global Financial Crisis of 2007-2008.

1.2 Static and Dynamic Economic Resilience

As seem, economic resilience is the capacity of a system to recover from shocks, also focusing on efficiency, constancy, absorption and other systemic characteristics of adapting to new conditions and recovering from shocks, but from an economic point of view.

In terms of functionality, however, two strands remain as the main standpoints for empirically defining the economic resilience: Static Economic Resilience (SER) and the Dynamic Economic Resilience (DER). The first, SER, can be defined as the capability of a system to maintain a certain level of functioning after a shock, when agents generally face resource scarcity (ROSE and KRAUSMANN, 2013). Basically, it deals with the core concept of coping with scarcity into an efficient way to sustain the functioning of a system during a disaster (ROSE, 2017b). By other hand, the dynamic resilience and can defined as the efficient use of resources, for repair and reconstruction. This time-related aspect of the economic resilience focus on enhancing the capacity of an economy, dealing with hastening the speed of recovery from the shocks or disturbances (ROSE and KRAUSMANN, 2013). Basically, it deals with the time needed by the system to recover (ROSE, 2017b).

In the next two subsections, these definitions are going to be reviewed in a deeper way, with the formal presentation of these two mentioned operational metrics:

1.2.1 Static Economic Resilience (SER)

The Static Economic Resilience is defined as the capability of a system to maintain a certain level of functioning after a shock (ROSE and KRAUSMANN, 2013).

In disaster conditions, commonly observed after these shocks, the agents generally face resource scarcity, and this field of study deals with the efficient use of these scarce resources at a given point of time (ROSE, 2017b).

This operational metric, by another hand, can be distinguished in another two: Direct Static Economic Resilience (DSER), and Total Static Economic Resilience (TSER). The first one, DSER, refers to the partial equilibrium analysis, i.e., the equilibrium analysis that consider only a part of a market, *ceteris paribus*, based on a restricted range of data, in order to study an individual firm or industry (micro and mesoeconomic levels), whilst TSER refers to the macroeconomic level of the economy, incorporating the general equilibrium effects, i.e., the

analysis of all price and quantity interactions, in addition to other macro considerations, and the fiscal, monetary and security policies that raises on the disaster context (ROSE, 2017b).

The definitions for these two metrics are given in the table as follows in table 2 below:

Table 2 – Static Economic Resilience Operational Metrics

Metric	Definition
Direct Static Economic Resilience (DSER)	Refers to the partial equilibrium analysis, i.e., the equilibrium analysis that considers only a part of a market, *ceteris paribus*, based on a restricted range of data, in order to study an individual firm or industry at the micro and mesoeconomic levels (ROSE, 2007).
Total Static Economic Resilience (TSER)	Refers to the macroeconomic level of the economy, incorporating General Equilibrium effects, i.e., the analysis of all price and quantity interactions, in addition to other macro considerations like fiscal, monetary and security policies during and after a disaster (ROSE, 2007).

Source: Elaborated by Author.

The Direct Static Economic Resilience can be measured by a simple mathematical model, given by equation 1 as follows (ROSE, 2007; D'LIMA and MEDDA, 2015):

$$DSER = \frac{\%\Delta DY^m - \%\Delta DY}{\%\Delta DY^m} \quad (1)$$

Where $\%\Delta DY^m$ can be interpreted as the maximum percent change in direct output, while $\%\Delta DY$ is the estimated percent change in direct output.

The DSER model expresses the percentage avoidance of the maximum economic disruption possibly caused by a determined shock. This approach, however, is suggestively a best fit in usages for modeling the maximum potential disruption, instead that, for ordinary disasters, the analyst should find a better fit in a linear model that can address the relationship between an input shortage and a direct disruption to the system, firm, industry, locality, etc (ROSE, 2017). In a wider viewpoint, the usage of linear models has an implicit connotation of rigidity, opposed to the concept of flexibility that defines Static Resilience (Rose, 2007).

Otherwise, a Total Static Economic Resilience (TSER), is defined by the formulation given by the equation 2 as follows:

$$TSER = \frac{\%\Delta TY^m - \%\Delta TY}{\%\Delta TY^m} = \frac{M\%\Delta DY^m - \%\Delta DY}{M\%\Delta DY^m} \quad (2)$$

Where $\%\Delta TY^m$ is the maximum percent change in total output, $\%\Delta TY$ is the estimated percent change in total output, and M is a multiplier for the economy-wide input-output relation (ROSE, 2007; D'LIMA and MEDDA, 2015).

The measure of TSER to input disruptions in the supply-side of the economy is defined by the difference between a linear set of General Equilibrium Effects, what by its hand can incorporate resilience. Adam Rose states that, operationally, this modeling standpoint is the difference between linear Input-Output multipliers and DCGE (or other non-comprehensive, non-linear) econometric models (ROSE, 2007; D'LIMA and MEDDA, 2015).

1.2.2 Dynamic Economic Resilience (DER)

The Dynamic Economic Resilience (DER), by its turn, is defined as the efficient use of resources, for repair and reconstruction. This time-related aspect of the economic resilience focuses on enhancing the capacity of an economy of to deal with the hastening speed of recovery from shocks (ROSE and KRAUSMANN, 2013).

Dynamic resilience models have been recurrently used to "incorporate major features of investment and traces the time-path of the economy as it recovers with and without dynamic economic resilience" (XIE *et al.*, 2018), by modeling this resilience via Dynamic Computable General Equilibrium (DCGE) approaches for instance (XIE *et al.*, 2018). To illustrate the relevance of DER empirical analyses, two of the works we recurred in this research, the mentioned work of Wei Xie and his colleagues found that the use of Dynamic Economic Resilience strategies could have reduced the GDP losses caused in the context of the Wenchuan earthquake on May 2008 by 47.4 percent from 2008 to 2011 (XIE *et al.*, 2018). Similarly, Minette D'Lima and Francesca Medda has found a model based on DER to simulate the impact of shocks such as delays or disruptions in the underground service, and found that, by using their proposed model for DER based on a mean-reversed stochastic approach could drop the probability of disruptions and failures substantially (ROSE, 2007; D'LIMA and MEDDA, 2015). Total Dynamic Economic Resilience is defined as the loss-reducing effect of speeding up the capital stock's repair and reconstruction:

$$TDER = \sum_{t=0}^{n} Y_{DR} - \sum_{t=0}^{m} Y_{DU} \quad (3)$$

Where m > n.

The reduction expressed in this mathematical formulation is interpreted as the difference between the resilient path (Y_{DR}), and the normal curve of recovery (Y_{DU}).

We can also include the Static Resilience in this model, with its loss-reducing effects of speeding up the repair and reconstruction:

$$TDER' = \sum_{t=0}^{n} Y_{DR} - \sum_{t=0}^{m} Y_{DU} - TSER \quad (4)$$

However, for the sake of consistency, as defended by Adam Rose, one might exclude these repair and reconstruction aspects from the Static definition, limiting the model to the time-path defined by the Y_{DU}. In sum, it reflects the possibility that a more prolonged recovery can cause the loss of customer's focus, i.e., customers of disrupted businesses will tend to look for other suppliers (D'LIMA and MEDDA, 2015; ROSE, 2007, 2017b).

1.3 Other Economic Resilience Models

The process of literature reviewing revealed many models used in the literature to calculate the economic resilience of micro or macroeconomic agents. In this section, some of the main models found are going to be introduced, with a brief description of their use and main findings, if applicable (if the model was applied by authors to a real problem).

1.3.1 Generalized Least Squares (GLS) random effects panel data

The first model to be discussed is a Generalised Least Squares (GLS) random effects panel data, used to analyze the economic resilience, measured in terms of impact over the GDP Per Capita, in 21 territories of Croatia from 2008 to 2012 (ĐOKIĆ, FRÖHLICH and BAKARIĆ, 2015). The authors had used detailed data for the counties following the NUTS-2

(a geographical standard similar to the Series M, No. 49 used in this work) dimension of geographical dispersion, a common practice of analyses on studies of the European economy. The general formulae used is:

$$\Delta Y_{it} = \beta_0 + \beta_1 Y_{it} + \alpha_j X_{j_{i,t}} + \varepsilon \quad (5)$$

Where the capital letter indicates variables expressed in natural logarithms,

$i = 1,\ldots,n$ with n = Number of countries analyzed

$j = 1,\ldots,k$ with k = number of additional independent variables, and $t = 1,\ldots,5$.

The independent variables used are GDP Per Capita, ICT Enterprises Per Capita, Openness, Investment / GDP Ratio, Productivity expressed by the Employment / GDP Ratio, Population, Primary Sector / GDP Ratio, Manufacturing Sector / GDP Ratio, Trade, Services and Transport / GDP Ratio, Construction / GDP Ratio and the constant.

The analysis concluded that, in the greatest part of the Croatian counties (12), the most significant determinant to the loss of economic resilience (dependent variable: GDP Per Capita) was the increase of the unemployment rate. In the other 9 counties, they found evidence that a combination of two variables were significant to explain the disruption of the economic activity and dynamism: loss of labor productivity and the unemployment.

They also found significance for the degree of openness of the economy (measured in terms of international trade) and the construction / GDP Ratio, both with a positive impact over the GDP Per Capita, suggesting that those counties that experienced a weaker decline in the construction sector and exports were also the most resilient (ĐOKIĆ, FRÖHLICH and BAKARIĆ, 2015).

1.3.2 Generalized Metric Model

The purpose of this model is to identify cost-effective strategies for increasing resilience towards a time-dynamic approach. In other words, it suggests a generalized metric to measure the degree of failure and recovery of a given event or shock. In this model, for a baseline performance Q (which is a function of time), there is a possibility of occurring a failure (a shock or bad event). This incident, when confirmed, lead to a failure event with a duration Δt_f, that

concludes at time t_f. This failure is therefore followed by a recovery process with a duration Δt_r, concluded at a time t_r. Consequently, the total disruption had a duration of $\Delta t_d = \Delta t_f + \Delta t_r$.

Given that, the model to measure the resilience is expressed by the formulae:

$$Resilience\ (R_e) = \frac{t_i + F\Delta t_f + R\Delta t_r}{t_f + \Delta t_f + \Delta t_r} \tag{6}$$

Where the failure event (*f*) is displayed as a function of time from t_i to t_f, representing the loss in performance in time during the failure shock. Otherwise, the recovery event (*r*) is displayed as a function of time from t_f to t_r, representing the recovery in performance in time during the recovery from the initial shock (GILBERT and AYYUB, 2016). From (6), then we have two formulae to represent the average performance of the economy during the failure or the recovery phases as percentages of the baseline *Q*:

$$Failure\ (F) = \frac{\int_{t_i}^{t_f} f dt}{\int_{t_i}^{t_f} Q dt} \tag{7}$$

$$Recovery\ (R) = \frac{\int_{t_i}^{t_f} r dt}{\int_{t_i}^{t_f} Q dt} \tag{8}$$

The Resilience (R_e) can be therefore understood as an approximate time-weighted average of the performance of an economic system during a shock. The failure (*F*) could be considered as the robustness and redundancy metric, while the recovery (*R*) could be considered as a resourcefulness and rapidity measure (GILBERT and AYYUB, 2016).

The final model that characterizes the time to failure (T_f) is a probability density function computed by the formulae (9) below.

$$-\frac{d}{dt}\int_{s=0}^{\infty} exp\left[-\lambda t\left(1-\frac{1}{t}\int_{\tau=0}^{t} F_L(\alpha(t)s)d\tau\right)\right] f_{s0}(s)ds \tag{9}$$

This indicates that a failure, i.e., a given shock occurs when the load on the economic

system (L) exceeds this systems strength (S), with both L and S being random variables.

Similarly, F_L is a cumulative probability function of L, while f_s is the probability density function of S. Moreover, the term $\alpha(t)$ represents a degradation mechanism as function of time t. This term also can represent an improvement in that economic system, depending of the conditions of the economy (GILBERT and AYYUB, 2016).

Lastly, one can notice that the equation (9) is a probability density function of T_f expressed as the negative derivative of the reliability function, based on a Poisson process with incident occurrences, representing the losses and costs that can be associated with disruptions caused by unpredicted (or predicted) shocks in economic systems. The disruption caused by the shock consists of consequences and costs (recovery costs and indirect costs) and can be useful for researchers that must to address how much should be invested at present to control these consequences and losses throughout a cost-effective strategy (GILBERT and AYYUB, 2016).

1.3.3 Macroeconomic Resilience

In this subsection and the following, there will be a summary of two other models used by researchers to measure the economic resilience of agents. The first is focused on access the resilience of macroeconomic agents (countries) to a given set of events, while the second tries to address the impact of these same set of events on microeconomic agents (people, assets and societies). In a brief way, macroeconomic resilience can be defined as the ability to maintain aggregated consumption losses ($\widetilde{\Delta C}$) as small as possible, for a given amount of capital losses (ΔK), i.e. minimizing an amplifying factor Γ (HALLEGATTE, 2014). In other words, the resilience is measured by the impact over consumption, that can be therefore reduced by reducing the amount of exposure and vulnerability of people and assets (reducing ΔK) or increasing macroeconomic resilience, given by the following formulae:

$$R^{macro} = \frac{\Delta K}{\widetilde{\Delta C}} = \frac{1}{\Gamma} \tag{10}$$

To proceed with the calculation, one must to consider fixed interest rate and decreasing returns of capital (HALLEGATTE, 2014). Once this set is hold true, the macroeconomic resilience of a country can be understood as the resilience to a given group of shocks, or specific

events with effects over the entire economy (the model only captures the entire set of events studied, not individual events), and its formulae is:

$$\overline{R^{macro}} = \frac{\int_0^{+\infty} \frac{1}{\tau} \Delta K(\tau)\, d\tau}{\int_0^{+\infty} \frac{1}{\tau} \widetilde{\Delta C}(\tau)\, d\tau} = \frac{\int_0^{+\infty} \frac{1}{\tau} \Delta K(\tau)\, d\tau}{\int_0^{+\infty} \frac{1}{\tau} \Delta K(\tau)\, \Gamma\,(\tau)\, d\tau} \quad (11)$$

Where:

Γ = a weighted average of the probabilities of direct losses ΔK of each shock; and

τ = return period of a shock, given by 1/p, with p being the annual probability of occurrence of a given shock or event.

Without any loss of generality, the researcher can focus on three periods of calculation for the return periods: 1 year, 10 years, and 100 years, estimating the amount of capital losses for these three periods (ΔK_1, ΔK_{10}, and ΔK_{100}), with the resulting model being:

$$\overline{R^{macro}} = \frac{\Delta K_1 + \frac{1}{10}\Delta K_{10} + \frac{1}{100}\Delta K_{100}}{\Delta K_1 \Gamma_1 + \frac{1}{10}\Delta K_{10}\Gamma_{10} + \frac{1}{100}\Delta K_{100}\Gamma_{100}} \quad (12)$$

It is worth that the researcher notices that, if she is facing multiple events or shocks in her studies of economic resilience, she must to repeat the procedures above for each event, and then properly weight them to promote its comparability (HALLEGATTE, 2014).

1.3.4 Microeconomic Resilience

The microeconomic resilience is defined as the ability of an economy and society to minimize household welfare losses (ΔW) for a given level of aggregate consumption losses ($\widetilde{\Delta C}$) (HALLEGATTE, 2014). This aspect of the economic resilience is used to measure the impact of a given specific event over microeconomic agents, and can be expressed as:

$$R^{micro} = \frac{\widetilde{\Delta C}}{\Delta W} \quad (13)$$

The step above suggests that the microeconomic resilience is independent of the macroeconomic resilience, and can be reduced by reducing the level of exposure and vulnerability of people and assets (by reducing ΔK), or by increasing the macroeconomic resilience (decreasing $\widetilde{\Delta C}$ to a given level of ΔW), or by increasing the microeconomic resilience (decreasing ΔW to a given level of $\widetilde{\Delta C}$) (HALLEGATTE, 2014):

$$\Delta W = \frac{1}{R^{micro}} \frac{1}{R^{macro}} \Delta K = \frac{1}{R^{micro}} \frac{1}{R^{macro}} K^{\alpha} V \tag{14}$$

To calculate the microeconomic resilience of a country ($\overline{R^{micro}}$), the following step is to calculate the welfare losses for a set of shocks, with their return periods:

$$\overline{R^{micro}} = \frac{\int_0^{+\infty} \frac{1}{\tau} \widetilde{\Delta C}(\tau) d\tau}{\int_0^{+\infty} \frac{1}{\tau} \Delta W(\tau) d\tau} \tag{15}$$

There is also the possibility of calculating the microeconomic resilience based on a selection of shocks with different return periods, by using the model:

$$\overline{R^{micro}} = \frac{\widetilde{\Delta C_1} + \frac{1}{10} \widetilde{\Delta C_{10}} + \frac{1}{100} \widetilde{\Delta C_{100}}}{\Delta W_1 + \frac{1}{10} \Delta W_{10} + \frac{1}{100} \Delta W_{100}} \tag{16}$$

1.3.5 Resilience through Specialization

Captured by the Gini-Index for regional specialization (Gj), this model is used as a metric in more complex analyses of economic resilience (HOLTERMANN, PUDELKO and HUNDT, 2018). Mathematically, the degree of specialization of a given region is computed at a two-digit level, according to the country' industry classification (the cited study uses data from the Federal Employment Agency in Germany, for instance).

