

Industrial policy, economic growth and international engagement: a comparison of selected countries

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Abstract

The current debate on industrial policies is no longer focused on whether such policies are necessary, but on how best to implement them and on the lessons that can be learned (and transferred) from successful industrialization experiences. Accordingly, the aim of this paper is to analyse the impact of different configurations of industrial policies on the growth and international engagement of nine Latin American economies. This impact is measured by analysing autoregressive integrated moving average (ARIMA) models and intervention models for 1966–2014. The results show that the interventions analysed did not significantly modify the behaviour of the time series studied, except in the case of the economic growth series. For the other variables, the interventions were quite self-contained, and it was impossible to identify any behavioural pattern associated with the intervention periods analysed.

Keywords

Industrial policy, industrialization, development policy, economic liberalization, economic growth, economic history, econometric models, Latin America

JEL classification

F2, F23, L5, N16

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I. Introduction

In recent years, there has been a revival of interest in the importance of industrial policies in the Latin American countries. According to Devlin and Moguillansky (2012), this shift towards accepting a more proactive stance occurred partly in response to the great global recession of 2008–2009, and partly through disillusion with the policies implemented under the Washington Consensus. These entailed adjustments based on macroeconomic balances and market-oriented institutional reforms that strongly discouraged State intervention in productive activities. It is in this context that, according to the aforementioned authors, Latin American countries began to show an emerging interest in State interventions, implemented through proactive and systemic industrial policies aimed at leading the private sector to overcome structural constraints in terms of innovation, productive restructuring and export promotion. In fact, the perception of a more proactive industrial policy has become a reasonable goal in Latin American countries, since the “visible hand” of public interventions can be discerned in a number of successful initiatives in Asia, Oceania, Europe and even North America (Stiglitz and Lin, 2013).

While there is renewed confidence in the market’s ability to perform a wide range of economic functions, there is also a recognition of its shortcomings in providing the ideal supply and demand conditions needed to ensure socially optimal investment in innovative and welfare-generating economic activities, which are seen as the main drivers of a country’s wealth. This combination is causing national governments to reassess their policies and recognize that their competitive advantages are increasingly based on the assets and capabilities that they develop, and not merely on their natural factor endowments (Dunning and Lundan, 2008).

Based on these findings, the question underlying this research is: what is the relationship between the different configurations and intensities of State intervention (through industrial policy) on the domestic structural conditions and international engagement of Latin American economies?

To answer this question, this article analyses the effects of different configurations and intensities of State intervention, through industrial policy, on the characteristics that define: (i) the domestic structural conditions prevailing in the Latin American countries; and (ii) their international engagement.

The article starts by recognizing that, in the broadest sense of the term, industrial policies embrace a wide range of elements, traditionally comprising not only trade and investment policies, but also policies on science and technology, the promotion of micro, small and medium-sized enterprises, human resource training and regional development. In other words, governments can change the shape and behaviour of economic agents through different types of industrial policy instruments, including trade policy measures, capital controls, regulation, antitrust and competition policy and foreign direct investment (FDI) (Spar, 2009). The concept of industrial policy in this study is based on Rodrik (2008), which views it as encompassing all policies of economic restructuring towards more dynamic activities, whether or not in the industrial sector as such.

As the international community resets the goals for a post-2015 development agenda, it is crucial to ensure that effective industrial policy instruments are available that are consistent with the trajectory, current situation and specific features of the Latin American countries, which serve as mechanisms capable of achieving the proposed goals and make it possible to advance the development agenda in the countries of the region (UNCTAD, 2014).¹

¹ “If macroeconomic policy is tacking uncomfortably close to the ‘business-as-usual’ strategy of the precrisis years, the discussions now under way on a post-2015 development agenda are tending to break with the past [...] The international community faces three principle challenges in fashioning this new approach. The first is aligning any new goals and targets to a policy paradigm that can help raise productivity and per capita incomes everywhere, generate enough decent jobs on a scale to meet a rapidly growing and urbanizing global labour force, establish a stable international financial system that boosts productive investment, and deliver reliable public services that leave no one behind, particularly in the most vulnerable communities. [...] The second challenge to consider in formulating a new development agenda is the massive rise in inequality, which has accompanied the spread of market liberalism. [...] The third challenge is ensuring that effective policy instruments are available to countries to enable them to achieve the agreed goals and advance the development agenda. Restoring a development model that favours the real economy over financial interests, puts sustainability ahead of short-term gains and truly seeks to achieve prosperity for all will almost certainly require adding more instruments to the policy toolkit than is currently contemplated by economic orthodoxy” (UNCTAD, 2014, pp. VI–VII).

Regardless of a country's political and economic orientations, and whatever the precise role played, the State is indispensable for competing in regional and global markets (Haar, 2015). Regardless of the origin of the issues surrounding the industrial policy debate, in the case of Latin America, the State has played a decisive role in development. The key question is no longer “whether” an industrial policy should be adopted, but “with what instruments” and “how” it should be adopted (Devlin and Mogueillansky, 2012; Haar, 2015; Rodrik, 2008).

This article is divided into five sections, including this introduction and the conclusions. Section II sets out theoretical foundations for the domestic structural conditions and international engagement of the Latin American countries in recent years. Section III describes the procedures used to select the countries, the data source and the assumptions underlying the time series fit and the intervention analysis. The fourth section reports the results and analysis, while the fifth and final section presents the conclusions.

II. International engagement and economic growth: the renewed interest in industrial policy in Latin American

The developed countries adopted a range of industrial policies during their industrialization period and continued to do so after World War II. Industrial policy also became a priority on the agenda of many developing country governments, which saw industrialization as a key to unlocking hitherto underutilized resources and addressing structural and technological weaknesses (UNCTAD, 2014).

According to Bielschowsky (1998), the 1960s were characterized by industrialization-oriented reforms, which included a process of international engagement by the developing countries (especially those of Latin America), marked by the dependency and vulnerability of the least developed countries. The author argues that, in that period, the structural conditions of economic growth, technical progress and employment in those countries were characterized by lack of impetus, dependency and structural heterogeneity, giving rise to reformist political agendas.

The 1970s witnessed a reorientation of the development styles of Latin American countries. According to Bielschowsky (1998), the international engagement of these countries was characterized by dependency, indebtedness and insufficient exports; while the structural conditions of economic growth, technical progress and employment reflected an industrialization process that combined policies oriented towards the domestic market and exports, but with limited capacity to sustain economic growth weighed down by the debt burden.

In response to the first oil shock of 1973–1974, the subsequent oil crisis of 1978–1979 and the debt crisis of the 1980s, Latin American countries, which had maintained protectionist policies through the 1950s and 1960s, started to liberalize their economies as a development strategy (Biglaiser and DeRouen, 2006). Governments in the region began to integrate their economies more fully into the global economy, by lowering trade barriers, privatizing State-owned enterprises, and eliminating controls on prices and capital accounts (Hernández and Parro, 2008; Williams, 2015).

The phases defined in the preceding paragraphs are grouped into three intervention periods (see table 1). The first, encompassing the 1960s, 1970s and 1980s, corresponds to the period in which industrial policies implemented in Latin America were based on “inward-looking development” strategies (see table 1).

Table 1
First intervention and period of “inward-looking development”

Phase	International engagement	Domestic structural conditions
Reforms adopted in the 1960s, and industrial policies implemented to facilitate industrialization.	Dependency, international policy to reduce vulnerability in less developed countries (periphery).	Lack of impetus, dependency and structural heterogeneity that pointed to reformist political agendas.
Reorientation of development styles and industrial policies for greater export diversification.	Dependency, indebtedness and export insufficiency.	Industrialization, combining the domestic market and export promotion. Limited capacity to sustain economic growth under the debt burden.
1980s and overcoming the external debt crisis through policies to foster adjustment with growth.	Fiscal crisis that highlighted the need to liberalize markets.	Adjustment with growth. Need for foreign direct investment (FDI) inflow policies and stabilizing shocks. Debt crisis resulting in macroeconomic and fiscal constraints.

Source: Prepared by the authors.

Since the early 1980s, industrial policy has largely ceased to be a priority in the development agenda of many countries, and Latin America is no exception. This occurred partly as a reaction to evidence of specific policy mistakes and abuses; but it reflected a more ideologically driven debate that blamed government failures much more than market failures for slow economic development and emphasized the need for market liberalization (UNCTAD, 2014).

Bielschowsky (2009) characterizes the 1990s in Latin America as a period of trade liberalization and international engagement, based on inefficient export specialization and vulnerability generated by capital movements. The author argues that the industrial policies developed in this period generally sought to nurture a production base that would combine continuous productivity growth and competitive engagement in the international economy. However, the structural conditions of economic growth and technical progress posed difficulties in implementing an effective productive and social transformation.

The regulatory reforms introduced since the 1990s were an important component of a reform agenda aimed at keeping Latin America at the forefront of FDI attraction (World Bank/CAF, 2013). According to Devlin and Moguillansky (2012), many concerned governments started to question the merits of deregulation and FDI attraction policies in developing countries, given the disappointing growth experiences in the 1980s and 1990s. The authors further argue that the emergence of major competitive challenges to trade arising from the process of economic liberalization and the questioning of the Washington Consensus allowed the State gradually to re-emerge as an active promoter of productive transformation and economic development.²

The second intervention period spans the 1990s, plus the period between 1998 and 2003 and then 2003–2008. The period is characterized by “outward-looking development” and reflects the industrial policies formulated and implemented by governments in the region prior to the subprime financial crisis of 2008. Table 2 summarizes the three phases that characterize this intervention period in terms of the configuration of international engagement and structural conditions.

² The Washington Consensus represents a set of policies, based mainly on fiscal austerity, privatization and market liberalization, that were deployed to solve Latin America’s problems in the 1980s and 1990s (Vicente, 2009). It advocated the State’s withdrawal from the economy, either as an entrepreneur or as a regulator of national and international transactions, to allow the region’s economies to submit to market forces (Bandeira, 2002). According to the Washington Consensus, the root of the problems facing Latin American countries was the development strategy adopted in the post-war period. This was based on the import substitution industrialization model, in which State protection of domestic firms was considered to have reduced their external competitiveness and discouraged exports (Portella Filho, 1994).

Table 2
Second intervention and period of “outward-looking development”

Phase	International engagement	Domestic structural conditions
1990s	Ineffective export specialization and vulnerability caused by capital movements. Actions aimed at increasing trade openness, attracting multinational companies, and competitive participation in the international economy.	Reforms with the central objective of preserving macroeconomic stability. Actions to develop a production base with increased productivity and competitiveness in the international economy.
1998–2003	Weakened international engagement owing to slow growth following the wave of financial and exchange rate crises in the emerging economies.	Crises in emerging economies that slowed economic growth rates and fuelled market volatility.
2003–2008	Consecutive years of growth associated with the commodity price bonanza. A strong impetus for policies to promote and expand international trade in the region.	Period characterized by five consecutive years of economic growth, expansionary fiscal policies, burgeoning international trade and rising commodity prices. Interruption of the development cycle in the region owing to the subprime financial crisis.

Source: Prepared by the authors.

Interest in proactive industrial policies was renewed in the late 1990s, and especially at the turn of the millennium, for several reasons: (i) the accumulating evidence that the most successful developing countries (particularly the newly industrialized economies of East Asia) were those that had adopted a pragmatic approach to the promotion of industrial development, combining macroeconomic and structural policies, protectionism associated with progressive openness to trade and investment, and effective public-private partnership; (ii) a growing recognition that the policies associated with the Washington Consensus were doing little to support modernization and economic diversification in developing countries; and (iii) the acceptance, even by mainstream economists, of the idea that economic development has a “structural” dimension. Logically, within the classical framework, there was increasing recognition of the importance of linkages and learning to accelerate productivity growth and the key role of demand in the dynamic of the economy (UNCTAD, 2014).

In 2008–2014, and especially from the second half of 2009 onwards, there were significant signs of improvement in the region’s economies, including the recovery of industrial production and exports. At the same time, the growth of global activity and international trade volumes fuelled the demand for commodities, the higher prices of which improved the terms of trade (Bárcena, 2010). During this period, government intervention in response to the crisis (of exogenous origin) consisted of countercyclical fiscal policies that mitigated the impact of the crisis on the growth of economic activity in the region. Table 3 summarizes the characteristics of this intervention period in terms of the configuration of international engagement and structural conditions.

Table 3
Third intervention and post-global financial crisis period

Phase	International engagement	Domestic structural conditions
Period after the global financial crisis	Significant signs of improvement in the region’s economies, including the recovery of industrial production and exports. At the same time, growth in the volume of international trade fuelled the demand for commodities.	Structural conditions of economic growth, technical progress and employment characterized by rapid recovery in most Latin American economies. Increase in the level of global activity.

Source: Prepared by the authors.

The orientation of industrial policies has thus shifted in the most recent period. The industrial policy debate has come to focus on a broader and more pragmatic approach: discussions no longer centre on whether industrial policies are necessary, but on how best to implement them, and on the lessons that can be learned (and transferred) from successful industrialization experiences, obviously taking into account the fact that specific policy measures adopted in some countries may not be easily replicable in others (Rodrik, 2008).

These findings show that individual success stories — or the lack of them — are invariably linked to domestic structural conditions and those related to the international engagement of each country, which are unlikely to be replicated elsewhere. This justifies an in-depth study of these analytical dimensions for the case of Latin America.