Each two-digit industry (g = 1, 2, …, G) is therefore represented by a specific term g, while the capital letter G describes the total amount of these industries occupied in the country.

$$Specialization\ (G_j) = \frac{2}{G^2\bar{R}}\sum_{g=1}^{G}\lambda_g\left(R_g - \bar{R}\right) \quad (17)$$

Where R_g is the total employment of region *j* as a proportion to the *g*'s share of total employment in the own country's total employment, represented by:

$$R_g = \frac{\frac{E_{g\,j}}{E_j}}{\frac{E_g}{E}} \quad (18)$$

Where E_{gj} is the total employment in a region *j*, E_g is the total employment in the country and E is the total employment of all two-digit industries in all the country's regions together. λ_g however represents the *g*'s rank position, determined by the individual values of the variable R_g, for each region *j* in ascending order. Lastly, $\bar{R}$ is the average of all R_g, and represent the average degree of specialization, given by the formulae:

$$\bar{R} = \frac{1}{G}\sum_{g=1}^{G} R_g \quad (19)$$

Where the differences between each R_g and $\bar{R}$ are weighted before the sum. This sum is then multiplied by a term $2/G^2\bar{R}$ to set a homogenous range from 0 to G-1 / G for all the index values of each individual region. A higher value of specialization can be interpreted as strong regional specialization in the industries, with a concentration of jobs and some degree of risks for the economic resilience based on employment rates (HOLTERMANN, PUDELKO and HUNDT, 2018).

1.3.5 Computable General Equilibrium (CGE) Models

Another common practice not only in the study of economic resilience but in many other studies involving economic equilibria is the adoption of Computable General Equilibrium

(CGE) models. Mostly used to assess the total economic impacts of a disaster or shock, it models economic system as sets of interactions among different sectors, capturing both indirect and general equilibrium effects. In the study of Static Resilience, CGE models can be useful in assessing a group of production function responses (input substitution, conservation and market reallocation, for instance), while in Dynamic Resilience they can trace the sources and recipients with potential to enhance the recovery of economic systems, like the effects of reconstruction funds and capital goods on the length and time-path of this economic recovery (XIE *et al.*, 2018). There are some examples of recognized models in the literature, like the Sichuan Province CGE model (DRC-CGE), created by the Research Center of the State Council of China to address the economic resilience to disasters, using production, consumption, investment, trade, government, business, trade modules as variables (XIE *et al.*, 2018). Other examples are the LA County model, built to assess a 2-week disruption of water and power systems in Los Angeles, USA; the REIM – Regional Economic Impact Model, another CGE used to compute the economic resilience to natural disruptions (ROSE, 2017b), the Cedar Rapids SCGE, a spatial computable general equilibrium model to assess the economic resilience to terrorism and disasters in Iowa, USA and many others.

A CGE model is considered as "a nonlinear equation that stimulates the economy to accommodate price adjustments and quantities as the equilibrium market for production factors and commodities" (MIYATA *et al.*, 2018), and their representations are therefore too complex to demonstrate in mathematical formulations here. A good literature review on these specific models, however, can be found in two of the studies reviewed in this work, demonstrating Inoperability Input-Output Model (IIM), Structural Dynamic Growth Model (SDGM), and other DGE-based approaches to economic resilience (CIMELLARO and MARTINELLI, 2015; MIYATA *et al.*, 2018; XIE *et al.*, 2018).

1.3.6 Other models and approaches

The literature on economic resilience have been growing each year, with significant contributions in many aspects both in its conceptualization and measurements. The literature review presented by this section introduced seven types of empirical approaches to calculate and assess this complex subject, otherwise the fact that there is space for a more prolonged research only in these methods and concepts.

The systematic literature review on this subject revealed many different approaches to empirically address the impact of shocks to the path of the economic activity of micro, meso and macroeconomic agents. Among those approaches that were not specifically reviewed here because of the lack of relevance or unnecessary complexity to the purpose of this text, there are methodologies like the use of Composite Resilience and Vulnerability Indexes (ANGEON and BATES, 2015); Spatial Panel Data Models (DIDIER, HEVIA and SCHMUKLER, 2012); the use of stochastic models based on the probability of occurrence of shocks (D'LIMA and MEDDA, 2015); Dynamic and Cost-effective Frameworks (FRANCIS and BEKERA, 2014; ROSE, 2017b); Input-Output models (BRISTOW and HEALY, 2018); models based on Constant Elasticity of Substitution (CES) functions (DORMADY, ROA-HENRIQUEZ and ROSE, 2018); and Impulse-Response Models (MARTIN and SUNLEY, 2015; BRISTOW and HEALY, 2018).

In a general way, the most appropriate models for the purpose of the next phase of this study was a model based on the Dynamic Static Economic Resilience (DSER). This model is recognized as a simple, but very efficient approach for the formulation of resilience indexes and the calculation of regional economic resilience (PANT, BARKER and ZOBEL, 2014; D'LIMA and MEDDA, 2015; HOSSEINI, BARKER and RAMIREZ-MARQUEZ, 2016; MARTIN *et al.*, 2016), one of the goals of the research. The next chapter, then, will cover the aspects of the empirical methodology used in the calculation of the two dimensions of the Regional Economic Resilience Index for Latin America and the Caribbean, as proposed in the introduction. At the end, more adequate discussions both on the economic performance and economic resilience of the region will be provided in Chapter 3, and some critics, notes and future steps for the research will therefore presented in Chapter 4.

2. METHODOLOGY

As seen in Introduction, the current work aims to (1) review the literature on recent (post-2010) contributions in concepts and measurements for Economic Resilience; (2) to calculate and apply a resilience index for Latin America and the Caribbean, from which one can raise insights about the economic behavior of these regional economies in terms of employment from 2000 to 2017, and (3) to discuss the path of both the economic performance and resilience of this region during this same period.

To expand the concepts and ideas that have hopefully been built until now, this chapter therefore aims to address the second specific objective of the enumerated list above, by presenting a new regional economic resilience index for the Latin American and Caribbean economies, inspired by four works in regional resilience (DAVIES, 2011; MARTIN *et al.*, 2016; SENSIER, BRISTOW and HEALY, 2016; PIZZUTO, 2017).

The methodology discussed in this chapter can also serve as basis for future research, and the chapter itself is structured to answer two questions: why the proposal of a new resilience index can be relevant, and how it was built, i.e., by presenting the technical procedures behind the analysis (source of the data, geographical standards and the model used). The model used here was based on the methodologies of two studies on Regional Economic Resilience (ROSE, 2007; MARTIN *et al.*, 2016), albeit the fact that the approach to this resilience is different (Martin uses a DSER approach to address the resilience of micro-regions in the United Kingdom, while this study uses the same DSER approach to address the resilience of countries).

2.1 Economic Resilience Index

The use of empirical analyses is a recurrent practice of all sciences, and the adoption of measurement procedures to study the economic resilience can be expected as a common work among an academic field that have been growing both in size and importance in the last decades (ROSE, 2017b). In this sense, proposing resilience indices with actionable variables have been addressed as one of the top priorities for future research in economic resilience, as much as new methods for modelling resilience throughout them (ROSE, 2017b). This have also been recurrently found in the methodologic literature, either in a central role (BRIGUGLIO *et al.*,

2009), or as a technical step of the empirical analysis to define policies, ideas, concepts and investigations (DAVIES, 2011; MARTIN *et al.*, 2016).

This illustrates the relevance of the study of resilience by building actionable indices, but an immediate question that can raise is how these indices can be calculated. As seen, economic resilience is understood as the capacity of an entity or system to react and/or to recover from a negative disruption (MARTIN *et al.*, 2016). In terms of functionality, it is defined in two contexts: dynamic and static. The dynamic context refers to the time-dependent aspect of the resilience, i.e., the speed at which a system recovers from a severe shock, while static refers to the ability of a system to maintain function (ROSE, 2007).

Because the present work specifically focuses on how the Latin America and Caribbean have been performing since 2000, it fits better in the static definition of resilience, by treating its determinants. Basically, a dynamic analysis was not performed exactly because the scope of this work is not to specifically address the speed of recovery, but only to raise insights on it.

Foremost, a question that can be raised on the technical validity of this methodology is whether or not the study of regional resilience could be performed through countries, as it is generally done through regions of a country. In this matter, there are studies into the literature (DAVIES, 2011; SENSIER, BRISTOW and HEALY, 2016) performing its regional analyses with countries as units and comparing them to the performance of their respective regions, just like the present work. A justification for the use of countries as units of measurement is that, when observing the levels of employment and output, the two most used variables in economic resilience, there is an assumption that these indicators tends not to vary too much across neighbor countries compared to their regional basis (MARTIN *et al.*, 2016).

Another aspect that was observed during the literature review is that these studies on economic resilience have been recurrently found on European countries at most, while there is an apparent lack of studies dedicated to Latin America. The same thing is apparently observed with worldwide analyses, i.e., studies proposing regional indices for countries in wider samples.

One of the reasons found for explaining this is because the empirical study of resilience is considered a widely complex thing to be treated in papers (BRIGUGLIO *et al.*, 2009; DAVIES, 2011; MARTIN *et al.*, 2016; SENSIER, BRISTOW and HEALY, 2016), but there is also a hypothesis that it can be derived from the fact that the research of this subject has been received a wider attention in Europe than in other regions in the last years (PIZZUTO, 2017).

As a try to approach the problem of the lack of empirical analyses for countries and regions, this work proposes a regional index that compares the performance of these countries

with their respective regions in terms of employment, a key variable found in studies in the economic resilience literature that presents a similarity with the scope of this work (MARTIN *et al.*, 2016; SENSIER, BRISTOW and HEALY, 2016; PIZZUTO, 2017).

The next section is going to introduce the details of the modelling procedures used to build the resilience index, while section 2.3 presents the employment data that served as input for the static-resilience-based model that calculated both the resistance and recoverability dimensions for 45 economies in Latin America and the Caribbean, from 2000 to 2017.

2.2 Model and calculations

As seen in the last chapter, the Static Economic Resilience can be derived in two operational metrics: Direct Static Economic Resilience (DSER), and Total Static Economic Resilience (TSER). The TSER metric consider an economy-wide input-output multiplier as a weight to address the differences in which each country can answer to the impacts of a recession or a recovery (D'LIMA and MEDDA, 2015). Because of this, it is more recommended for analyses between different regions, what, at first look, could see to be the case of this work.

DSER models, however, deals with individual micro or macroeconomic units and its regional relations, being more recommended for Regional Economic Resilience analyses, where growth, employment, and other main indicators would not probably contract (in recessions) or expand (in recoveries) in a substantially different way among these units, as it would vary among different regions (MARTIN *et al.*, 2016; SILVA, 2018).

This implies that the objective of the explanatory analysis is not to compare different regions (what would demand a TSER approach according the literature), but to analyze countries in a region-by-region research, providing insights over what factors have been determinant for each of these units in being resilient or not. Consequently, as also defined in the last chapter, the mathematical formulations for a simple DSER model can be given by the equation (1), as demonstrated in the subsection 1.2.1.

The Regional Resilience can be addressed by many variables, like output and employment, the most recurrent (MARTIN *et al.*, 2016). Other models also use inequality and income (HALLEGATTE, 2014), institutional quality (POSTAL and OLIVEIRA, 2016) and others. Following similar works (ROSE, 2007; MARTIN *et al.*, 2016; FAGGIAN *et al.*, 2018; HOLTERMANN, PUDELKO and HUNDT, 2018; SILVA, 2018), the dependent variable

chosen was the level of employment.

The hypothesis found in literature is that, *ceteris paribus*, the size of the labor force will contract in recessions and expand in recoveries at a same rate (or near it) as regionally.

Therefore, the change in the employment (and similarly in the output) of a country *r* during a given recession or recovery with a duration of *k* periods can be expressed as[7]:

$$(\Delta E_r^{t+k})^e = \sum_i g_N^{t+k} E_{ir}^t \tag{20}$$

Where g_N^{t+k} is the rate of contraction (in recessions) or expansion (in recoveries) of the national employment or output, while E_{ir}^t is this same employment or output in a specific sector *i* (a special industry, for example), in country *r* at a starting time *t* (the base year that marks the turning point into a recession or recovery) for a crisis. From the equation 5, then, a measure of Regional Resistance and Regional Recovery in terms of employment can be expressed as:

$$Resistance_r = \frac{\left(\Delta E_r{}^{Recession}\right) - \left(\Delta E_r{}^{Recession}\right)^{expected}}{\left|\left(\Delta E_r{}^{Recession}\right)^{expected}\right|} \tag{21}$$

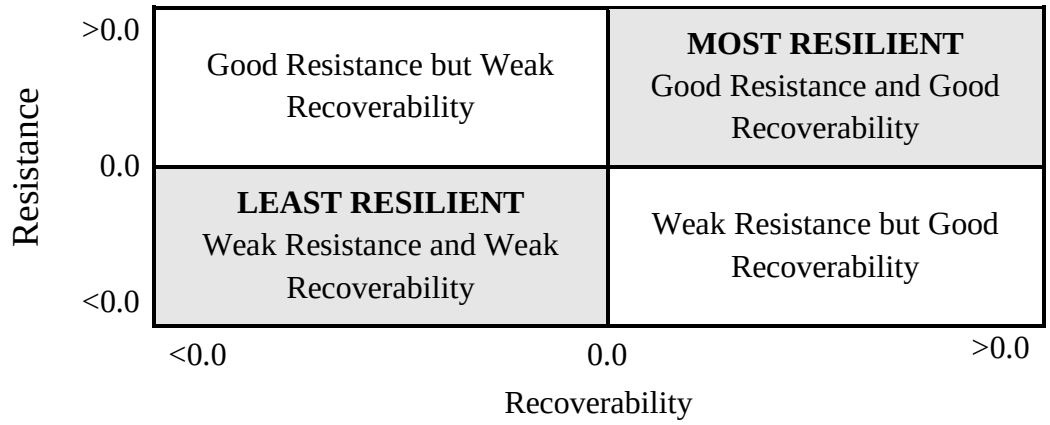
$$Recoverability_r = \frac{\left(\Delta E_r{}^{Recovery}\right) - \left(\Delta E_r{}^{Recovery}\right)^{expected}}{\left|\left(\Delta E_r{}^{Recovery}\right)^{expected}\right|} \tag{22}$$

Basically, a positive value of $Resis_r$ indicates that a country is more resistant to a recession, or at least less affected by it. Similarly, a positive of 0.5, for example, represent that a country is 50 percent more resilient than the region in which it is located, although a negative value of – 0.3, for another example, would represent that a country is 30 percent less resilient than its region. The same logic applies to $Recov_r$ resulting in a 2 x 2 matrix defined by the

[7]A generalization of the equation 20 could be $(\Delta x_r^{t+k})^e = \sum_i v_N^{t+k} x_{ir}^t$, where x is the variable used to analyze Regional Resilience (Output, Income, Inequality, etc), and v is the same rate of contraction or expansion, of the variable x chosen. Similarly, the following equations 6 and 7 can also be adjusted to support these other variables.

possible combinations of resistance and recoverability (MARTIN *et al.*, 2016).

Figure 1 – Combinations of Resistance and Recoverability



Source: (MARTIN *et al.*, 2016).

In sum, this section addressed the model that was used in the calculation of the two metrics of Regional Economic Resilience. In the next section, however, the data and the geographic standard that was considered in those calculations are presented in more details.

2.3 Data and Geographical Standards

As mentioned before, the regional economic resilience index in this work was built in terms of employment. The data used for this variable is the total labor force, in real numbers, gathered from two databases: World Bank's World Development Indicators (WDI), and the International Labour Organization Statistics (ILOSTAT), resulting in a panel with 45 countries from 2000 to 2017, distributed through South America, Central America and Caribbean, following the United Nations' M49 Standard. The data is annual and reflects the differences of scale on the growth rates during recessions and expansions (MARTIN *et al.*, 2016).