1. Identification of the intervention periods

In this study, three intervention periods are defined by classifying seven distinct phases. The first three phases encompass: (i) the 1960s, the reform agenda and the economic and sociological theories of stagnation, dependency and structural heterogeneity; (ii) the 1970s and the reorientation of the industrialization process to promote industrial exports; and (iii) the 1980s and debt renegotiation, inflation control and expansionary adjustment. These three phases constitute the first period of intervention, characterized by what Bielschowsky (1998) calls inward-looking development. This period was dominated by the defence of Latin America's industrialization process, the reduction of external vulnerability and domestic structural reforms, all with active participation from the State. In terms of FDI, the inward-looking development period is characterized by policies such as: (i) prohibition of entry and restriction of the operations of multinational firms in the host economy, including prohibition of foreign ownership in a wide range of activities linked to national sovereignty interests; (ii) restrictions on the movement of funds, through bureaucratic controls or tax measures that made it difficult to remit profits, interest or royalties; and (iii) discretionary treatment, in which multinationals were subject to domestic legislation that discriminated between foreign- and domestically-owned firms.

The second intervention period mainly reflects the post-1990s, characterized by an intensification of the market opening and deregulation movement, and the dissemination of measures to promote and attract FDI. The next three phases thus correspond to the second intervention period, characterized by “outward-looking development”, when liberalization reforms predominated in Latin America, and the State played a more role in complementing the process. The fourth phase spans the entire 1990s and the trade liberalization period, with State intervention policies promoting international capital mobility, deregulation and privatization, backdropped by greater regional integration. The fifth phase, based on Aldrighi and Cardoso (2009), Bárcena (2010) and Bielschowsky (1998), which starts in 1998 and ends in 2003, was a period of declining economic activity after a wave of currency crises in emerging economies. State intervention was based on policies associated with the Washington Consensus. The sixth phase, based on Bárcena (2010) and Bielschowsky (1998), starts in 2003 and lasts until 2008. This was a period of economic growth, driven by stronger commodity prices and expansionary fiscal policies. The industrial policy debate focuses on a broader and more pragmatic approach than previously. These three phases jointly constitute the second intervention period, which runs from the 1990s to 2008 (before the subprime financial crisis).

The third intervention period, which begins in 2008 and lasts until 2014, corresponds to the seventh phase identified in this study and represents the post-financial crisis stage. Following Bárcena (2010), it is characterized by a rapid recovery in most of the region's economies. In this period, State intervention — in response to the crisis — takes the form of countercyclical fiscal and monetary policies, which seek to mitigate the impact of the crisis on economic activity across the region. According to Bremmer (2014), the post-2008 period characterizes a new phase, which he calls “guarded globalization” — a more cautious globalization in which developing country governments have become more wary of opening their industries to multinational corporations and seek to protect local interests. They choose the countries and regions with which they want to do business and the sectors in which they will allow capital investment; and they often select the State-owned enterprises they wish to promote, in a process that is very different from globalization: slow-moving, selective and with traces of nationalism and regionalism.

III. Methodological process

1. The data

The variables chosen for the analyses performed in this section represent the two analytical dimensions: the countries' international engagement and the domestic structural conditions. The latter are represented by the following variables: (i) economic growth; (ii) gross fixed capital formation; and (iii) FDI inflows. The variables representing the countries' international engagement are: (i) international trade; (ii) high-tech exports; and (iii) FDI outflows.

The variables selected for the analysis in this section were taken from the World Bank (2016b) database and are described in detail in annex A1. The analyses were performed using the Gnu Regression, Econometrics and Time-series Library (Gretl) statistical software package.

2. Choice of sample countries

This research focuses on the following Latin American economies: (i) Argentina; (ii) Brazil; (iii) Chile; (iv) Colombia; (v) Costa Rica; (vi) Ecuador; (vii) Mexico; (viii) Peru; and (ix) the Bolivarian Republic of Venezuela. The choice of these countries is particularly relevant in the current economic scenario and in the context of the international diffusion of technology, because, although their economies are heterogeneous, their different characteristics and dynamics make it possible to define a relevant framework of comparison. Although the region's countries are very different in many respects, they share a common element: in recent decades, governments have made active use of a variety of industrial policy instruments, with different effects on their domestic structural conditions and their international engagement. Moreover, according to data from the Economic Commission for Latin America and the Caribbean (ECLAC), these nine countries accounted for over 90% of Latin America's gross domestic product (GDP) in 2013, with Mexico and Brazil alone accounting for more than 60% (ECLAC, 2013).

The Latin American countries included in the sample are those participating in research in the FDI Regulations project, published by the World Bank (2010–2013), which are also ranked as upper-middle (UM) or high (H) income countries, according to the World Bank's analytical classification based on the countries' per capita GDP.³ The countries selected for analysis based on this classification are presented in table 4.

Table 4
Latin America (9 countries): ranking of countries by per capita GDP, 2010–2015
(Dollars)

	2010	2011	2012	2013	2014	2015
Low income (L)	≤ 1 005	≤ 1 025	≤ 1 035	≤ 1 045	≤ 1 045	≤ 1 025
Lower-middle income (LM)	1 006–3 975	1 026–4 035	1 036–4 085	1 046–4 125	1 046–4 125	1 026–4 035
Upper-middle income (UM)	3 976–12 275	4 036–12 475	4 086–12 615	4 126–12 745	4 126–12 735	4 036–12 475
High income (H)	> 12 275	> 12 475	> 12 615	> 12 745	> 12 735	> 12 475
Argentina	UM	UM	UM	UM	H	UM
Brazil	UM	UM	UM	UM	UM	UM
Chile	UM	UM	H	H	H	H
Colombia	UM	UM	UM	UM	UM	UM

³ The income-based ranking is updated in July each year for World Bank member economies and all other economies with a population of over 30,000. It serves as the official analytical classification during the World Bank's fiscal year (ending June 30). Therefore, until July of the following year, economies remain in the categories in which they are classified, regardless of any revision of their per capita income data (World Bank, 2016c).

Table 4 (concluded)

	2010	2011	2012	2013	2014	2015
Costa Rica	UM	UM	UM	UM	UM	UM
Ecuador	UM	UM	UM	UM	UM	UM
Mexico	UM	UM	UM	UM	UM	UM
Peru	UM	UM	UM	UM	UM	UM
Venezuela (Bolivarian Republic of)	UM	UM	UM	UM	H	UM

Source: World Bank, "New country classifications by income level: 2016–2017", 2016 [online] <http://blogs.worldbank.org/opendata/new-country-classifications-2016> [accessed on 26 May 2016].

Note: Updates of national accounts data include Argentina, which was temporarily declassified in July 2016 pending the release of revised statistics. It was subsequently classified as an upper middle-income country in 2015.

3. Autoregressive integrated moving average (ARIMA) models

The models used to describe the time series are stochastic processes, in other words processes controlled by probabilistic laws (Morettin and Toloï, 2006). Thus, according to the constructions presented in Morettin and Toloï (2006), a time series could be, in general, a vector $Z(t)$ of order $r \times 1$, where t is a vector of order $p \times 1$. Having obtained the time series, $Z(t)$, ..., $Z(t_1)$, ..., $Z(t_n)$, in this study represented by the series that identify domestic structural conditions and international engagement, the next step is to identify the effects of the relevant periodicities, represented by the three intervention periods defined in section II.1.

In addition, the hypothesis of uncorrelated errors imposes a series of constraints on the validity of time series models that aim to describe the behaviour of series of this type. In such cases, the recommended practice is to fit the series to ARIMA models, which Morettin and Toloï (2006) describe in three different forms.

The first form refers to stationary linear processes represented by:

$$Z_t - \mu = \alpha_t + \psi_1 \alpha_{t-1} + \psi_2 \alpha_{t-2} + \dots = \sum_{k=0}^{\infty} \psi_k \alpha_{t-k}, \psi_0 = 1 \quad (1)$$

In (1), α_t is white noise, $\mu = E(z_t)$ and ψ_1, ψ_2, \dots is a sequence of parameters such that:

$$\sum_{k=0}^{\infty} \psi_k^2 < \infty \quad (2)$$

In this first form, there are three special cases of model (1), namely: (i) an autoregressive process of order p : AR(p); (ii) a moving average process of order q : MA(q); and (iii) an autoregressive and moving average process of origin p and q : ARMA (p, q).

The second form refers to homogeneous nonstationary linear processes — a generalization of stationary linear processes which assumes that the series-generating mechanism produces autocorrelated errors, and that the series are nonstationary in level or slope, or both. In these cases, the series can be made stationary by differencing a finite number of times.

ARIMA models can also be described as long memory processes — that is, stationary processes that have an autocorrelation function that decays very slowly and will require fractional differencing for its analysis.

A widely used methodology for fitting ARIMA models is the Box, Jenkins and Reinsel (1976) approach. According to Morettin and Toloï (2006), this consists of fitting ARIMA (p, d, q) models to a data set. Consequently, the Box, Jenkins and Reinsel (1976) approach includes both autoregressive (AR) and moving average (MA) terms.

In an autoregressive AR(p) model, the data series Z_t is described by its regressed past values and random noise α_t .

$$Z_t = \phi_1 Z_{t-1} + \phi_2 Z_{t-2} + \dots + \phi_p Z_{t-p} + \alpha_t \quad (3)$$

Where $Z_t = Z_t - \mu$. The autoregressive model of order 1, or AR(1), is the simplest version of this class of models and is expressed as:

$$Z_t = \phi_1 Z_{t-1} + \alpha_t \quad (4)$$

In AR models, it is accepted that $\bar{Z}_t = Z_t - \mu$ are the deviations from μ . So, $\bar{Z}_t = \phi_1 \bar{Z}_{t-1} + \phi_2 \bar{Z}_{t-2} + \dots + \phi_p \bar{Z}_{t-p} + \alpha_t$ is an autoregressive process of order p , denoted by AR(p). That is, the series is represented by a weighted sum of p previous observations of the series plus a random term. Then, by defining the autoregressive operator as $\phi(B) = 1 - \phi_1 B - \dots - \phi_p B^p$, where $B^p Z_t = Z_{t-p}$ is the lag operator, it can be described as $\phi(B)\bar{Z}_t = \alpha_t$ where α_t is the residual, in other words the noise.

The moving average process MA(q) is represented by:

$$Z_t = \mu + \alpha_t - \theta_1 \alpha_{t-1} - \dots - \theta_q \alpha_{t-q} \quad (5)$$

where $\bar{Z}_t = Z_t - \mu$.

Moving average (MA) models admit a process $\bar{Z}_t = \alpha_t - \theta_1 \alpha_{t-1} - \theta_2 \alpha_{t-2} - \dots - \theta_q \alpha_{t-q}$, which views the series as a weighted sum of q previous observations of the noise, and α_t is called a moving average process of order q , denoted by MA(q). The moving average operator can then be defined by $\theta(B) = 1 - \theta_1 B - \theta_2 B^2 - \dots - \theta_q B^q$ which can be written as $\bar{Z}_t = \theta(B)\alpha_t$.

Consequently, the mixed autoregressive and moving average model (ARMA) includes both autoregressive and moving average terms and is represented by ARMA(p, q):

$$\bar{Z}_t = \phi_1 \bar{Z}_{t-1} + \dots + \phi_p \bar{Z}_{t-p} + \alpha_t - \theta_1 \alpha_{t-1} - \theta_q \alpha_{t-q} \quad \text{ou} \quad \phi(B)\bar{Z}_t = \theta(B)\alpha_t \quad (6)$$

It is generally assumed that the series is purely random, or independent white noise, with zero mean and constant variance (Wooldridge, 2011). In practice, however, many series exhibit some form of non-stationarity; and, according to Wooldridge (2011), economic series, in particular, have a tendency to grow over time, so ignoring this fact can lead to erroneous conclusions. Since the series are assumed to be stationary, the original data need to be transformed. The most common procedure consists of taking successive differences in the series until a stationary series is obtained (Moretton and Tolo, 2006).

Moretton and Tolo (2006) argue that in some cases it will be sufficient to take one or two differences for the series to become stationary. The number of differences needed to make a series stationary is called the order of integration (d). According to the aforementioned authors, inclusion of the order of integration term makes it possible to use the ARIMA (p, d, q) models given by equation $W_t = \Delta^d Z_t$. They argue that, for ARIMA models, if $W_t = \Delta^d Z_t$ is stationary, W_t can be represented by an ARMA (p, q) model, as follows: $\phi(B)\bar{W}_t = \theta(B)\alpha_t$. If W_t is a difference of Z_t , then Z_t follows a autoregressive integrated moving average (ARIMA) model of order (p, d, q), namely $\phi(B)\Delta^d \bar{Z}_t = \theta(B)\alpha_t$.

4. Intervention models

Intervention models analyse the occurrence, at a certain point in time t (known *a priori*) of an event of some kind that may manifest itself later and which affects the series being analysed, either temporarily or permanently (Morettin and Toloï, 2006).

Intervention analysis consists specifically in evaluating the impact of such an event on the behaviour of the series. Morettin and Toloï (2006) argue that economic series, in particular, are often affected by exogenous events that manifest themselves through changes in the level or slope of the series at a given moment. Thus, an intervention can affect a time series in several ways. Its manifestation may be abrupt or residual, and its duration may be permanent or temporary.

The greatest effects caused by interventions usually entail a change in the level, direction or slope of the series. The model can be expressed by:

$$Y_t = \sum_{i=1}^k v_i(B)X_{it} + n_t \quad (7)$$

where Y_t is the model's response variable; k is the number of interventions in the series; $v_i(B)$ the value of the transfer function; X_{it} the binary variable; and n_t the model noise, represented by an ARIMA model.