The labor force is understood as people above 15 years old supplying labor to produce goods and services. Some countries do not count members of the armed forces as workers, and unpaid workers, family workers and students are often omitted from the data. The ILOSTAT data also includes people who are currently unemployed but seeking work, as well as first-time

job-seekers. However, to treat these peculiarities, and to minimize any problems that can be related with the data generating process, the World Bank performs modelling procedures, assuring the quality of the information (WORLD BANK, 2018).

Another aspect of the quality of data is that the ILO estimates are harmonized to ensure the comparability across countries and time, accounting for differences in "data source, scope of coverage, methodology, and other country-specific factors" (ILOSTAT, 2018).

One limitation of the data is the time periodicity of the employment data, because the standard in which both WDI and ILOs database is organized. The official data only considers annual data, and one of the future steps for this work is intended to be the analysis of quarterly or monthly data for Latin America and the Caribbean. This data, however, was not available for many of the studied countries when the methodology was applied. The problem of having quality information for the region is otherwise recognized by the literature (OCAMPO, 2009; BALL, ROUX and HOFSTETTER, 2013; MORENO-BRID and GARRY, 2016) and reassure the need for primary research in proper databases.

The next aspect is the determination of a geographical delimitation for regions to be used in the modelling procedure. For this, the work followed the official standards of the United Nations' academic and policy papers, originally named as Series M, No. 49, and today called simply by M49 Standard. The standard is basically a list of country codes, names and regions, firstly proposed by the Statistics Division of the United States Secretariat (UNSD) in 1970. Because the fact that the country codes doesn't change when a country's name changes, but only when there is a relevant change in its geographical territory, the M49 Standard is considered as a good option for international studies that needs a technical background for regional delimitations (THE UNITED NATIONS STATISTICS DIVISION, 2018).

Another limitation can be the calculation of resilience for countries inside a regional approach. This methodology was based on authors like Fingleton and Briguglio, that considered national analyses in their works, but it is otherwise worth to notice that this work is experimental, and constitutes a first step in a longer project of empirically studying the economic resilience of Latin America and the Caribbean (for more details on the future steps that is already intended to be researched, please see Chapter 4 – Conclusions).

Because the fact that the sample is too large to be presented inside this text, the complete list of countries and states is given in the Annex B, at the end of the work. Similarly, the regional basic statistics (sample size, mean, and standard deviations) can be found in the Annex B, while the complete Regional Economic Resilience Indexes are given in the Annexes C, D and E.

3. RESULTS AND DISCUSSION

As mentioned before, this work proposes an Economic Resilience Index, measured through two of its dimensions (resistance and recoverability), for 45 economies from Latin America and Caribbean, with the addition of Canada and United States of America (Northern America), from 2000 to 2017.

The results of both indexes are only presented in detail in the annexes C and D, where two separate tables demonstrate the values found for each metric through the calculations of the equations 6 and 7 based on a Dynamic Static Resilience model (MARTIN *et al.*, 2016).

In this chapter, otherwise, the discussion will gravitate around the results of these two indexes for each one of the three main regions that together composes the Latin America and Caribbean, accordingly the United Nations. These three regions (South America, Central America, and Caribbean) were individually analyzed, and the main findings are summarized here. Because there were too many countries, the individual analysis of all of them would prolong this work too much, what is therefore a relevant step for a future research itself.

The chapter is then organized in three sections: section 3.1 discusses the determinants and path of the economic performance of Latin America and the Caribbean, while the sections 3.2 and 3.3 discusses the path of economic resilience in two separate periods: 2000 to 2008 (the period of relative growth before the global financial crisis of 2007-2008), and 2009 to 2017, the post-crisis period in which some countries has experienced recessions and shrinkages.

For the reader's convenience, a table is also presented in Annex E with a ranking that relates the performance of Latin American, Caribbean and North American countries during the period addressed in terms of the average Economic Resilience, (the average of both the resistance and recoverability metrics from 2000 to 2017).

3.1 Economic performance of Latin America and Caribbean

Latin America and Caribbean are marked by the plurality of cultures, ethnicities, languages, a rich history, anthropology, and a wide natural patrimony. Its territory comprehends 33 independent states and 26 dependencies (20 sovereign states and 13 dependencies in Latin America, and 13 sovereign states and 13 dependencies in Caribbean), spread across more than

700 islands and territories and accounting a current GDP of US$ 5.95 trillion, a population of 644 million people, and a Per Capita GDP of about US$ 9,250 (WORLD BANK, 2018)

During the last decades, its economy experienced many structural and economic challenges, due to fiscal imbalances, balance-of-payments constraints and inflationary pressures (including hyperinflations in Argentina, Brazil, Bolivia and Peru). Otherwise, many countries adopted inflation targeting mechanisms, prudent fiscal and monetary policies, and investments in infrastructure, what contained the inflation (mainly the component caused by pressures due to excess demand) and built some of the bases for a greater maturity of the economy (OCAMPO, 2009; MORENO-BRID and GARRY, 2016).

Analyzing the aspect of inflation first, there was a trend in the region that countries with high levels of exports in minerals and metals (Brazil, Chile and Peru) tended to better contain these pressures (MORENO-BRID and GARRY, 2016). Brazil, for instance, has come from an annual hyperinflation of 951 percent in 1992, to a single-digit inflation average of 7.11 percent between 2000 and 2008, and below the 7 percent average from 2013 to 2017 (see table 3). Chile also reduced it from an average above 20 percent in the 1980s to a single-digit inflation in the 1990s, while Uruguay reduced it from 57.6 percent in average in the 1980s and 48.9 percent in the 1990s to 8.8 percent in the early 2000s. Mexico also experienced strong fiscal imbalances that led to an annual average inflation of almost 70 percent in the 1980s and 20.4 percent in the 1990s to an inflation near 5 percent until 2000 (CEPALSTAT, 2018).

During this period, the fiscal and monetary policies were essential to control these inflationary pressures, a common factor among the Latin American economies during the decades of 1980 and 1990. From 2000 ahead, many Central Banks reduced interest rates, in accordance with a beneficial external environment (MORENO-BRID and GARRY, 2016), while their governments tried to attract foreign investments. The exception, however, was Argentina and Venezuela that failed in controlling the inflation due to the excess demand and the underestimation of the national rate by official authorities (ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN, 2018).

Albeit the phantom of inflation paired over the heads of the Latin America and Caribbean during the decades of 1980 and 1990, the economy gained in diversity and dynamism, driven by exports and foreign investments. The exports are mainly represented by primary products, commodities, and goods and services with a low-to-mid level of aggregate value, like minerals and metals (notably Brazil, Chile, and Peru), hydrocarbons (Bolivia, Colombia, Ecuador, and Venezuela), agro-industrial products (Argentina, Brazil, Paraguay, and Uruguay), oil (Brazil, Bolivia and Venezuela), coal and copper (Chile); and manufacturing

(Brazil and Mexico) (MORENO-BRID and GARRY, 2016). The level of change in the exports for many of these countries, however, passed through a diminish in the last years, from 2009 to 2013, due to the lower performance of the external sector after the global financial crisis, and again from 2014 to 2017, due to lower prices of many of these goods (see table 3 below).

Table 3 – Economic Performance of Argentina, Brazil, Uruguay and Mexico (1980 - 2017)

Country / Indicator	2000-08	2009-13	2014	2015	2016	2017
Argentina						
GDP Growth	3.614	2.318	-2.513	2.731	-1.823	2.864
Inflation Rate (Consumer Prices)	8.957	9.434	N/A	N/A	N/A	25.675
Unemployment (% Labor Force)	14.196	7.570	7.250	N/A	8.467	8.350
Exports (% of Annual Change)	3.898	-0.863	-7.786	-1.633	6.759	0.000
Account Balance (% of GDP)	2.226	-0.348	-1.629	-2.743	-2.652	-4.828
Brazil						
GDP Growth	3.781	3.294	0.001	-3.550	-3.468	0.001
Inflation Rate (Consumer Prices)	7.113	5.634	6.329	9.030	8.740	3.446
Unemployment (% Labor Force)	12.133	8.120	6.792	8.300	11.267	12.767
Exports (% of Annual Change)	8.926	0.920	0.000	8.085	3.681	10.917
Account Balance (% of GDP)	-0.702	-2.799	-4.242	-3.302	-1.312	-0.475
Uruguay						
GDP Growth	2.145	5.077	3.239	0.000	1.453	3.100
Inflation Rate (Consumer Prices)	8.747	7.705	8.877	8.666	9.639	6.218
Unemployment (% Labor Force)	12.895	6.790	6.583	7.517	7.867	7.393
Exports (% of Annual Change)	N/A	N/A	-1.073	-10.805	-3.906	5.859
Account Balance (% of GDP)	N/A	N/A	-3.027	-0.710	1.576	1.634
Mexico						
GDP Growth	2.283	1.698	2.845	3.270	2.913	2.037
Inflation Rate (Consumer Prices)	5.206	4.155	4.022	2.721	2.822	6.042
Unemployment (% Labor Force)	3.308	5.113	4.823	4.350	3.882	3.420
Exports (% of Annual Change)	4.270	5.423	6.982	8.414	3.462	3.249
Account Balance (% of GDP)	-1.310	-1.266	-1.804	-2.507	-2.120	-1.639

Source: Elaborated by the author. Data: World Economic Outlook, Nov 2018 update (IMF DATA, 2018)

The performance of the exports in Latin America and Caribbean is illustrated by the rise on its representation, coming from 15.5 percent of its GDP in the 1980s to more than 20 percent since 2000, a level is been maintained since then. Even so, this rate is still below the world's

average exports rate (see table 4), what also reflects into the account balances of countries in the region. The concern here, again, is with Argentina, that is coming out of a recession combined with inflationary pressures. For this country, however, there is a potential perspective for the next years, from 2018 to 2023, due to the reduction of the primary fiscal deficit. This reduction can help to contain the appreciation pressures on the Peso and at same time alleviate the pressures over the current account balance, that is under deterioration (WERNER, 2018).

In Central America and Caribbean, Costa Rica and Nicaragua are the greatest concerns. Both countries register historical rates of negative current account balances, with -7.3 and -22 percent respectively in the 1980s, -4.5 and -21.5 in the 1990s, and -9 and -11.9 from 2000 to 2017 in average. In 2017, the region suffered with a hurricane season. Dominica, for instance, is expecting a GDP decline of 16 percent in 2018, due to the impacts of natural catastrophes. By another hand, strong remittances flows, improved financial conditions, and good harvests can help the Caribbean islands to generate positive economic performances (CEPALSTAT, 2018; COMISIÓN ECONÓMICA PARA AMÉRICA LATINA Y EL CARIBE, 2018).

Table 4 – Economic Performance of Latin America and Caribbean compared to the World

Region / Indicator	1990s	2000-08	2009-13	2014	2015	2016	2017
Latin America & Caribbean							
GDP Growth (%)	2.80	3.53	2.78	0.99	0.08	-0.48	1.73
Inflation (%)	148.17	6.43	4.63	4.89	5.53	5.59	4.10
Exports (% of GDP)	16.46	22.44	21.46	20.20	20.99	21.50	20.86
Total External Debt (% of GDP)	34.94	33.83	27.75	34.50	39.62	41.93	39.97
Resilience (Resistance) *	-0.013	0.015	-0.016	0.049	-0.041	-0.002	-0.010
Resilience (Recoverability) *	0.008	0.005	0.000	-0.003	0.000	-0.003	-0.003
World							
GDP Growth (%)	2.67	3.33	2.18	2.86	2.86	2.51	3.15
Inflation (%)	19.99	4.38	3.83	3.23	2.78	2.76	3.05
Exports (% of GDP)	21.50	27.78	29.38	30.18	29.29	28.52	-
Resilience (Resistance) *	0.000	0.014	0.003	0.025	0.013	0.008	-0.008
Resilience (Recoverability) *	0.001	0.002	-0.001	-0.002	-0.001	-0.001	-0.003

Source: Elaborated by the author. Note: (*) The Resilience Indexes displayed are the average of the calculated countries' indexes. Data: World Economic Outlook, Nov 2018 update (IMF DATA, 2018).

Another aspect of the Latin American and Caribbean economic performance is the persistent unemployment. Argentina, for example, suffered with crises in the 1990s and early 2000s, known as the *Tango* and *Corralito* crises, when the unemployment reached rates above

the 22.5 percent and poverty came to more than 40 percent of the population in 2002 (WIEL, 2013). In Brazil, the high unemployment rates of the 1990s (11.7 percent in average) persisted in the early 2000s (12.3 percent in average), falling from 2008 to 2014. These rates, however, returned to a two-digit level in 2016, and the prediction for 2019 is above 10 percent. Uruguay also registered high unemployment rates, reaching 17.2 percent in 2003, while Chile, that experienced a 21 percent unemployment rate in 1983 (13.6 percent for the 1980s) controlled it to a 6 percent rate in 2017 (CEPALSTAT, 2018; ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN, 2018, p. 133; IMF DATA, 2018).

In Central America and Caribbean, the scenario seems to be particularly similar for the aspect of unemployment. Historically, the record pertains to Jamaica, that experienced an unemployment rate of 27.6 percent in 1982 (23.7 percent in average during the 1980s) caused mainly by political instability and an overvalued exchange rate (BALL, ROUX and HOFSTETTER, 2013). After policymakers allow exchange rate to fall, a GDP growth of 2.9 percent in average from 1981 through 2007 helped the economy to reduce the unemployment to 11.6 percent in 2017 (BALL, ROUX and HOFSTETTER, 2013; IMF DATA, 2018). Trinidad and Tobago registered an average unemployment of 16 percent during the 1980s and 17.2 percent in the 1990s, caused by a fall of 28 percent in the output due to a disinflationary monetary policy and low oil prices. but that fell to an average of 7 percent during the 2000s, coming to an impressive rate of 4 percent in 2017, mostly due to a recovery in the exports of primary products and tourism in the country (IMF DATA, 2018).

In sum, Latin America and Caribbean were both regions that faced significant challenges in the last decades. From authoritarian governments to external crises, the region was strongly affected by recurrent economic shocks that left structural imbalances, embedded into their economies and societies. By other side, the region is also affected by recurrent episodes of natural catastrophes, like the wildfires in Peru and Chile, the two earthquakes in Mexico and the hurricane Maria, that raided to Dominica, Puerto Rico, Dominican Republic and the islands of Turkey and Caicos in September 2017, killing more than 3 thousand people and leaving US$ 91 billion in estimate damage (WERNER, 2018). All these events combined, the Latin America and Caribbean had been trying to solve its two main constrains to a sustainable economic development: fiscal and balance-of-payment imbalances and inflationary pressures, studied throughout this section. In the next section, otherwise, the question addressed is going to be the economic resilience, intimately connected with the subject of unemployment.

3.2 Regional Economic Resilience in Latin America and Caribbean (2000 – 2013)

As seen in chapter 1, the concept of Regional Economic Resilience is intimately connected to the performance of the labor market, and more specifically the employment. The two regional economic resilience indexes presented in this work, for instance, were calculated using data for the size of the labor force, following the methodology of previous well-known academic works (SIMMIE and MARTIN, 2010; MARTIN *et al.*, 2016).

The complete tables with the indexes are presented at the end of this work, in the annexes B, C, and D, from which the following set of tables and figures were calculated. In table 6, the average calculations for both the resistance and recoverability dimensions of Economic Resilience (see section 1.1.2 for details). By observing the world average, there is a trend of more regional resistance than recoverability. In general, it is less difficult to recover from shocks than prepare the economies to resist them, corroborating with the main literature in Economic Resilience (MARTIN *et al.*, 2016; ROSE, 2017a).

Table 5 – Average Regional Economic Resilience by regions (2000-2017)

Region / Index	2000-08	2009-13	2014	2015	2016	2017
Caribbean						
Resistance	-0.007	-0.052	-0.083	-0.070	-0.052	-0.062
Recoverability	0.007	0.004	0.002	0.001	0.000	0.000
South America						
Resistance	0.000	0.012	0.048	-0.038	0.057	0.010
Recoverability	0.006	-0.006	-0.007	-0.004	-0.007	-0.006
Central America						
Resistance	0.051	-0.008	0.183	-0.015	-0.010	0.020
Recoverability	0.003	0.001	-0.005	0.001	-0.003	-0.002
Latin America and Caribbean						
Resistance	0.015	-0.016	0.049	-0.041	-0.002	-0.010
Recoverability	0.005	0.000	-0.003	0.000	-0.003	-0.003

Source: Elaborated by the author. Values calculated using data from the calculated index (see annexes C to E). Data from the International Labor Organization database, updated in Nov 2018 (ILOSTAT, 2018).