In this study, intervention models are constructed by augmenting the ARIMA models with the effects of exogenous variables; in other words the effects of temporary historical and macroeconomic events associated with the government intervention, on the behaviour of the series representing domestic structural conditions (economic growth, gross fixed capital formation and FDI inflows) and international engagement (international trade, high-technology content exports and FDI outflows).

The intervention variables incorporated into the model were selected on the basis of historical events that represent different intensities and configurations of State interventions in Latin American countries. The classification of the periods is based primarily on the work of Bielschowsky (1998), complemented by contributions from Aldrighi and Cardoso (2009), Bárcena (2010), Biglaiser and DeRouen (2006), Bremmer (2014), Devlin and Moguillansky (2012), Machinea and Vera (2006) and Rodrik (2008).

In this study, the intervention analysis is based on the three distinct periods defined in section II.1.

IV. Results and analysis

This section presents the results obtained for the ARIMA and intervention models fitted to the Latin American countries included in sample, in the following order: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Peru and the Bolivarian Republic of Venezuela.

1. Argentina

Estimations of the fit of the ARIMA model for Argentina are reported in table 5, comprising: (i) a model with autoregressive and integrated structure for the variable "FDI inflows"; (ii) a model with autoregressive and moving average structure for the variable "high-tech exports", and (iii) a model with autoregressive, integrated and moving average structure for the variable "FDI outflows".

Table 5
Argentina: Estimations of the ARIMA and intervention parameters

	Coefficient	Standard error	z	p-value
Economic growth				
Outward-looking development	3.98042	1.31403	3.029	0.0025 ***
FDI inflows ARIMA(1,1,0)				
Phi_1	-0.331300	0.140005	-2.366	0.018 **
High-tech exports ARMA(1,1)				
Phi_1	0.623372	0.182174	3.422	0.0006 ***
Theta_1	-1.00000	0.157732	-6.340	2.30e-010 ***
FDI outflows ARIMA(1,1,1)				
Constant	-0.00803544	0.004124	-1.949	0.0513 *
Phi_1	0.374805	0.142553	2.629	0.0086 ***
Theta_1	-1.00000	0.063339	-15.79	3.76E-56 ***

Source: Prepared by the authors.

Note: *significant $p < 0.05$; **highly significant $p < 0.01$; ***highly significant $p < 0.001$.

The results obtained indicate that the interventions characterizing the “inward-looking development” period in the region — that is, the 1960s, 1970s and 1980s — were unable to modify the behaviour of any of the series analysed (see table 5). Table 5 does not report the results that were not significant after fitting the model. It is therefore concluded that the results were only significant when the “outward-looking development” period is considered and the variable for which behaviour was modified was economic growth.

Between the end of World War II and the mid-1970s, industrial policies in Argentina pursued import substitution; the main instruments being tariff and non-tariff barriers to imports, taxes on agricultural exports, various exchange rate regimes, subsidies and tax credits for investments in manufacturing industry (Sánchez, Butler and Rozemberg, 2011). In general, these three decades were dominated by protection for Latin America’s industrialization process, the reduction of external vulnerability and domestic structural reforms, all with the active participation of the State (Bielschowsky, 1998).

With respect to the next three phases, which correspond to the period of “outward-looking development” — characterized by liberalizing reforms in Latin America, with more passive State action complementary to this process — the results indicate that the intervention was significantly and positively related only to Argentina’s economic growth. In this period, which coincides with the formation of the Southern Common Market (MERCOSUR) in 1991, industrial policies were not abandoned but less emphasis was placed on them; so they became oriented towards strengthening competitiveness in a more open economic environment (Sánchez, Butler and Rozemberg, 2011).

In the period following the global financial crisis (2008–2014), this did not change the behaviour of any of the series analysed (see table 5). In fact, this period is characterized by rapid recovery in most of the region’s economies. However, the intervention periods tested, in which policies are implemented to enhance competitiveness in order to participate in global markets (Melo and Rodríguez-Clare, 2006) and mitigate the impact of the global financial crisis on economic activity (Bielschowsky, 1998), did not contribute to changes in any of the time series analysed.

2. Brazil

The results for Brazil show that the interventions corresponding to the region’s inward-looking development period boosted the economic growth and gross fixed capital formation series (see table 6). This period, between the post-war years and the end of the 1970s, is one of rapid industrialization accompanied

by nationalist developmentalism and State interventionism, which combined the political forces and economic interests of the industrialization project (Suzigan and Furtado, 2006). These three decades were dominated by protection of the industrialization process and domestic structural reforms, with active State participation.

Table 6
Brazil: Estimations of the ARIMA and intervention parameters

	Coefficient	Standard error	z	p-value
Economic growth AR(1)				
Phi_1	0.462032	0.124966	3.697	0.0002 ***
Inward-looking development	6.16003	1.21386	5.075	3.88e-07 ***
Outward-looking development	2.73969	1.32122	2.074	0.0381 **
Gross fixed capital formation AR(1)				
Constant	18.2378	1.08609	16.79	2.78e-063 ***
Phi_1	0.733381	0.144691	5.069	4.01e-07 ***
Inward-looking development	3.87548	1.61253	2.403	0.0162 **
High-tech exports ARIMA(1,1,0)				
Phi_1	0.439195	0.174138	2.522	0.0117 **
FDI outflows ARIMA(1,1,0)				
Phi_1	-0.717119	0.100574	-7.130	1.00E-12 ***

Source: Prepared by the authors.

Note: *significant $p < 0.05$; **highly significant $p < 0.01$; ***highly significant $p < 0.001$.

In the outward-looking development period, which is identified by a series of liberalizing reforms in the region and a more passive State, the results show that intervention only modified (positively) the behaviour of Brazil's economic growth series. The 1990s witnessed the exhaustion of the import substitution model and the elimination of protection mechanisms for the industrial sector. This led to the opening up of the Brazilian economy, and, at the same time, the roll-out of privatization and deregulation programmes (Coronel, Azevedo and Campos, 2014; Suzigan and Furtado, 2006). The period also coincides with the formation of MERCOSUR in 1991. Although industrial policies were not abandoned, they ceased to be a priority in Brazil's economic policy agenda.

The intervention in 2008–2014 did not change the behaviour of any of the series analysed. However, in the inward-looking development period, the behaviour of the economic growth and gross fixed capital formation variables changes; and, in the outward-looking development period the behaviour of economic growth variable is altered. Table 6 does not report the results that were not significant after fitting the model. This intervention characterizes the period following the financial crisis, which was one of rapid recovery in most Latin American countries, including Brazil. State intervention was based on implementing countercyclical fiscal and monetary policies to mitigate the impact of the crisis on economic activity in the region.

3. Chile

The results for Chile show that the intervention that characterizes the period of inward-looking development (comprising the 1960s, 1970s and 1980s) only modified (positively) the behaviour of the FDI outflows series (see table 7). This intervention characterizes a period in which domestic structural reforms and the implementation of a unilateral trade liberalization policy predominated in the country.

Table 7
Chile: Estimations of the ARIMA and intervention parameters

	Coefficient	Standard error	z	p-value
Economic growth ARMA(1,1)				
Constant	4.41086	0.754909	5.843	5.13e-09 ***
Phi_1	-0.543451	0.127358	-4.267	1.98e-05 ***
Theta_1	1	0.065637	15.24	2.06e-052 ***
Gross fixed capital formation ARIMA(1,1,1)				
Phi_1	0.704025	0.136737	5.149	2.62e-07 ***
Theta_1	-1.00000	0.074683	-13.39	6.93e-041 ***
Outward-looking development	2.86977	1.58419	1.812	0.0701 *
Global financial crisis	4.47275	1.69919	2.632	0.0085 ***
FDI inflows ARIMA(1,1,1)				
Constant	0.231501	0.027782	8.333	7.89e-017 ***
Phi_1	0.266776	0.157375	1.695	0.0900 *
Theta_1	-1.00000	0.069796	-14.33	1.47e-046 ***
FDI outflows ARIMA(1,1,1)				
Constant	-2.61969	1.12258	-2.334	0.0196 **
Phi_1	0.389821	0.155731	2.503	0.0123 **
Theta_1	-1.00000	0.071585	-13.97	2.39e-044 ***
Inward-looking development	2.67167	1.13426	2.355	0.0185 **
Outward-looking development	2.72713	1.10487	2.468	0.0136 **
Global financial crisis	2.6519	0.973648	2.724	0.0065 ***

Source: Prepared by the authors.

Note: *significant $p < 0.05$; **highly significant $p < 0.01$; ***highly significant $p < 0.001$.

The intervention that characterizes the outward-looking development period (from the 1990s to 2007) positively and significantly modified the behaviour of the gross fixed capital formation and FDI outflows series. Table 7 does not report the results that were not significant after fitting the model.

Since the 1990s, Chile's industrial policy repertoire can broadly be characterized as well-coordinated, horizontal and export-oriented, with the Production Development Corporation (CORFO) serving as the country's main development agency (Agosin, Larraín and Grau, 2010). The government complemented the unilateral trade liberalization of the 1980s with an extensive programme of bilateral free trade agreements (Aninat and others, 2010).

Interventions in the period following the global crisis positively influenced the behaviour of the gross fixed capital formation and FDI outflows series. This intervention reflects a period in which, according to Agosin, Larraín and Grau (2010), Chilean industrial policy embarked on a process of transition from a model based on horizontal policies to a new model based on vertical industrial policies targeted on specific groups of industries. This process, based on the correction of market failures, prevailed from the 1980s until around 2000.

4. Colombia

The results for Colombia show that the intervention periods prior to the 1990s — those corresponding to “inward-looking development” — were unable to modify the behaviour of any of the series analysed (see table 8). According to Meléndez and Perry (2010), although, like other Latin American countries, Colombia pursued an import substitution industrialization strategy from 1950 until the early 1990s, from 1967 onward the strategy was hybridized by adding export promotion to import substitution. The aforementioned authors argue that the main policy instruments used to implement the import substitution model included trade protectionism, tax exemptions and subsidized credit.

Table 8
Colombia: Estimations of the ARIMA and intervention parameters

	Coefficient	Standard error	z	p-value
Economic growth ARIMA(1,1)				
Phi_1	0.986632	0.023572	41.86	0.00E+00 ***
Theta_1	-0.635198	0.21847	-2.907	0.0036 ***
FDI inflows ARIMA(1,1,1)				
Constant	0.099417	0.014351	6.927	4.29e-012 ***
Phi_1	0.289042	0.147583	1.959	0.0502 *
Theta_1	-1.00000	0.062073	-16.11	2.17e-058 ***
High-tech exports(1,1)				
Phi_1	0.716328	0.108296	6.615	3.73e-011 ***
Theta_1	-1.00000	0.078472	-12.74	3.39e-037 ***
Outward-looking development	0.432655	0.11506	3.76	0.0002 ***
FDI outflows ARIMA(1,1,1)				
Phi_1	-0.308372	0.141821	-2.174	0.0297 **
Theta_1	-0.999999	0.075209	-13.30	2.43e-040 ***
Outward-looking development	0.066992	0.007546	8.878	6.82e-019 ***

Source: Prepared by the authors.

Note: *significant $p < 0.05$; **highly significant $p < 0.01$; ***highly significant $p < 0.001$.

Interventions become significant from the 1990s onwards and characterize the period of “outward-looking development”, dominated by the protection of Latin America’s industrialization process, the reduction of external vulnerability and domestic structural reforms, all with the active State participation (Bielschowsky, 1998). This intervention period positively modified the behaviour of the high-tech exports and FDI outflows series (although to a lesser extent in the latter).

In Colombia, this period is characterized by the implementation of policies to eliminate a large part of the trade protection institutions and instruments, capital account liberalization and several other measures that changed the nature of industrial policies. The paradigm shifted from a model based on protectionism to a more open economy from the start of the 1990s (Meléndez and Perry, 2010).

In contrast, intervention in the post-global crisis period (2008–2014) did not change the behaviour of any of the series analysed. In the most recent period, Colombian industrial policies have been largely selective and highly sectoral (Meléndez and Perry, 2010). This intervention characterizes the period following the financial crisis, which saw rapid recovery in most Latin American countries, including Colombia. Table 8 does not report results that were not significant after fitting the model.

5. Costa Rica

The results show that the interventions characterizing the inward-looking development, outward-looking development and post global financial crisis periods had positive effects only on the behaviour of the economic growth series (see table 9). Table 9 does not report results that were not significant after fitting the model.

The results obtained for the intervention in the inward-looking development period reflect not only the 1960s and 1970s, when industrial policy instruments based on State protectionism and the “entrepreneurial state” model were adopted in Costa Rica, but also the period following the economic crisis of the early 1980s. Although interventionist industrial policies were not abandoned in the latter period, their nature and objectives were changed to align with a new vision that sought to promote non-traditional exports to markets outside Central America. This meant changing industrial policy instruments, target sectors and beneficiaries (Monge-González, Rivera and Rosales-Tijerino, 2010). Accordingly, this period is characterized by an inward-looking economic strategy that was deployed during the 1960s, 1970s and part of the 1980s (Bielschowsky, 1998).

Table 9
Costa Rica: Estimations of the ARIMA and intervention parameters

	Coefficient	Standard error	z	p-value
Economic growth MA(1)				
Theta_1	0.557633	0.122807	4.541	5.61e-06 ***
Inward-looking development	4.81883	0.854516	5.639	1.71e-08 ***
Outward-looking development	4.86091	0.954928	5.09	3.57e-07 ***
Global financial crisis	2.59415	1.42713	1.818	0.0691 *
Gross fixed capital formation ARIMA(1,1,0)				
Constant	4.74098	0.70175	6.756	1.42E-11 ***
Phi_1	0.426795	0.128572	3.32	0.0009 ***
FDI outflows ARIMA(1,1,1)				
Phi_1	-0.305765	0.137118	-2.230	0.0258 **
Theta_1	-0.512060	0.166541	-3.075	0.0021 ***

Source: Prepared by the authors.