The two indexes for Latin America and Caribbean (resistance and recoverability) reflect the average regional economic resilience of the region in comparison with the world average. One can notice that, during the early 2000s, before the global financial crisis, the region

performed slightly better than this world average. The time-path of the calculated Economic Resilience presents a similarity with the time-path of the economic performance, characterized by a positive external environment heated by the commodities price boom (however, is worth to notice that there is no evidence of correlation between these two time-paths yet. This is intended to integrate a future step of the research). From 2003 to 2008, investments rates grew on average by 10 percent in real terms, the exports were higher on average and there was a significant recovery in the labor market, with declining unemployment rates (MORENO-BRID and GARRY, 2016; ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN, 2018, p. 108).

In this period, the highlights were the Central American resistance and the Caribbean recoverability. From 1995 to 2016, there was a strong cycle of Gross Fixed Capital Formation (GFKF) in many regions of Latin America and Caribbean, closing the investment gap to other developing regions of the globe, with exception perhaps of China and India, two fast-growing economies (ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN, 2018). This explains in part why Central America, a region that is highly dependent of economic relations with the Northern American countries to present a higher degree of resistance, due to the levels of foreign direct investments and private capital inflows to the region. By other side, the Caribbean recovery was mainly due to a rise in the diversity of economic activities like tourism and financial activities, beside succeeding exceptional harvests in the region in the early 2000s (COMISIÓN ECONÓMICA PARA AMÉRICA LATINA Y EL CARIBE, 2018, p. 37).

There is also a trend in investment flows in Latin America and Caribbean for a private composition: while most part of the investments were made by the public sector in the 1980s and early 1990s, in average, 75 percent of the investments made from 1995 to 2016 came from the private sector. These investments cycles, aligned with an appropriate management of macroeconomic policies and the mentioned GFKF are considered as factors that helped to create the relative stability in the region's economy during this period, from 2000 to the edge of the global financial crisis in 2008 (BUSTILLO *et al.*, 2018), also contributing to a greater dynamism in its economic system at all (MORENO-BRID and GARRY, 2016). This dynamism, however, was shaken by the 2008's shock in the global markets, creating asymmetric cyclical fluctuations in the Latin American growth path that also produced the divergences in the resilience path in the following period, from 2008 to 2013.

The relationship between the Gross Fixed Capital Formation and economic activity in Latin America and Caribbean was investigated in a recent study by the Economic Commission for Latin America and the Caribbean (ECLAC / CEPAL), that presents empirical evidences of

a positive (0.93) and significant relation at 1 percent confidence level between the two variables. Their analysis suggests how these investments on capitals, most of them in machinery and technology plants (on which 75 percent in average were performed by private sector), hold a key role in the understanding of the roots for the growing economic performance of Latin America and Caribbean economy from 1995 to 2013 (ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN, 2018, p. 108).

Otherwise, in the period between 2008 to 2013 (marked by the aftermath of the global financial crisis and its recession), the Latin American and Caribbean average was worse than the world average, mostly because of the negative performance of the Caribbean economic resistance (-0.052 points, suggesting a 5.2 percent lower resistance). The decline of the economic performance in the region coincides with the recessions in two economies in particular: United States of America and United Kingdom. This would be an expected fact, given the level of economic and political dependence of many states in Central America and Caribbean (3 countries in the region are dependencies under the dominance of the United States, 5 under the United Kingdom, 4 of Netherland and 2 are under French dependency).

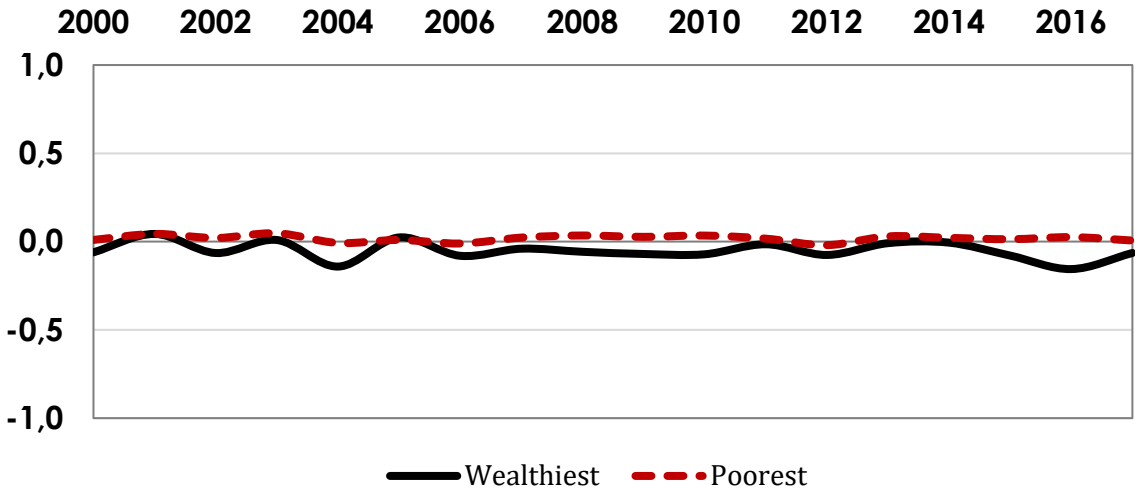
Not surprisingly, both the resistance and recoverability indexes for the Caribbean states (see figures 4 and 5 below) presents a slightly declining resilience between 2008 and 2010, and a high degree of oscillation before this. The behavior is observed in the figure below, plotting the trajectories of the two resilience metrics for both the wealthiest and in the poorest countries of the region. It can be noticed that the group of the wealthiest economies in the Caribbean was

Figure 2 – Resistance Index of Caribbean states from 2000 to 2017

Source: Elaborated by the author. Note: The result compares the means of the four Caribbean wealthiest states

(Puerto Rico, Bahamas, Trinidad and Tobago, and Barbados), and four poorest states (Saint Vincent and Grenadines, Dominican Republic, Jamaica, and Haiti), accordingly their 2016's Per Capita GDP.

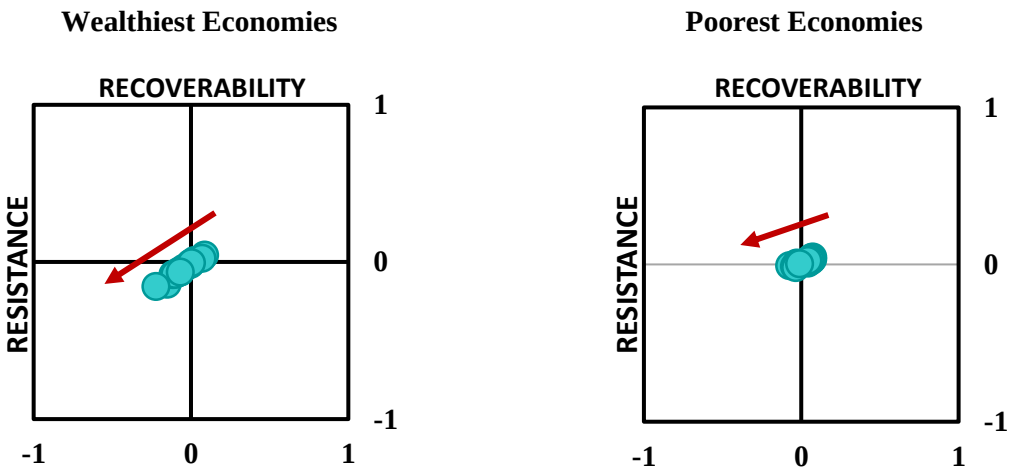
Figure 3 – Recoverability Index of Caribbean states from 2000 to 2017



Source: Elaborated by the author. Note: same as figure 2.

the one with the highest level of oscillation. By observing the resilience quadrants for the two groups in the figure 4 below, it is also noticed that the Caribbean economies again present a higher degree of oscillation, getting from the right-superior quad to the left-inferior quad, suggesting a decline in the Economic Resilience, from 0.0 in 2000 to -0.032 in 2017 (the arrow displays the direction of the economic resilience towards the time during the period).

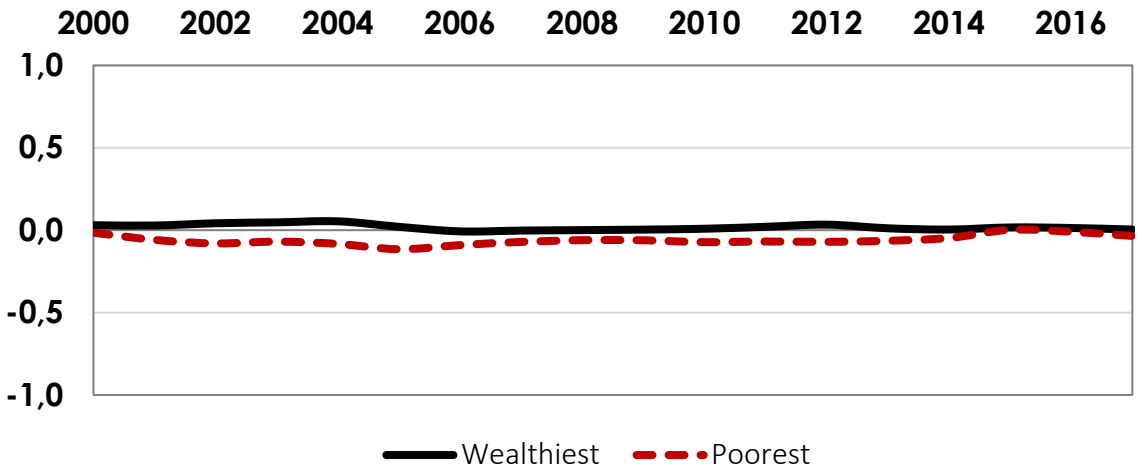
Figure 4 – Caribbean Economic Resilience Indexes (Resistance and Recoverability)



Source: Elaborated by the author.

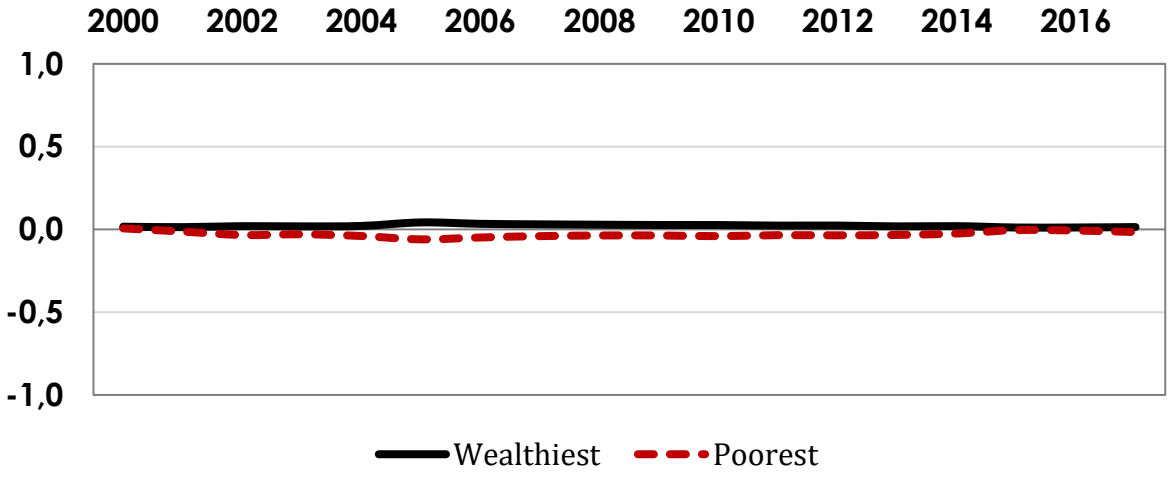
In relation to the Central America, the path of both the resistance and recoverability indexes were stable in the course of the years (see figures 5 and 6 below), even during the recession from 2008 to 2010. The average Economic Resilience of the region, however, have experienced a decline, from 0.027 in 2000 to 0.09 in 2018 (see table 5).

Figure 5 – Resistance Index of Central American states from 2000 to 2017



Source: Elaborated by the author. This figure compares the means of the Central America's four wealthiest states (Panama, Costa Rica, Mexico, and Belize), and four poorest states (Guatemala, El Salvador, Honduras, and Nicaragua), accordingly their 2016's Per Capita GDP.

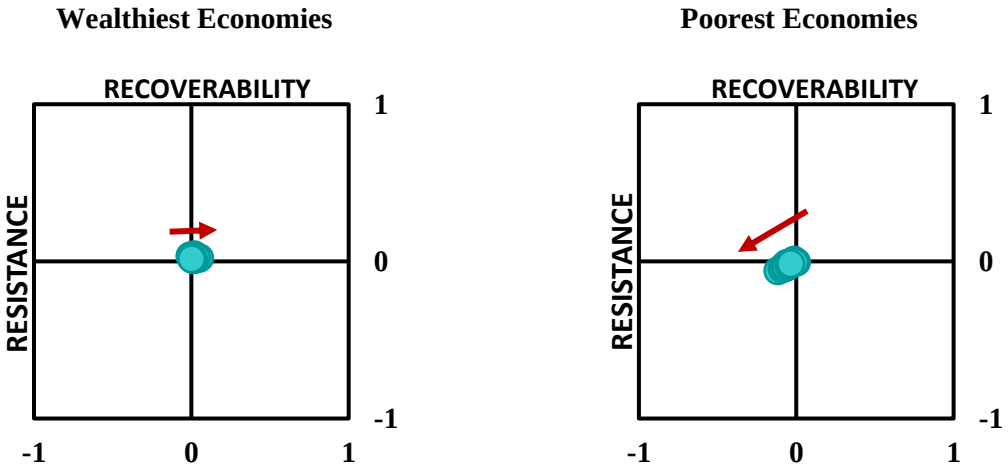
Figure 6 – Recoverability Index of Central American states from 2000 to 2017



Source: Elaborated by the author. This figure compares the means of the Central America's four wealthiest states (Panama, Costa Rica, Mexico, and Belize), and four poorest states (Guatemala, El Salvador, Honduras, and Nicaragua), accordingly their 2016's Per Capita GDP.

In the figure 7 below, one can also notice the pattern of stagnation for both the wealthiest and poorest economies in the region, notwithstanding two facts: the improvement of the Economic Resilience in Mexico (0.007 in 2000 to 0.026 in 2017), contributing to an increase in the resilience of the wealthiest group; and the fact that the poorest economies have experienced a stronger decline in the average Economic Resilience during the period:

Figure 7 – Central America Economic Resilience Indexes (Resistance and Recoverability)



Source: Elaborated by the author.

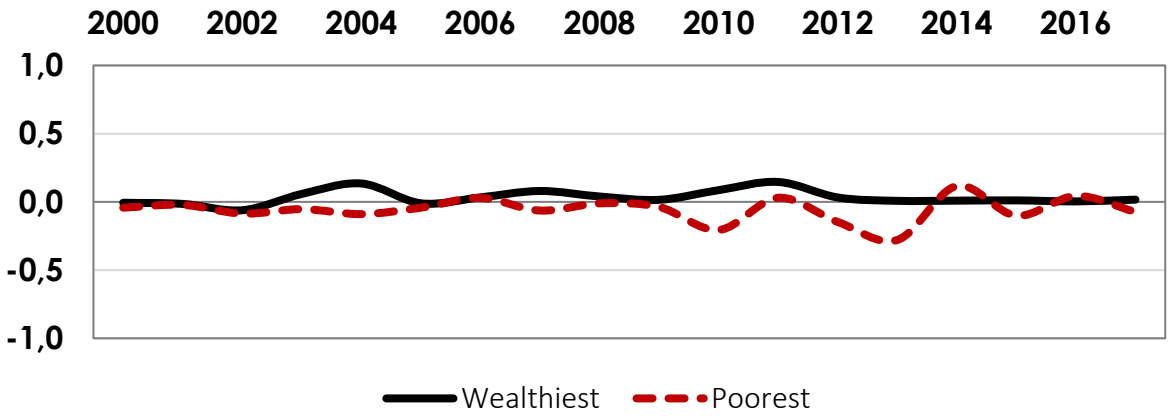
From 2009 to 2011, Mexico rose its amount of revenues from natural resources from 6 to 7.5 percent of the GDP on average. This rate rose again in 2013 to 8 percent, consolidating the country as a major petroleum extractor and producer (MORENO-BRID and GARRY, 2016). The country is also one of the major manufacturing exporters in Latin America, together with Brazil, and the rise in revenues with exports helped to reduce the problem with the national account balance, from -1.6 percent in average between 2000 to 2008 to -0.9 percent in 2009 and -0.4 in 2010 (IMF DATA, 2018). Nonetheless, the recession in United States impacted the trade terms in the country before this, and the Mexican account balance fell again to -1.1 percent in 2011, -1.3 in 2012 and -2.1 in 2013, elevating the unemployment from the 3.3 percent average from 2000 to 2008 to 5.1 percent in average from 2009 to 2013 (COMISIÓN ECONÓMICA PARA AMÉRICA LATINA Y EL CARIBE, 2018). Even so, the country has showing a capacity of keeping its levels of gross fixed capital formation stable since the early 2000s, a trend that is also observed in many countries of the region, although its labor productivity compared to the United States, a main economic partner, is falling considerably since 1990

(from approximate 28 percent to 22 percent, suggesting that an US employee can be even 4 to 5 times more productive than a Mexican one), another trend that can be observed in Latin America and Caribbean (MORENO-BRID and GARRY, 2016).