Note: *significant $p < 0.05$; **highly significant $p < 0.01$; ***highly significant $p < 0.001$.

The policies implemented in the 1990s – which in this study are represented by the second intervention period (corresponding to outward-looking development) and show changes only in the behaviour of the economic growth variable— reflect a period of State intervention associated with the Washington Consensus.

The intervention that characterizes the post-financial crisis period (2008–2014) and influences the behaviour of the economic growth series corresponds to a period in which economic policies pursued increasing integration into the international economy. Thus, especially since the last decade, the implementation of a policy based on free trade agreements, in conjunction with the export promotion strategy of the last two decades, made attracting FDI a pillar of Costa Rica's growth (Monge-González, Rivera and Rosales-Tijerino, 2010). However, the behaviour of these variables was not modified during this period of analysis.

6. Ecuador

The results obtained for Ecuador indicate that the intervention characterizing the inward-looking development period did not alter the behaviour of any of the series analysed (see table 10). Table 10 does not report the results that were not significant after model fit.

Table 10
Ecuador: Estimations of the ARIMA and intervention parameters

	Coefficient	Standard error	z	p-value
Economic growth ARIMA(1,1,1)				
Phi_1	0.415984	0.137282	3.03	0.0024 ***
Theta_1	-1.00000	0.117616	-8.502	1.86e-017 ***
Gross fixed capital formation ARIMA(1,1,0)				
Phi_1	-0.318841	0.13705	-2.326	0.0200 **
Global financial crisis	0.996318	0.577856	1.724	0.0847 *

Source: Prepared by the authors.

Note: *significant $p < 0.05$; **highly significant $p < 0.01$; ***highly significant $p < 0.001$.

The structural adjustment programmes implemented in Ecuador began in the 1980s and sought greater trade liberalization. The priority objectives were economic recovery, adjustment and economic stabilization, which led to a significant reduction in the role of the State as planner and regulator of

economic activity. There was no formally structured industrial policy in this country until the 1990s (Ministry for the Coordination of Production, Employment and Competitiveness/Ministry of Industry and Productivity, 2016).

The intervention that characterized the period of outward-looking development and prior to the global financial crisis did not change the behaviour of any of the series analysed.

The intervention that characterized the period following the global financial crisis only modified the behaviour of the gross fixed capital formation series (see table 10). The policies adopted in Ecuador in this period, include those of the Ministry of Industries and Productivity, the Industrial Policy of Ecuador 2008–2012 and the Institutional Strategic Plan 2011–2013. These aimed to nurture the development of national industry, through public policies and programmes, with a view to raising levels of quality, productivity and competitiveness (Coordinating Ministry of Production, Employment and Competitiveness/Ministry of Industries and Productivity, 2016).

7. Mexico

The results for Mexico indicate that the intervention characterizing the inward-looking development period (the 1960s, 1970s and 1980s) did not change the behaviour of any of the series analysed (see table 11). Table 11 does not report the results that were not significant after model fit.

Table 11
Mexico: Estimations of the ARIMA and intervention parameters

	Coefficient	Standard error	z	p-value
Economic growth AR(1)				
Constant	3.74967	0.67551	5.551	2.84E-08 ***
Phi_1	0.298475	0.135397	2.204	0.0275 **
Gross fixed capital formation ARIMA(1,1,2)				
Phi_1	0.686771	0.134888	5.091	3.55e-07 ***
Theta_1	-0.725219	0.179953	-4.030	5.58e-05 ***
Theta_2	-0.274781	0.155734	-1.764	0.0777 *
FDI inflows ARIMA(1,1,0)				
Phi_1	-0.466714	0.1445	-3.230	1.20E-03 ***
International trade ARIMA(2,1,1)				
Constant	0.881001	0.122849	7.171	7.42e-013 ***
phi_1	0.82687	0.131533	6.286	3.25e-010 ***
phi_2	-0.390884	0.130074	-3.005	0.0027 ***
theta_1	-1.00000	0.058491	-17.10	1.57e-065 ***
Outward-looking development	0.539929	0.233057	2.317	0.0205 **
FDI outflows ARIMA(1,1,0)				
Phi_1	-0.410740	0.153539	-2.675	7.50E-03 ***

Source: Prepared by the authors.

Note: *significant $p < 0.05$; **highly significant $p < 0.01$; ***highly significant $p < 0.001$.

From the 1940s until the second half of the 1970s, Mexico's economic development was based on robust State intervention to promote industrialization through import substitution and the adoption of protectionist policies. These included: (i) an import licensing requirement; (ii) officially set prices for imported goods; (iii) a ban on imports of a range of products obtained from abroad; and (iv) stringent regulation of FDI (Moreno-Brid, Rivas and Santamaría, 2005).

Between the early 1950s and the early 1970s, Mexico implemented an economic model known as “stabilizing development”. Although the pillars of the import substitution model were maintained, in those two decades a set of economic measures were implemented that prioritized monetary stabilization, the reduction of balance of payments deficits, and measures such as exchange rate devaluation and the creation of mechanisms to attract FDI (Iglecias, Cardoso and Neves Streich, 2014).

In the case of Mexico, the intervention represented by the period of outward-looking development and prior to the global financial crisis only modified (positively) the behaviour of the international trade series. Since the mid-1980s, the Mexican economy started to operate under a liberal economic model, in which the economic policies had been established in the 1990s, based on the principles of the Washington Consensus (Calderón and Sánchez, 2012). Since the early 1990s, especially since the implementation of the North American Free Trade Agreement (NAFTA), State intervention was reduced, and neoliberal reforms were deepened through the process of privatization of State-owned enterprises, trade deregulation, Mexico’s admission into NAFTA and the deregulation of FDI (Iglecias, Cardoso and Neves Streich, 2014).

The results of this study show that the intervention that characterized the post-financial crisis period did not modify the behaviour of any of the series analysed for Mexico.

8. Peru

The results reported in table 12 show that the period of inward-looking development (the 1960s, 1970s and 1980s) only modified (positively) the behaviour of the economic growth series (see table 12).

Table 12
Peru: Estimations of the ARIMA and intervention parameters

	Coefficient	Standard error	z	p-value
Economic growth AR(1)				
Phi_1	0.394873	0.137625	2.869	0.0041 ***
Inward-looking development	2.4205	1.42934	1.693	0.0904 *
Outward-looking development	4.55783	1.62294	2.808	0.0050 ***
Global financial crisis	4.21665	2.50132	1.686	0.0918 *
Gross fixed capital formation ARIMA(0,1,1)				
Theta_1	0.214174	0.114255	1.875	0.0609*
International trade				
Outward-looking development	2.03125	1.13326	1.792	7.31E-02 ***

Source: Prepared by the authors.