As mentioned, the observation of the figure 7 suggests that the average resilience of the Central America almost did not change from 2000 to 2008. While many investments were attracted to the region, the decline of labor productivity and a rise of unemployment now turn to be concerning questions for countries in the region. In 2017 and 2018, however, the rebound of the United States economy after a revision in their tax revenue policies can appear as a promising news for the countries in the region, and the Mexican economy can reach an unexpected growth of more than 2.6 percent, contributing for the dynamism of the region, a reduction of this unemployment and a better control of the Central American countries' account balances (MORENO-BRID and GARRY, 2016; WERNER, 2018).

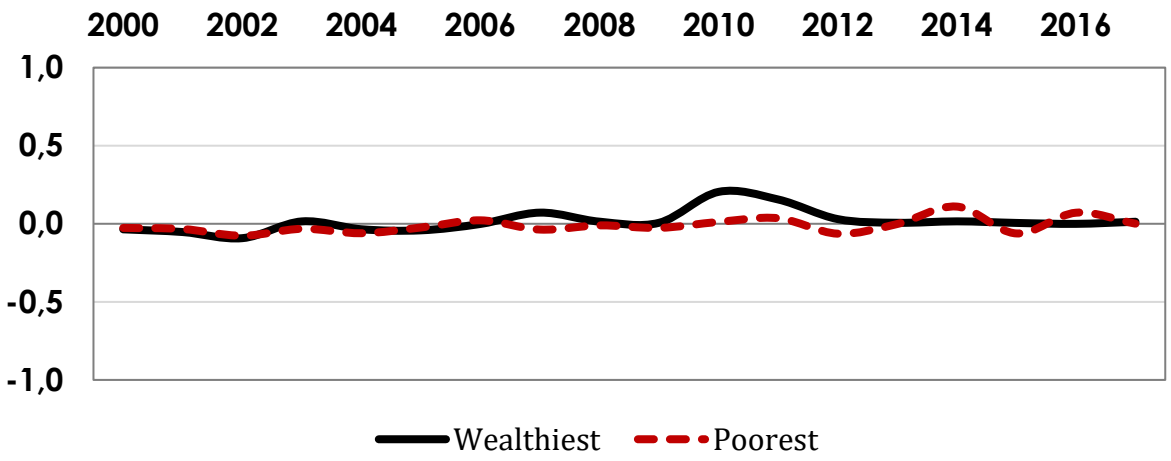
The situation in South America, a major economic market of the Latin America and Caribbean, is more peculiar: both resistance and recoverability indexes presented many oscillations, particularly since 2009 (see figures 8 and 9). From 2008 to 2013, only a few major economies in the region were not strongly hit by the recessions in United States and Europe, mainly because of the economic relations and partnerships tied with China and India, developing countries that were in a fast-paced growth path at time.

Figure 8 – Resistance Index of South American states from 2000 to 2017



Source: Elaborated by the author. Note: This figure compares the means of the South America's four wealthiest states (Uruguay, Chile, Argentina, and Brazil), and four poorest states (Bolivia, Paraguay, Guyana, and Colombia), accordingly their 2016's Per Capita GDP.

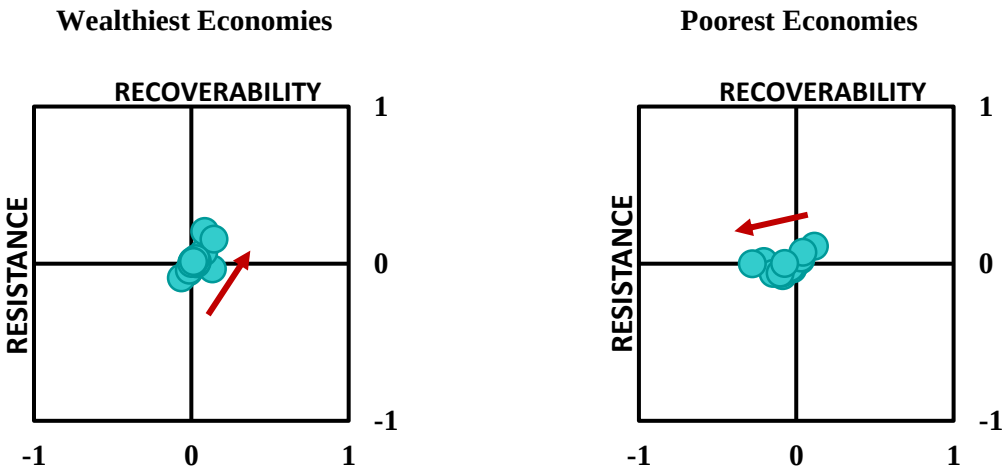
Figure 9 – Recoverability Index of South American states from 2000 to 2017



Source: Elaborated by the author. Note: This figure compares the means of the South America's four wealthiest states (Chile, Uruguay, Argentina, and Brazil), and four poorest states (Bolivia, Guyana, Paraguay, and Ecuador), accordingly their 2016's Per Capita GDP.

However, for economies like Chile, Ecuador and Venezuela, the effects of the global recession were felt in the most: the overall primary balance in the countries fell by 3.9, 3.5 and 3.7 percent, respectively, while their overall fiscal balance closed with a decline of 4.4, 4.2 and 5 percent in average from 2009 to 2011 (IMF DATA, 2018). From 2009 to 2017, the average resilience of the region declined from 0.050 to 0.047, and the region demonstrated a high degree of oscillation (see figure 10 below).

Figure 10 – South America Economic Resilience Indexes (Resistance and Recoverability)



Source: Elaborated by the author.

The inflation in Argentina rose from 6.3 percent in 2009 to 10.5 percent in 2010, and kept this two-digit level since them, while Venezuela came from an average of 20.8 percent between 2000 and 2008 to 28.6 percent in 2009 and 29.1 percent in 2010. The negative effects of the global recession, however, were in part controlled by a high performance of the exports from 2010 to 2013, mainly among the mineral and metals exporters and the exporters of agro-industrial products. For the first group, Chile experienced a growth in its exports by 5.8 percent in 2010, while Peru had a growth by 8.5 percent and Brazil 7.5 percent at that same year. Among the agro-industrial exporters, Argentina experienced a growth by 9.5 percent, Paraguay 13.1 percent and Uruguay 7.8 percent, what contributed to an average GDP growth of the South American economy by 6.7 percent in 2010, compared to 6.3 percent of the Latin American average. In 2011, the region performed a 5 percent growth, compared to 4.7 for Latin America, therefore deaccelerating before this year (MORENO-BRID and GARRY, 2016).

When observing the labor productivity of the South American countries, however, the analysis becomes much worse. The analysis is generally made by comparing the labor productivity of an average employee of a given country to an average employee of a developed industrial economy, like United States, Germany or Japan, for instance. In comparison with the United States, also a major economic partner for many economies in the region, this productivity of an average employee in Chile rose from approximately 19 percent to 22 percent from 1990 to 2012, suggesting that an US employee can be 4 to 5 times more productive. In Peru, the labor productivity kept stable for all these years, with an US employee being 10 times more productive. The average workers in Colombia and Ecuador also fell from 8 to 10 times less productive than an US worker, followed by Venezuela, Brazil, Uruguay and Argentina, all countries where an average worker is approximately 7 to 8 times less productive than those in US. The extreme cases are Bolivia and Paraguay, where the labor productivity is 20 times lower than in the United States (MORENO-BRID and GARRY, 2016).

All these indicators suggest that the Latin America continue to hold a persistent lag to the major industrial economies. With exception of Chile, all countries in the region presented declining or stagnating labor productivities from 1990 to 2012, evidencing the need for education, training and technical capacitation in the next decades (MORENO-BRID and GARRY, 2016). The influence of the labor productivity and the rise of unemployment in the region can be observed in the performance of the economic resilience indexes. By observing the resilience quadrants below for the region, one can notice that there was a shy increase in the economic resilience of the group of wealthiest economies in South America (Chile, Uruguay, Argentina and Brazil, respectively, in terms of the 2016 Per Capita GDP in Purchase Power

Parity – PPP). The same cannot be said about the poorest economies in the region (Bolivia, Guyana, Paraguay, and Ecuador), concentrated in the region between a lower recoverability with neutral resistance and the quad of the economies that are starting to create some resilience.

Summing up, from 2000 to 2008 the Latin America and Caribbean's economy has a growing path in many aspects, driven by rising exports (notably in sectors like minerals and metals, hydrocarbons and agroindustry products), strong fixed investments (both in gross fixed capital formation and foreign direct investments inflows), adoption of inflation targeting and other prudent macroeconomic policies, what helped to solve some of the major fiscal and balance-of-payments constraints (MORENO-BRID and GARRY, 2016).

The path for economic resilience, however, did not presented significant changes throughout the time: for many countries, there was no evidence of statistical relationship between the calculated resilience (resistance vs. recoverability) and the economic activity (gross fixed capital formation vs. index for economic activity). The stagnation of this economic resilience was then explained by an unfortunate rebound of the unemployment rates and the decline of labor productivity of all the Latin America and Caribbean economies, except Chile (MORENO-BRID and GARRY, 2016; ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN, 2018, p. 133). In the next section, the last period of analysis (2014 to 2018) is going to be addressed in more details, discussing the economic performance path and some of the determinants for the economic resilience in the region.

3.3 Regional Economic Resilience in Latin America and Caribbean (2014 – 2018)

From 2014 to 2018, economic recessions were registered in Argentina, Bolivia, Brazil and Peru (MORENO-BRID and GARRY, 2016), suggesting that the global financial crisis was postponed in many Latin American economics. In the case of Brazil, the recession was also caused by a political instability crisis, culminating in many scandals, contributing to the decline of many public companies' stocks and a deterioration in the GDP growth (OECD, 2018). The Brazilian economy shrank 3.55 percent in 2015, 3.47 in 2016 and closed 2017 with a null growth. The expectation, however, is that the economy grows again in 2018 and the next years, heated by the recovery of commodity prices, and the improving situation of the United States' economy after the passing of the fiscal package in December 2017 (COMISIÓN ECONÓMICA PARA AMÉRICA LATINA Y EL CARIBE, 2018).

Table 6 – GDP Growth by Region (2015 to 2023)

Region	2000-08	2009-13	2014	2015	2016	2017
World	4.31	3.30	3.58	3.45	3.23	3.76
Advanced economies	2.36	0.79	2.09	2.30	1.67	2.34
European Union	2.41	-0.09	1.82	2.42	2.03	2.65
Emerging and developing economies	6.47	5.40	4.70	4.30	4.36	4.76
Emerging and developing Asia	8.20	7.78	6.81	6.81	6.46	6.54
Latin America and the Caribbean	**3.59**	**2.91**	**1.33**	**0.32**	**-0.65**	**1.27**
Middle East and North Africa	5.67	3.51	2.79	2.54	4.86	2.55
Sub-Saharan Africa	5.95	5.14	5.10	3.37	1.45	2.81

Source: Elaborated by the author. Data from the IMF World Economic Outlook 2018 (IMF Data, 2018).

Even with this growth, the Latin American and Caribbean economy registered low growth rates when compared to other regions, as shown in table 6 above. The region performed below the World, the European Union, the Sub-Saharan Africa and the Advanced Economies' averages from 2015 to 2018, and only in 2019 it has an expected growth above the EU and Advanced Economies' growth rates.

Table 7 – Latin American and Caribbean Expected GDP Growth by country (2015 – 2023)

Region	2000-08	2009-13	2014	2015	2016	2017
South America	**3.76**	**4.08**	**2.11**	**1.14**	**-0.26**	**1.01**
Argentina	3.61	2.32	-2.51	2.73	-1.82	2.86
Bolivia	3.72	4.92	5.46	4.86	4.26	4.20
Brazil	3.78	3.29	0.00	-3.55	-3.47	0.00
Chile	4.84	3.96	1.77	2.30	1.27	1.47
Colombia	4.25	4.23	4.39	3.05	2.04	1.77
Paraguay	2.75	5.25	4.72	2.96	4.02	4.31
Peru	5.42	5.55	2.41	3.29	4.06	2.51
Uruguay	2.14	5.08	3.24	0.00	1.45	3.10
Venezuela	4.78	1.29	-3.89	-6.22	-16.46	-14.00
Central America and Caribbean	**3.63**	**1.31**	**3.07**	**2.26**	**2.13**	**1.79**
Costa Rica	4.79	3.26	3.52	3.57	4.51	3.20
Jamaica	1.18	-0.68	0.00	0.00	1.50	0.00
Mexico	2.28	1.70	2.85	3.27	2.91	2.04
Panama	5.91	7.01	6.04	5.78	4.99	5.36
Trinidad and Tobago	7.66	0.05	0.00	1.52	-5.96	-2.56
Latin America and the Caribbean	**3.59**	**2.91**	**1.33**	**0.32**	**-0.65**	**1.27**

Source: Elaborated by the author. Data from the IMF World Economic Outlook 2018 (IMF Data, 2018).

When analyzing the region through the lenses of its individual countries (see table 7 above), however, it is noticed that most of the Latin American and Caribbean economies recorded positive GDP growth rates. From 2015 to 2018, the highlights were Panama (5.43 percent in average per year), Bolivia (4.33 percent) and Paraguay (3.94 percent). Despite that, the negative rates presented by Brazil (-1.19 percent in average) and Venezuela (impressive -12.92 percent in average) helped to pull back the Latin American average growth. Signs of recovery are only expected for 2020, when the region will have the opportunity for gaining momentum, what will can only be achieved if many of the current constraints are eliminated: an excessive dependency on natural resources revenues among the exports, weak backwards and forward linkages on its economic structure, inappropriate innovation and high-technology processes and the low rates of labor productivity (MORENO-BRID and GARRY, 2016).

Table 8 – Average Regional Economic Resilience by Country (Latin America and the Caribbean)

Index / Country	2000-08	2009-13	2014	2015	2016	2017
Resistance Index						
Argentina	-0.080	-0.030	-0.092	-0.015	-0.020	-0.039
Bolivia	0.058	0.005	0.317	-0.510	0.106	0.063
Brazil	-0.007	0.080	0.027	-0.025	-0.026	-0.005
Chile	0.130	0.087	0.002	0.012	-0.028	0.008
Colombia	-0.005	-0.207	0.078	0.486	0.535	0.004
Costa Rica	-0.016	-0.089	-0.188	-0.101	-0.099	-0.202
Mexico	0.095	0.122	0.084	-0.001	0.009	0.025
Paraguay	-0.168	-0.363	0.033	-0.358	-0.420	-0.343
Puerto Rico	0.118	0.090	0.094	0.074	0.068	0.138
Uruguay	0.068	0.093	0.099	0.071	0.088	0.102
Recoverability Index						
Argentina	-0.158	-0.017	-0.069	-0.015	-0.017	-0.034
Bolivia	0.012	0.021	0.353	-0.431	0.112	0.062
Brazil	-0.004	0.142	0.033	-0.024	-0.031	-0.006
Chile	0.072	0.108	0.003	0.012	-0.033	0.009
Colombia	-0.003	-0.049	0.043	0.329	0.311	0.003
Costa Rica	-0.009	-0.029	-0.041	-0.025	-0.028	-0.028
Mexico	0.092	0.121	0.090	-0.001	0.011	0.027
Paraguay	-0.107	-0.056	0.012	-0.132	-0.102	-0.050
Puerto Rico	0.050	0.039	0.048	0.028	0.032	0.046
Uruguay	0.019	0.089	0.095	0.049	0.079	0.083

Source: Elaborated by the author. Economic Resilience calculations (Resistance and Recoverability) based on country's data (WORLD BANK, 2018).

Lastly, when analyzing the individual path of each of the major economies in the region, the results shows some interesting things: for Argentina, the value and signal of both resistance and recoverability indexes carries a theorical sense, given the country's crises in the end of the 1990s and early 2000s. Uruguay, otherwise presented a surprising result, with low resistance indexes. The same happens with Venezuela, one of the countries with higher degrees of decline in labor productivity, but that kept its average resistance indexes positive for all the periods analyzed. In general, the countries with less resistance were those with lower values for this productivity (MORENO-BRID and GARRY, 2016), suggesting a possible relation between the variable and unemployment.

In sum, this section analyzed some of the aspects of both the economic performance and economic resilience for Latin America and the Caribbean. The results of the calculated metrics of the resilience index were presented and there was an effort to connect these results with the literature about the economic performance of the region. By the side of this economic performance, the major countries appeared to came out of a trap of low inflation and slow growth paradox, by adopting prudent macroeconomic policies, attracting fixed investments and gross fixed capital formation and inflation targeting, all measures that helped the region to end many of the fiscal and balance-of-payment constraints and inflationary pressures that undermined the region's development during the decades of 1980 and 1990 (MORENO-BRID and GARRY, 2016). Otherwise, in the side of economic resilience, the decline or stagnation of labor productivity during all the observed period, and the rebound of the unemployment in major economies like Argentina and Brazil in the last years contributed for the low averages in the regional economic resilience indexes calculated.

4. CONCLUSIONS

The subject of the Economic Resilience has gained attention throughout the last two decades, and naturally gathered some relevant contributions and critical during this period. In general, the initial research on the literature revealed that infrastructure and quality of institutions (POSTAL and OLIVEIRA, 2016), stronger active labour market programs and other prudential policies (OECD, 2017), high rates of urbanization (BRAKMAN, MARREWIJK and PARTRIDGE, 2015) and more adequate (generally tighter) monetary, exchange rate and fiscal policies (DIDIER, HEVIA and SCHMUKLER, 2012) can be considered policies and measures associated with more resilient economies. By other hand, the excessive financial market liberalization (POSTAL and OLIVEIRA, 2016), openness via debt mechanisms, high degrees of capital flow openness, rapid growth of private credit and imbalances in house and debt markets (OECD, 2017) are generally associated with economic vulnerabilities and are therefore signals that contribute to a lower degree of economic resilience.

This work then is a part of a wider research to be performed on the Economic Resilience of Latin America and the Caribbean. It initially addresses some of the concepts and methodologies that have been used to calculate this resilience, and a first experimental work in calculating a national index for the region. Moreover, the literature review aims at contributing as an initial checkpoint for future researchers that can somehow need a list of some models and main aspects that together composes an exploratory view of the current literature on the science.

The empirical contribution of this work was the calculation of two metrics of a Regional Economic Resilience Index for the Latin America and the Caribbean (resistance and recoverability), based on the level of employment of its economies, what will therefore serve as basis for future analyses to empirically address the determinants and factors that can explain the apparent stagnation of the region towards the studied period (2000 to 2017). The limitations, however, are given to the time periodicity of the data found, that is annual only, and the lack of studies in the calculation of national indexes for resilience in the literature to compare the results. Even so, to minimize the impact of these limitations, the work has looked for insights in the literature on the Latin American economic performance and resilience to trace some possible factors that could explain this stagnation of the region towards the studies period, finding that the systemic unemployment and low rates of labor productivity are considered as potential reasons on the issue (MORENO-BRID and GARRY, 2016; WERNER, 2018).

Nonetheless, the region registered an evolution on its economic performance from 1990 to now. The two main constraints for its growth, inflationary pressures and fiscal imbalances were almost totally solved since them, by the application of inflation targeting and more prudent macroeconomic policies, contributing to the formation of some important basis for the sustainable development of the region (MORENO-BRID and GARRY, 2016).

Steps for Future Research

The current work introduced a Regional Economic Resilience for Latin America and the Caribbean. Thereto, one can address many possibilities as possible steps for future research on the subject, listing the following priorities on this project:

a) the consolidation of a proper database with quarterly or monthly employment data and the subsequent recalculation of the index with the gathered data.
b) the replication of the calculated indexes to other countries, regions and a wider range of time (depending on the availability of data);
c) the recalculation of the two metrics studied (resistance and recoverability), but using GDP or other indicators data instead of employment only;
d) the application of statistical methods to investigate what can be the main determinants and time-path dynamics of the economic resilience in Latin America and the Caribbean;
e) the comparative analysis of the correlation (or lack of it) between the calculated metrics for Regional Economic Resilience and other metrics for Economic Performance.

As an introductory work, the current research endeavored to contribute specifically within the debate of resilience in Latin America, by either reviewing some (but no means all) of the existent literature on the field, and by empirically assessing it as an initial exercise. The path is therefore long, with much to be done as forthcoming work. A thing that must to be considered is otherwise the fact that the region has a shortage of important studies dedicated to it, otherwise deserving this attention. Again, there is much to be done yet.

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ANNEX A – LIST OF COUNTRIES AND M49 STANDARD'S CODES

n	M49-1	Code	State / Country	M49-2	Continent	M49-3	Region	M49-4	Subregion
1	032	**ARG**	Argentina	019	Americas	419	Latin America and the Caribbean	005	South America
2	068	**BOL**	Bolivia (Plurinational State of)	019	Americas	419	Latin America and the Caribbean	005	South America
3	074	**BVT**	Bouvet Island	019	Americas	419	Latin America and the Caribbean	005	South America
4	076	**BRA**	Brazil	019	Americas	419	Latin America and the Caribbean	005	South America
5	152	**CHL**	Chile	019	Americas	419	Latin America and the Caribbean	005	South America
6	170	**COL**	Colombia	019	Americas	419	Latin America and the Caribbean	005	South America
7	218	**ECU**	Ecuador	019	Americas	419	Latin America and the Caribbean	005	South America
8	238	**FLK**	Falkland Islands (Malvinas)	019	Americas	419	Latin America and the Caribbean	005	South America
9	254	**GUF**	French Guiana	019	Americas	419	Latin America and the Caribbean	005	South America
10	328	**GUY**	Guyana	019	Americas	419	Latin America and the Caribbean	005	South America
11	600	**PRY**	Paraguay	019	Americas	419	Latin America and the Caribbean	005	South America
12	604	**PER**	Peru	019	Americas	419	Latin America and the Caribbean	005	South America
13	239	**SGS**	South Georgia and the South Sandwich Islands	019	Americas	419	Latin America and the Caribbean	005	South America
14	740	**SUR**	Suriname	019	Americas	419	Latin America and the Caribbean	005	South America
15	858	**URY**	Uruguay	019	Americas	419	Latin America and the Caribbean	005	South America
16	862	**VEN**	Venezuela (Bolivarian Republic of)	019	Americas	419	Latin America and the Caribbean	005	South America
17	084	**BLZ**	Belize	019	Americas	003	North America	013	Central America
18	188	**CRI**	Costa Rica	019	Americas	003	North America	013	Central America
19	222	**SLV**	El Salvador	019	Americas	003	North America	013	Central America
20	320	**GTM**	Guatemala	019	Americas	003	North America	013	Central America
21	340	**HND**	Honduras	019	Americas	003	North America	013	Central America
22	484	**MEX**	Mexico	019	Americas	003	North America	013	Central America
23	558	**NIC**	Nicaragua	019	Americas	003	North America	013	Central America
24	591	**PAN**	Panama	019	Americas	003	North America	013	Central America
25	060	**BMU**	Bermuda	019	Americas	003	North America	021	Northern America
26	124	**CAN**	Canada	019	Americas	003	North America	021	Northern America
27	840	**USA**	United States of America	019	Americas	003	North America	021	Northern America

28	028	**ATG**	Antigua and Barbuda	019	Americas	419	Latin America and the Caribbean	029	Caribbean
29	533	**ABW**	Aruba	019	Americas	419	Latin America and the Caribbean	029	Caribbean
30	044	**BHS**	Bahamas	019	Americas	419	Latin America and the Caribbean	029	Caribbean
31	052	**BRB**	Barbados	019	Americas	419	Latin America and the Caribbean	029	Caribbean
32	192	**CUB**	Cuba	019	Americas	419	Latin America and the Caribbean	029	Caribbean
33	531	**CUW**	Curaçao	019	Americas	419	Latin America and the Caribbean	029	Caribbean
34	212	**DMA**	Dominica	019	Americas	419	Latin America and the Caribbean	029	Caribbean
35	214	**DOM**	Dominican Republic	019	Americas	419	Latin America and the Caribbean	029	Caribbean
36	308	**GRD**	Grenada	019	Americas	419	Latin America and the Caribbean	029	Caribbean
37	332	**HTI**	Haiti	019	Americas	419	Latin America and the Caribbean	029	Caribbean
38	388	**JAM**	Jamaica	019	Americas	419	Latin America and the Caribbean	029	Caribbean
39	474	**MTQ**	Martinique	019	Americas	419	Latin America and the Caribbean	029	Caribbean
40	630	**PRI**	Puerto Rico	019	Americas	419	Latin America and the Caribbean	029	Caribbean
41	652	**BLM**	Saint Barthélemy	019	Americas	419	Latin America and the Caribbean	029	Caribbean
42	662	**LCA**	Saint Lucia	019	Americas	419	Latin America and the Caribbean	029	Caribbean
43	670	**VCT**	Saint Vincent and the Grenadines	019	Americas	419	Latin America and the Caribbean	029	Caribbean
44	780	**TTO**	Trinidad and Tobago	019	Americas	419	Latin America and the Caribbean	029	Caribbean
45	850	**VIR**	United States Virgin Islands	019	Americas	419	Latin America and the Caribbean	029	Caribbean

Note: The list of countries and/or states above was organized accordingly the following order:

1st – The Subregion United Nations' M49 Standard Code;

2nd – The country or states' name.

ANNEX B – STATISTIC SUMMARY OF AMERICA'S LABOR GROWTH

			1991-1995			1996-2000			2001-2005		
Region	**Qtd.**	**M49 Code**	**Mean Growth**	**Mean Labor Force**	**Std. Dev.**	**Mean Growth**	**Mean Labor Force**	**Std. Dev.**	**Mean Growth**	**Mean Labor Force**	**Std. Dev.**
South America	16	005	3.00%	8,627,051	15,246,586	2.97%	9,973,793	17,576,301	2.82%	11,400,091	20,182,237
Central America	8	013	3.32%	2,185,162	2,088,248	3.00%	2,550,533	2,412,238	3.07%	2,959,294	2,798,725
North America	3	021	2.46%	11,938,311	14,132,795	2.47%	13,466,019	16,040,419	2.59%	15,270,909	18,110,408
Caribbean	18	029	3.18%	5,519,783	8,587,615	2.84%	6,420,357	10,028,241	2.68%	7,309,087	11,309,893
Total	**45**	-	-	**28,270,307**	-	-	**32,410,702**	-	-	**36,939,381**	-
Mean	**11,25**	-	**2.99%**	**7,067,577**	**10,013,811**	**2.82%**	**8,102,676**	**11,514,300**	**2.79%**	**9,234,845**	**13,100,316**

			2006-2010			2011-2015			2016-2017		
Region	**Qtd.**	**M49 Code**	**Mean Growth**	**Mean Labor Force**	**Std, Dev,**	**Mean Growth**	**Mean Labor Force**	**Std, Dev,**	**Mean Growth**	**Mean Labor Force**	**Std, Dev,**
South America	16	005	1.94%	12,729,361	22,306,303	1.40%	13,641,006	23,283,057	1.39%	14,328,271	24,238,116
Central America	8	013	3.79%	3,529,423	3,303,157	3.44%	4,201,022	3,882,054	3.10%	4,679,098	4,292,319
North America	3	021	2.77%	17,377,596	20,451,994	2.73%	19,914,704	23,322,189	2.83%	21,917,368	25,646,159
Caribbean	18	029	2.77%	8,448,246	13,050,859	2.66%	9,679,180	14,878,884	2.71%	10,611,284	16,181,660
Total	**45**	-	-	**42,915,989**	-	-	**47,435,912**	-	-	**51,536,021**	-
Mean	**11,25**	-	**2.82%**	**10,521,157**	**14,778,078**	**2.56%**	**11,858,978**	**16,341,546**	**2.51%**	**12,884,005**	**17,589,564**

ANNEX C – REGIONAL ECONOMIC RESILIENCE INDEX (RESISTANCE)

n	Code	Subregion	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	ARG	South America	-0.048	-0.085	-0.123	-0.015	-0.048	-0.100	-0.048	-0.122	-0.133	-0.002	-0.250	0.206	-0.045	-0.061	-0.092	-0.015	-0.020	-0.039
2	BOL	South America	0.032	0.141	0.126	0.093	-0.019	0.085	0.066	-0.092	0.093	0.031	0.096	0.070	-0.296	0.125	0.317	-0.510	0.106	0.063
3	BVT	South America	0.059	-0.022	0.057	-0.040	0.004	-0.016	-0.038	-0.107	-0.030	-0.054	-0.094	-0.160	-0.064	-0.005	-0.024	0.012	-0.062	-0.064
4	BRA	South America	-0.316	-0.177	-0.287	-0.014	0.510	-0.164	0.056	0.219	0.110	-0.101	0.356	0.159	-0.021	0.007	0.027	-0.025	-0.026	-0.005
5	CHL	South America	0.160	0.164	0.141	0.130	0.121	0.121	0.094	0.131	0.113	0.098	0.117	0.122	0.108	-0.010	0.002	0.012	-0.028	0.008
6	COL	South America	-0.004	-0.048	-0.049	0.115	-0.028	0.022	0.118	-0.072	-0.103	-0.115	-1.048	-0.040	0.204	-0.036	0.078	0.486	0.535	0.004
7	ECU	South America	-0.325	-0.289	-0.303	-0.247	-0.227	-0.210	-0.109	-0.051	-0.092	-0.101	0.035	0.275	0.055	0.098	0.162	0.019	0.031	-0.018
8	FLK	South America	0.167	0.011	0.020	0.094	-0.021	0.097	0.017	0.097	0.052	0.163	-0.145	0.129	0.630	-0.078	-0.168	0.051	0.177	0.051
9	GUF	South America	-0.539	0.468	0.128	0.210	0.067	0.253	0.149	0.268	0.038	0.172	0.178	0.007	0.018	-0.044	-0.062	-0.210	0.063	0.084
10	GUY	South America	-0.035	-0.118	-0.110	-0.084	-0.102	-0.080	-0.069	0.071	0.038	0.009	0.107	0.076	0.033	0.035	0.038	-0.024	-0.049	-0.018
11	PRY	South America	-0.163	-0.063	-0.311	-0.338	-0.210	-0.197	-0.001	-0.162	-0.072	-0.075	0.020	0.014	-0.530	-1.241	0.033	-0.358	-0.420	-0.343
12	PER	South America	0.546	0.029	-0.084	-0.052	0.096	0.970	0.154	-0.029	0.063	0.037	0.062	0.076	-0.054	0.078	0.054	-0.004	-0.060	0.028
13	SGS	South America	0.099	0.081	0.130	0.162	0.068	0.137	0.073	0.113	0.095	0.091	0.143	0.125	0.136	0.142	0.149	0.139	0.145	0.156
14	SUR	South America	-0.022	-0.103	-0.093	-0.065	-0.095	-0.037	-0.093	0.070	0.046	0.037	0.112	0.074	0.050	0.056	0.060	0.237	0.217	0.195
15	URY	South America	0.178	0.037	0.023	0.133	-0.045	0.100	0.030	0.092	0.068	0.065	0.121	0.097	0.087	0.095	0.099	0.071	0.088	0.102
16	VEN	South America	-0.041	-0.144	-0.156	-0.154	-0.168	-0.142	-0.122	-0.067	-0.070	-0.060	0.105	0.121	0.160	0.285	0.179	0.092	0.162	2.714
17	BLZ	Central America	0.068	0.037	0.056	0.067	0.075	-0.030	-0.078	-0.064	-0.053	-0.042	-0.027	0.019	0.042	-0.063	0.002	0.044	0.037	0.063
18	CRI	Central America	-0.055	0.027	0.045	0.058	0.062	-0.065	-0.065	-0.074	-0.078	-0.079	-0.078	-0.093	-0.095	-0.100	-0.188	-0.101	-0.099	-0.202
19	SLV	Central America	-0.139	-0.151	-0.146	-0.130	-0.123	-0.139	-0.136	-0.125	-0.122	-0.112	-0.112	-0.105	-0.101	-0.092	-0.075	-0.039	-0.039	-0.032
20	GTM	Central America	-0.223	-0.177	-0.123	-0.098	-0.085	-0.110	-0.113	-0.107	-0.101	-0.095	-0.087	-0.076	-0.059	-0.054	-0.047	-0.014	-0.036	-0.061
21	HND	Central America	0.188	0.067	-0.045	-0.016	-0.087	-0.123	-0.014	0.046	0.078	0.055	-0.004	-0.031	-0.067	-0.092	-0.063	-0.020	-0.011	-0.022
22	MEX	Central America	0.006	0.006	0.014	0.011	0.018	0.225	0.198	0.192	0.183	0.171	0.158	0.101	0.093	0.086	0.084	-0.001	0.009	0.025
23	NIC	Central America	0.112	0.027	-0.008	-0.034	-0.039	-0.091	-0.100	-0.098	-0.097	-0.093	-0.088	-0.063	-0.056	-0.019	-0.005	0.081	0.048	-0.025

n	Code	Subregion	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
24	**PAN**	Central America	0.101	0.042	0.052	0.054	0.060	-0.050	-0.084	-0.064	-0.051	-0.037	-0.018	0.055	0.093	0.123	0.118	0.123	0.107	0.131
25	**BMU**	Northern America	-0.004	-0.022	-0.072	-0.045	-0.046	-0.020	-0.004	-0.063	-0.033	-0.027	-0.026	-0.037	0.005	0.003	0.003	-0.010	-0.004	-0.009
26	**CAN**	Northern America	0.001	0.007	0.013	0.016	0.035	0.015	0.029	0.149	0.149	0.150	0.150	0.155	0.040	0.039	0.038	0.024	0.021	0.041
27	**USA**	Northern America	0.023	0.129	0.154	0.215	0.512	0.033	-0.038	-0.092	-0.117	-0.121	-0.115	-0.129	-0.117	-0.114	-0.113	0.024	-0.026	-0.028
28	**ATG**	Caribbean	0.133	0.293	0.046	0.115	-0.034	-0.002	-0.048	-0.080	-0.072	-0.087	-0.091	-0.114	-0.046	0.057	0.054	0.004	0.026	-0.007
29	**ABW**	Caribbean	0.157	0.149	0.118	0.120	0.078	0.097	0.132	0.143	0.143	0.130	0.124	0.149	0.089	-0.031	-0.035	-0.061	0.060	0.037
30	**BHS**	Caribbean	-0.176	0.459	-0.017	0.055	-0.216	0.264	-0.116	0.056	-0.107	-0.156	-0.291	0.146	-0.180	-0.045	0.143	-0.218	-0.545	-0.110
31	**BRB**	Caribbean	-0.195	-0.188	-0.199	0.104	-0.295	-0.080	-0.076	-0.053	-0.125	-0.128	-0.134	-0.065	-0.092	-0.032	-0.149	-0.167	-0.153	-0.096
32	**CUB**	Caribbean	0.025	0.126	0.043	0.086	-0.007	0.298	0.209	-0.108	-0.095	-0.106	-0.111	-0.104	0.620	-0.857	0.178	-0.032	0.137	0.018
33	**CUW**	Caribbean	-0.098	-0.072	-0.088	-0.066	-0.163	-0.126	0.303	0.137	0.141	0.132	0.063	-0.139	-0.244	0.278	0.262	0.257	0.041	-0.017
34	**DMA**	Caribbean	-0.099	-0.232	-0.061	-0.210	0.077	-0.041	0.014	-0.037	-0.087	-0.060	-0.077	-0.045	-0.005	-0.104	-0.196	-0.066	-0.104	-0.098
35	**DOM**	Caribbean	0.247	0.087	0.039	0.054	-0.105	-0.241	-0.099	0.067	0.055	0.026	0.028	0.016	-0.106	0.018	0.000	-0.114	-0.049	-0.222
36	**GRD**	Caribbean	0.027	0.040	0.014	0.032	-0.015	-0.018	-0.217	0.014	0.140	0.031	-0.096	-0.253	0.055	0.106	-0.053	-0.004	0.001	-0.065
37	**HTI**	Caribbean	-0.127	0.087	0.107	0.145	0.139	0.128	0.081	0.096	0.095	0.075	0.068	-0.021	-0.177	-0.006	-0.007	0.059	0.078	0.030
38	**JAM**	Caribbean	0.006	0.060	0.023	0.057	-0.085	-0.007	-0.089	0.031	0.065	0.056	0.071	0.057	-0.055	0.072	0.078	0.061	0.050	0.027
39	**MTQ**	Caribbean	0.107	0.063	-0.066	-0.098	-0.118	-0.101	-0.111	-0.080	-0.059	-0.059	-0.039	-0.030	-0.082	0.001	-0.008	-0.056	-0.082	-0.062
40	**PRI**	Caribbean	0.198	0.152	0.165	0.168	0.157	0.193	-0.071	0.037	0.068	0.078	0.097	0.116	0.035	0.121	0.094	0.074	0.068	0.138
41	**BLM**	Caribbean	-0.074	-0.073	-0.129	-0.079	-0.532	-0.270	0.011	0.066	0.084	0.073	0.073	0.074	-0.005	0.083	0.079	0.054	0.066	0.052
42	**LCA**	Caribbean	0.060	0.069	0.052	0.071	-0.001	0.031	0.092	0.106	0.110	0.104	0.109	0.032	-0.045	0.032	0.021	-0.019	0.046	0.060
43	**VCT**	Caribbean	0.040	0.027	-0.008	0.037	-0.244	0.004	-0.066	0.056	0.079	0.086	0.107	0.102	0.195	0.141	0.093	0.074	0.091	0.122
44	**TTO**	Caribbean	-0.091	-0.068	-0.216	-0.233	-0.247	-0.093	-0.190	-0.216	-0.125	-0.138	-0.054	-0.205	-0.126	-0.061	-0.068	-0.090	-0.255	-0.198
45	**VIR**	Caribbean	0.073	0.161	0.022	0.095	-0.067	-0.050	-0.103	-0.080	-0.074	-0.092	-0.102	-0.141	-0.170	0.081	0.087	0.038	0.074	0.044

OBS.: This table reflects the ‘Resistance’ dimension of Economic Resilience. For more details, please see section 3.1.2 (Dimensions of Economic Resilience) and chapter 5 (Results and Discussion).

ANNEX D – REGIONAL ECONOMIC RESILIENCE INDEX (RECOVERABILITY)

n	Code	Subregion	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	ARG	South America	-0.078	-0.226	-0.331	-0.027	-0.231	-0.160	-0.090	-0.119	-0.159	-0.003	-0.135	0.144	-0.040	-0.051	-0.069	-0.015	-0.017	-0.034
2	BOL	South America	0.038	0.023	0.023	0.079	-0.010	0.106	0.053	-0.154	0.260	0.129	0.123	0.096	-0.457	0.184	0.443	-0.857	0.153	0.095
3	BVT	South America	0.027	-0.013	0.033	-0.020	0.003	-0.008	-0.019	-0.038	-0.006	-0.015	-0.093	-0.116	-0.029	-0.003	-0.016	0.005	-0.036	-0.033
4	BRA	South America	-0.278	-0.135	-0.219	-0.012	0.265	-0.144	0.049	0.204	0.101	-0.092	0.339	0.150	-0.020	0.007	0.025	-0.024	-0.025	-0.005
5	CHL	South America	0.200	0.359	0.316	0.171	0.111	0.151	0.126	0.146	0.130	0.114	0.126	0.133	0.119	-0.012	0.003	0.014	-0.031	0.009
6	COL	South America	-0.005	-0.049	-0.051	0.118	-0.028	0.022	0.120	-0.075	-0.106	-0.118	-0.723	-0.046	0.214	-0.038	0.085	0.504	0.569	0.005
7	ECU	South America	-0.468	-0.367	-0.384	-0.339	-0.278	-0.304	-0.149	-0.111	-0.192	-0.189	0.019	0.078	0.072	0.092	0.092	0.043	0.024	-0.020
8	FLK	South America	0.189	0.015	0.027	0.496	-0.026	0.102	0.050	0.081	0.037	0.107	-0.133	0.116	0.535	-0.068	-0.149	0.043	0.155	0.044
9	GUF	South America	-0.264	0.318	0.087	0.119	0.049	0.123	0.086	0.277	0.017	0.055	0.327	0.026	0.026	-0.084	-0.261	-0.214	0.152	0.138
10	GUY	South America	-0.027	-0.105	-0.098	-0.069	-0.094	-0.061	-0.057	0.096	0.062	0.008	0.117	0.086	0.042	0.042	0.044	-0.033	-0.058	-0.022
11	PRY	South America	-0.149	-0.059	-0.291	-0.310	-0.198	-0.179	-0.001	-0.117	-0.062	-0.066	0.025	0.027	-0.299	-0.364	0.066	-0.259	-0.337	-0.124
12	PER	South America	0.127	0.023	-0.064	-0.029	0.079	0.163	0.089	-0.042	0.203	0.136	0.071	0.092	-0.072	0.099	0.066	-0.006	-0.076	0.036
13	SGS	South America	0.107	0.058	0.079	0.181	0.060	0.148	0.083	0.117	0.100	0.096	0.146	0.128	0.140	0.147	0.153	0.144	0.149	0.161
14	SUR	South America	-0.015	-0.088	-0.080	-0.049	-0.084	-0.025	-0.071	0.100	0.090	0.041	0.126	0.086	0.065	0.070	0.072	0.340	0.264	0.246
15	URY	South America	0.100	0.032	0.020	0.078	-0.041	0.065	0.020	0.105	0.086	0.087	0.129	0.104	0.097	0.105	0.108	0.081	0.096	0.113
16	VEN	South America	-0.053	-0.168	-0.182	-0.190	-0.191	-0.184	-0.150	-0.070	-0.135	-0.101	0.084	0.082	0.076	0.094	0.106	0.100	0.078	0.209
17	BLZ	Central America	0.070	0.038	0.058	0.069	0.077	-0.029	-0.074	-0.062	-0.051	-0.041	-0.026	0.022	0.050	-0.075	0.002	0.045	0.038	0.066
18	CRI	Central America	-0.127	0.053	0.520	0.062	0.055	-0.056	-0.054	-0.063	-0.067	-0.068	-0.068	-0.069	-0.071	-0.074	-0.122	-0.230	-0.443	-0.096
19	SLV	Central America	-0.141	-0.154	-0.148	-0.132	-0.125	-0.140	-0.137	-0.126	-0.123	-0.113	-0.113	-0.106	-0.102	-0.093	-0.076	-0.040	-0.040	-0.033
20	GTM	Central America	-0.254	-0.236	-0.145	-0.109	-0.093	-0.113	-0.117	-0.111	-0.104	-0.098	-0.090	-0.079	-0.061	-0.057	-0.050	-0.016	-0.043	-0.065
21	HND	Central America	0.603	0.166	-0.129	-0.072	-0.459	-0.126	-0.017	0.048	0.076	0.052	-0.004	-0.056	-0.120	-0.164	-0.144	-0.064	-0.031	-0.073
22	MEX	Central America	0.009	0.009	0.019	0.015	0.024	0.325	0.282	0.278	0.266	0.249	0.230	0.140	0.129	0.119	0.115	-0.001	0.012	0.034
23	NIC	Central America	0.198	0.026	-0.022	-0.048	-0.053	-0.098	-0.107	-0.105	-0.104	-0.100	-0.095	-0.071	-0.063	-0.021	-0.006	0.143	0.192	-0.030

n	Code	Subregion	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
24	**PAN**	Central America	0.095	0.040	0.049	0.051	0.055	-0.061	-0.120	-0.079	-0.061	-0.043	-0.022	0.040	0.068	0.089	0.100	0.116	0.101	0.116
25	**BMU**	Northern America	-0.004	-0.024	-0.164	-0.050	-0.047	-0.018	-0.004	-0.055	-0.032	-0.027	-0.025	-0.036	0.004	0.003	0.003	-0.010	-0.004	-0.009
26	**CAN**	Northern America	0.001	0.007	0.013	0.016	0.035	0.016	0.029	0.147	0.146	0.147	0.148	0.152	0.039	0.039	0.038	0.024	0.021	0.040
27	**USA**	Northern America	0.022	0.122	0.146	0.204	0.477	0.031	-0.036	-0.088	-0.112	-0.116	-0.110	-0.123	-0.111	-0.108	-0.108	0.024	-0.025	-0.027
28	**ATG**	Caribbean	0.104	0.137	0.037	0.073	-0.030	-0.002	-0.043	-0.067	-0.057	-0.071	-0.071	-0.090	-0.041	0.042	0.039	0.004	0.020	-0.006
29	**ABW**	Caribbean	0.154	0.147	0.116	0.119	0.077	0.095	0.129	0.140	0.141	0.128	0.122	0.147	0.087	-0.031	-0.034	-0.060	0.059	0.036
30	**BHS**	Caribbean	-0.147	0.278	-0.015	0.037	-0.294	0.283	-0.169	0.057	-0.093	-0.145	-0.243	0.125	-0.258	-0.034	0.108	-0.203	-0.437	-0.107
31	**BRB**	Caribbean	-0.273	-0.318	-0.275	0.162	-0.364	-0.104	-0.094	-0.070	-0.172	-0.172	-0.187	-0.090	-0.113	-0.047	-0.218	-0.225	-0.218	-0.127
32	**CUB**	Caribbean	0.024	0.116	0.041	0.081	-0.008	0.288	0.204	-0.104	-0.091	-0.102	-0.106	-0.099	0.604	-0.811	0.169	-0.031	0.130	0.018
33	**CUW**	Caribbean	-0.101	-0.090	-0.088	-0.077	-0.120	-0.110	0.213	0.124	0.141	0.126	0.065	-0.140	-0.174	0.303	0.287	0.245	0.043	-0.016
34	**DMA**	Caribbean	-0.141	-0.931	-0.083	-0.447	0.090	-0.051	0.016	-0.047	-0.120	-0.079	-0.109	-0.063	-0.006	-0.165	-0.313	-0.087	-0.153	-0.125
35	**DOM**	Caribbean	0.419	0.106	0.080	0.069	-0.078	-0.074	-0.078	0.059	0.113	0.108	0.049	0.031	-0.082	0.025	-0.001	-0.397	-0.076	-0.296
36	**GRD**	Caribbean	0.021	0.035	0.011	0.027	-0.009	-0.012	-0.120	0.010	0.104	0.022	-0.072	-0.189	0.031	0.084	-0.043	-0.003	0.001	-0.045
37	**HTI**	Caribbean	-0.298	0.220	0.215	0.554	0.086	0.140	0.041	0.122	0.190	0.122	0.158	-0.046	-0.094	-0.028	-0.031	0.094	0.220	0.042
38	**JAM**	Caribbean	0.007	0.063	0.025	0.060	-0.074	-0.010	-0.080	0.037	0.070	0.062	0.076	0.062	-0.049	0.077	0.082	0.067	0.053	0.031
39	**MTQ**	Caribbean	0.156	0.038	-0.090	-0.056	-0.129	-0.117	-0.120	-0.094	-0.079	-0.074	-0.057	-0.042	-0.090	0.004	-0.029	-0.070	-0.135	-0.075
40	**PRI**	Caribbean	0.155	0.130	0.127	0.141	0.124	0.116	-0.092	0.025	0.053	0.058	0.077	0.090	0.040	0.099	0.077	0.055	0.055	0.097
41	**BLM**	Caribbean	-0.080	-0.077	-0.139	-0.083	-1.189	-0.308	0.010	0.074	0.091	0.080	0.079	0.080	-0.007	0.089	0.084	0.059	0.071	0.058
42	**LCA**	Caribbean	0.110	0.102	0.099	0.110	-0.002	0.140	0.116	0.298	0.210	0.223	0.198	0.059	-0.059	0.054	0.035	-0.041	0.081	0.149
43	**VCT**	Caribbean	0.036	0.025	-0.007	0.035	-0.091	0.004	-0.041	0.048	0.070	0.075	0.095	0.091	0.090	0.128	0.085	0.065	0.082	0.104
44	**TTO**	Caribbean	-0.071	-0.050	-0.169	-0.174	-0.204	-0.075	-0.158	-0.173	-0.097	-0.109	-0.042	-0.160	-0.105	-0.047	-0.052	-0.072	-0.197	-0.157
45	**VIR**	Caribbean	0.052	0.072	0.017	0.055	-0.057	-0.040	-0.087	-0.063	-0.054	-0.069	-0.073	-0.102	-0.144	0.054	0.057	0.029	0.051	0.034

OBS.: This table reflects the ‘Recovery’ dimension of Economic Resilience. For more details, please see section 3.1.2 (Dimensions of Economic Resilience) and chapter 5 (Results and Discussion).

n	Code	Subregion	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	**ARG**	South America	-0.063	-0.155	-0.227	-0.021	-0.139	-0.130	-0.069	-0.121	-0.146	-0.003	-0.193	0.175	-0.042	-0.056	-0.080	-0.015	-0.019	-0.036
2	**BOL**	South America	0.023	0.076	0.069	0.064	-0.013	0.062	0.045	-0.085	0.077	0.026	0.122	0.078	-0.285	0.125	0.335	-0.470	0.109	0.063
3	**BVT**	South America	0.043	-0.018	0.045	-0.030	0.004	-0.012	-0.029	-0.074	-0.018	-0.034	-0.098	-0.143	-0.048	-0.004	-0.020	0.009	-0.050	-0.050
4	**BRA**	South America	-0.250	-0.119	-0.193	-0.011	0.299	-0.130	0.043	0.215	0.099	-0.089	0.473	0.185	-0.021	0.007	0.030	-0.024	-0.028	-0.005
5	**CHL**	South America	0.128	0.112	0.097	0.100	0.074	0.098	0.072	0.130	0.102	0.088	0.157	0.144	0.111	-0.011	0.003	0.012	-0.030	0.008
6	**COL**	South America	-0.004	-0.044	-0.045	0.104	-0.026	0.020	0.106	-0.060	-0.089	-0.101	-0.648	-0.030	0.168	-0.029	0.061	0.408	0.423	0.004
7	**ECU**	South America	-0.282	-0.258	-0.271	-0.216	-0.205	-0.182	-0.096	-0.041	-0.076	-0.084	0.028	0.166	0.042	0.072	0.110	0.016	0.023	-0.013
8	**FLK**	South America	0.105	0.008	0.015	0.063	-0.017	0.060	0.012	0.078	0.036	0.107	-0.165	0.127	0.530	-0.069	-0.158	0.041	0.160	0.045
9	**GUF**	South America	-0.361	0.354	0.097	0.147	0.053	0.170	0.106	0.204	0.024	0.104	0.197	0.006	0.015	-0.038	-0.056	-0.160	0.056	0.070
10	**GUY**	South America	-0.024	-0.089	-0.084	-0.059	-0.080	-0.054	-0.049	0.055	0.025	0.005	0.119	0.073	0.027	0.030	0.035	-0.019	-0.043	-0.015
11	**PRY**	South America	-0.134	-0.054	-0.265	-0.280	-0.182	-0.160	-0.001	-0.110	-0.055	-0.058	0.018	0.010	-0.331	-0.687	0.022	-0.245	-0.261	-0.197
12	**PER**	South America	0.299	0.021	-0.059	-0.032	0.072	0.518	0.098	-0.025	0.046	0.027	0.072	0.077	-0.048	0.071	0.052	-0.004	-0.056	0.025
13	**SGS**	South America	0.072	0.045	0.070	0.112	0.044	0.101	0.050	0.106	0.080	0.076	0.182	0.139	0.133	0.144	0.159	0.130	0.150	0.155
14	**SUR**	South America	-0.015	-0.077	-0.070	-0.044	-0.073	-0.024	-0.064	0.055	0.030	0.023	0.126	0.072	0.041	0.048	0.055	0.185	0.193	0.165
15	**URY**	South America	0.101	0.026	0.016	0.079	-0.034	0.057	0.019	0.078	0.050	0.047	0.143	0.099	0.077	0.088	0.097	0.060	0.084	0.092
16	**VEN**	South America	-0.033	-0.123	-0.133	-0.127	-0.146	-0.116	-0.101	-0.045	-0.053	-0.046	0.097	0.091	0.097	0.168	0.125	0.062	0.104	1.409
17	**BLZ**	Central America	0.048	0.027	0.041	0.047	0.051	-0.019	-0.048	-0.041	-0.034	-0.027	-0.017	0.011	0.024	-0.036	0.001	0.032	0.026	0.040
18	**CRI**	Central America	-0.035	0.018	0.029	0.035	0.037	-0.046	-0.044	-0.051	-0.054	-0.055	-0.055	-0.060	-0.061	-0.064	-0.115	-0.063	-0.063	-0.115
19	**SLV**	Central America	-0.103	-0.110	-0.108	-0.098	-0.093	-0.113	-0.109	-0.101	-0.099	-0.091	-0.091	-0.083	-0.079	-0.072	-0.058	-0.029	-0.029	-0.025
20	**GTM**	Central America	-0.143	-0.107	-0.078	-0.065	-0.056	-0.083	-0.085	-0.082	-0.077	-0.072	-0.066	-0.055	-0.042	-0.039	-0.034	-0.009	-0.023	-0.042
21	**HND**	Central America	0.158	0.058	-0.038	-0.014	-0.072	-0.087	-0.011	0.033	0.055	0.038	-0.003	-0.024	-0.052	-0.071	-0.049	-0.017	-0.009	-0.018
22	**MEX**	Central America	0.007	0.007	0.015	0.012	0.020	0.220	0.195	0.188	0.178	0.166	0.154	0.103	0.095	0.088	0.087	-0.001	0.010	0.026
23	**NIC**	Central America	0.069	0.015	-0.005	-0.022	-0.026	-0.069	-0.074	-0.074	-0.073	-0.071	-0.067	-0.045	-0.040	-0.014	-0.003	0.050	0.029	-0.017

	Code	Subregion	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
24	**PAN**	Central America	0.072	0.031	0.038	0.038	0.041	-0.031	-0.051	-0.040	-0.033	-0.024	-0.012	0.032	0.054	0.071	0.073	0.088	0.077	0.085
25	**BMU**	Northern America	-0.002	-0.014	-0.039	-0.027	-0.032	-0.012	-0.002	-0.035	-0.020	-0.017	-0.016	-0.023	0.003	0.002	0.002	-0.006	-0.002	-0.006
26	**CAN**	Northern America	0.001	0.007	0.013	0.016	0.036	0.015	0.029	0.144	0.141	0.141	0.140	0.147	0.038	0.038	0.036	0.023	0.020	0.038
27	**USA**	Northern America	0.019	0.108	0.130	0.180	0.417	0.028	-0.032	-0.078	-0.099	-0.104	-0.098	-0.110	-0.099	-0.097	-0.096	0.021	-0.022	-0.024
28	**ATG**	Caribbean	0.095	0.175	0.034	0.074	-0.027	-0.001	-0.038	-0.060	-0.052	-0.064	-0.065	-0.082	-0.037	0.040	0.037	0.003	0.019	-0.005
29	**ABW**	Caribbean	0.148	0.152	0.110	0.120	0.065	0.086	0.108	0.128	0.134	0.120	0.117	0.140	0.074	-0.030	-0.034	-0.056	0.057	0.033
30	**BHS**	Caribbean	-0.145	0.359	-0.014	0.044	-0.187	0.223	-0.101	0.047	-0.088	-0.131	-0.239	0.121	-0.157	-0.036	0.117	-0.182	-0.446	-0.092
31	**BRB**	Caribbean	-0.172	-0.161	-0.176	0.090	-0.267	-0.072	-0.070	-0.048	-0.110	-0.113	-0.118	-0.057	-0.084	-0.028	-0.130	-0.148	-0.135	-0.086
32	**CUB**	Caribbean	0.019	0.092	0.034	0.065	-0.006	0.243	0.177	-0.087	-0.076	-0.085	-0.088	-0.082	0.522	-0.661	0.138	-0.026	0.107	0.014
33	**CUW**	Caribbean	-0.093	-0.073	-0.082	-0.065	-0.135	-0.111	0.246	0.122	0.131	0.120	0.060	-0.130	-0.199	0.268	0.253	0.234	0.039	-0.015
34	**DMA**	Caribbean	-0.076	-0.161	-0.047	-0.152	0.063	-0.033	0.011	-0.029	-0.067	-0.047	-0.059	-0.035	-0.005	-0.077	-0.146	-0.052	-0.078	-0.077
35	**DOM**	Caribbean	0.169	0.069	0.027	0.041	-0.068	-0.131	-0.066	0.040	0.037	0.017	0.020	0.011	-0.071	0.013	-0.001	-0.073	-0.035	-0.137
36	**GRD**	Caribbean	0.025	0.040	0.013	0.032	-0.012	-0.016	-0.176	0.012	0.129	0.028	-0.090	-0.236	0.045	0.101	-0.052	-0.003	0.001	-0.058
37	**HTI**	Caribbean	-0.102	0.077	0.084	0.125	0.091	0.093	0.051	0.071	0.075	0.058	0.055	-0.017	-0.113	-0.005	-0.006	0.045	0.063	0.023
38	**JAM**	Caribbean	0.005	0.049	0.016	0.045	-0.053	-0.005	-0.057	0.020	0.045	0.038	0.050	0.040	-0.035	0.054	0.058	0.041	0.036	0.018
39	**MTQ**	Caribbean	0.072	0.038	-0.045	-0.056	-0.090	-0.074	-0.086	-0.057	-0.040	-0.041	-0.027	-0.020	-0.064	0.001	-0.006	-0.039	-0.054	-0.045
40	**PRI**	Caribbean	0.143	0.124	0.117	0.132	0.094	0.121	-0.045	0.024	0.049	0.054	0.070	0.083	0.022	0.092	0.071	0.051	0.050	0.092
41	**BLM**	Caribbean	-0.057	-0.063	-0.098	-0.065	-0.317	-0.187	0.006	0.047	0.064	0.054	0.057	0.057	-0.003	0.067	0.064	0.040	0.052	0.038
42	**LCA**	Caribbean	0.051	0.064	0.043	0.064	-0.001	0.024	0.064	0.084	0.092	0.085	0.092	0.027	-0.032	0.028	0.019	-0.015	0.040	0.049
43	**VCT**	Caribbean	0.031	0.023	-0.006	0.031	-0.134	0.003	-0.037	0.039	0.058	0.062	0.080	0.076	0.107	0.110	0.073	0.054	0.070	0.086
44	**TTO**	Caribbean	-0.080	-0.058	-0.191	-0.201	-0.224	-0.083	-0.172	-0.193	-0.110	-0.123	-0.048	-0.181	-0.114	-0.054	-0.059	-0.080	-0.224	-0.176
45	**VIR**	Caribbean	0.052	0.099	0.017	0.063	-0.054	-0.038	-0.083	-0.061	-0.054	-0.068	-0.074	-0.103	-0.137	0.057	0.060	0.028	0.053	0.034

OBS.: This table displays the total Economic Resilience of countries by calculating the mean of the two resilience metrics (resistance and recoverability) for each year and each country

ANNEX F – LATIN AMERICAN RANKING FOR ECONOMIC RESILIENCE

Rank	M49-1	Code	State / Country	M49-4	Subregion	Mean Resistance	Mean Recoverability	Mean Resilience
1	239	**SGS**	South Georgia and the South Sandwich Islands	005	South America	0.1214	0.0947	**0.1081**
2	484	**MEX**	Mexico	013	Central America	0.0878	0.0868	**0.0873**
3	533	**ABW**	Aruba	029	Caribbean	0.0888	0.0751	**0.0819**
4	152	**CHL**	Chile	005	South America	0.0891	0.0658	**0.0774**
5	630	**PRI**	Puerto Rico	029	Caribbean	0.1049	0.0443	**0.0746**
6	862	**VEN**	Venezuela	005	South America	0.1497	-0.0129	**0.0684**
7	858	**URY**	Uruguay	005	South America	0.0800	0.0512	**0.0656**
8	604	**PER**	Peru	005	South America	0.1061	0.0219	**0.0640**
9	124	**CAN**	Canada	021	Northern America	0.0595	0.0542	**0.0568**
10	254	**GUF**	French Guiana	005	South America	0.0694	0.0403	**0.0549**
11	238	**FLK**	Falkland Islands (Malvinas)	005	South America	0.0746	0.0341	**0.0543**
12	662	**LCA**	Saint Lucia	029	Caribbean	0.0517	0.0348	**0.0432**
13	670	**VCT**	Saint Vincent and the Grenadines	029	Caribbean	0.0520	0.0287	**0.0403**
14	332	**HTI**	Haiti	029	Caribbean	0.0471	0.0272	**0.0371**
15	740	**SUR**	Suriname	005	South America	0.0358	0.0339	**0.0349**
16	531	**CUW**	Curaçao	029	Caribbean	0.0333	0.0300	**0.0317**
17	591	**PAN**	Panama	013	Central America	0.0420	0.0146	**0.0283**
18	076	**BRA**	Brazil	005	South America	0.0172	0.0360	**0.0266**
19	068	**BOL**	Bolivia	005	South America	0.0294	0.0173	**0.0233**
20	388	**JAM**	Jamaica	029	Caribbean	0.0264	0.0142	**0.0203**
21	192	**CUB**	Cuba	029	Caribbean	0.0176	0.0157	**0.0167**
22	170	**COL**	Colombia	005	South America	0.0011	0.0229	**0.0120**
23	084	**BLZ**	Belize	013	Central America	0.0085	0.0056	**0.0070**
24	840	**USA**	United States of America	021	Northern America	0.0045	0.0005	**0.0025**
25	028	**ATG**	Antigua and Barbuda	029	Caribbean	0.0082	-0.0033	**0.0024**
26	340	**HND**	Honduras	013	Central America	-0.0089	-0.0046	**-0.0067**
27	214	**DOM**	Dominican Republic	029	Caribbean	-0.0166	0.0014	**-0.0076**
28	328	**GUY**	Guyana	005	South America	-0.0156	-0.0006	**-0.0081**
29	850	**VIR**	United States Virgin Islands	029	Caribbean	-0.0114	-0.0118	**-0.0116**
30	308	**GRD**	Grenada	029	Caribbean	-0.0147	-0.0093	**-0.0120**
31	652	**BLM**	Saint Barthélemy	029	Caribbean	-0.0248	-0.0025	**-0.0136**
32	060	**BMU**	Bermuda	021	Northern America	-0.0228	-0.0046	**-0.0137**
33	558	**NIC**	Nicaragua	013	Central America	-0.0307	-0.0177	**-0.0242**
34	074	**BVT**	Bouvet Island	005	South America	-0.0359	-0.0226	**-0.0293**
35	474	**MTQ**	Martinique	029	Caribbean	-0.0488	-0.0215	**-0.0352**
36	188	**CRI**	Costa Rica	013	Central America	-0.0654	-0.0192	**-0.0423**
37	044	**BHS**	Bahamas	029	Caribbean	-0.0586	-0.0423	**-0.0505**
38	212	**DMA**	Dominica	029	Caribbean	-0.0795	-0.0388	**-0.0591**
39	320	**GTM**	Guatemala	013	Central America	-0.0924	-0.0362	**-0.0643**
40	218	**ECU**	Ecuador	005	South America	-0.0721	-0.0688	**-0.0705**
41	032	**ARG**	Argentina	005	South America	-0.0577	-0.0912	**-0.0744**
42	222	**SLV**	El Salvador	013	Central America	-0.1064	-0.0596	**-0.0830**
43	052	**BRB**	Barbados	029	Caribbean	-0.1180	-0.0913	**-0.1047**
44	780	**TTO**	Trinidad and Tobago	029	Caribbean	-0.1485	-0.1146	**-0.1316**
45	600	**PRY**	Paraguay	005	South America	-0.2454	-0.0845	**-0.1650**

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INSTITUTO DE CIÊNCIAS SOCIAIS APLICADAS
DEPARTAMENTO DE CIÊNCIAS ECONÔMICAS

Mariana, 07 de Janeiro de 2019

Certifico que o aluno Bruno Rodrigues Candea, autor do trabalho de conclusão de curso intitulado **Analysis of the Regional Economic Resilience in Latin America and the Caribbean from 2000 to 2017** efetuou as correções sugeridas pela banca examinadora e que estou de acordo com a versão final do trabalho.

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