Note: *significant $p < 0.05$; **highly significant $p < 0.01$; ***highly significant $p < 0.001$.

The intervention that characterized the 1990s affected (positively) the behaviour of the economic growth and international trade series, as shown in table 12, which does not report the results that were not significant after fitting the model.

In the late 1980s, the Peruvian government started to adopt liberal policies and implement economic reforms (Prado, 2014).

The liberalization, privatization and deregulation policies adopted in the early 1990s contributed to macroeconomic adjustment and control of inflation and public debt; they also consolidated the structural reforms implemented to deregulate and privatize the economy (IMF, 2015).

In this study, the intervention representing the period after the global financial crisis (2008–2014) only modified (positively) the behaviour of the economic growth series.

9. Bolivarian Republic of Venezuela

The results obtained for the Bolivarian Republic of Venezuela show that the intervention period corresponding to inward-looking development did not alter the behaviour of any of the series analysed (see table 13). Table 13 does not report results that were not significant after fitting the model.

Table 13

Bolivarian Republic of Venezuela: Estimations of the ARIMA and intervention parameters

	Coefficient	Standard error	z	p-value
Economic growth				
Outward-looking development	3.55847	1.25173	2.843	0.0045 ***
Gross fixed capital formation AR(1)				
Constant	22.178	1.62985	13.61	3.62e-042 ***
Phi_1	0.704271	0.097842	7.198	6.11e-013 ***
FDI inflows ARIMA(1,1,0)				
Phi_1	-0.433137	0.138245	-3.133	0.0017 ***
FDI outflows				
Constant	0.189834	0.093235	2.036	0.0417 **
Outward-looking development	0.497542	0.122874	4.049	5.14e-05 ***

Source: Prepared by the authors.

Note: *significant $p < 0.05$; **highly significant $p < 0.01$; ***highly significant $p < 0.001$.

The discovery of oil, and its industrial extraction leveraged by foreign oil companies, contributed to changes in the Venezuelan production structure starting in the 1940s and 1960s. Based on the import substitution model, the Venezuelan State deployed policies to foster the formation of a more diversified production base (Levy-Carciente, 2013). However, none of the interventions of this period were significant.

On the other hand, the intervention that characterized the period of outward-looking development and prior to the global financial crisis did affect (positively) the behaviour of the economic growth series and FDI outflows. An important development in the 1990s in the Bolivarian Republic of Venezuela was the adoption of measures to eliminate non-tariff barriers, promote exports and deepen integration into the international economy (Levy-Carciente, 2013). In the Bolivarian Republic of Venezuela, this period reflects a set of policies adopted to increase the role of the State in the economy, not only as a regulator of economic activity, but also as the owner of the means of production (Guerra, 2013). The period is also characterized by an expansionary budgetary policy, formally established with the Economic and Social Development Plan of the Nation 2001–2007. This aimed to develop a diversified production system, open to international markets, and with the State participating in strategic sectors, but with openness to private investment to develop the later stages of the industrial fabric (Guerra, 2013).

The intervention in the period following the global financial crisis did not alter the behaviour of any of the series analysed for the Bolivarian Republic of Venezuela.

10. Summary of results

The results obtained show that interventions analysed did not significantly alter the behaviour of the series considered, except economic growth in the following cases: (i) for Argentina and the Bolivarian Republic of Venezuela in the outward-looking development period; (ii) for Brazil in the inward and outward-looking development periods; and (iii) for Costa Rica and Peru in all three intervention periods analysed.

Apart from these cases, the interventions proved to be quite self-contained; and no behavioural pattern could be detected for the sample of countries in terms of temporal shifts in the behaviour of the time series associated with the three intervention periods analysed.

In terms of gross fixed capital formation, the results indicate that: (i) in Brazil, the behaviour of this series was only modified (positively) during the inward-looking development period; (ii) in the case of Chile, it was altered (positively) in the outward-looking development periods and in the period following the global financial crisis; and (iii) in Ecuador there were also positive shifts in the behaviour of this series in the period following the global financial crisis. For most of the other countries, the effects revealed concern the trend component and gradual changes in the behaviour of the series (fluctuations around a straight line, with a positive or negative slope). The exceptions were Ecuador and the Bolivarian Republic of Venezuela, for which the trend component was not observed in this series. In fact, gross capital formation has proven to be one of the main challenges for resuming the path of vigorous and systematic growth in the region.

In the case of FDI inflows, no intervention was significant for the countries analysed. The results show that the FDI inflows series behaved like most economic series, in the period under review, since it presented only the trend component (with a positive or negative slope). The same applies to the variables of international trade, high-tech exports and FDI outflows. The exceptions are changes in the following series: (i) international trade for the intervention corresponding to the outward-looking development period in Mexico; (ii) high-tech exports during the outward-looking development period in Colombia, and (iii) FDI outflows in the three intervention periods for Chile and during the outward-looking development period in both Colombia and the Bolivarian Republic of Venezuela.

The results for the FDI outflows series in Chile, Colombia and Peru reveal behavioural shifts from the 1990s onwards. In the case of Chile, the effect begins in the inward-looking development period and extends into the period following the global financial crisis. This result reflects the recent intensification of the process of internationalization of the Latin American economies, in which FDI flows originating in the region itself started to increase through cross-border investment by Latin American multinational companies, known as “multilatinas”. For the other countries, the effects identified refer to the trend component (except for the Bolivarian Republic of Venezuela, for which no trend component was observed in this variable).

No significant results were found for the intervention characterizing the inward-looking development period for the FDI outflows variable, except in the case of Chile. This partly reflects the import substitution period in which Latin American firms were protected from foreign competition and faced limited competition domestically.

V. Final remarks

This article answers the question initially posed and achieves its objective of analysing the impact of different industrial policy configurations on the growth and international engagement of a selected group of nine Latin American countries. The study finds that the interventions analysed did not significantly modify the behaviour of the series examined, except in the case of economic growth. For the other variables, the interventions were quite self-contained, and no behavioural shift based on the intervention periods analysed was observed.

In fact, the results reported in this study reflect not only the uncertainty and negative shocks pervading the global economy, but also the sharp decline in consumption and domestic investment. Undoubtedly, economic activity slowed more rapidly in Latin America than in other emerging regions, and this accentuated slowdown partly reflects the role of commodity prices. The impossibility of identifying uncertainty and negative shocks in the global economy, the sharp fall in consumption and domestic investment, and the role of commodity prices in the analysis is a shortcoming of this study. However, these issues also suggest a direction for future research.

Lastly, the region has undergone profound economic and social transformations in recent decades. However, the challenges that remain include the need to place greater emphasis on building new skills and reducing barriers to economic activity, such as precarious infrastructure and inflexible, bureaucratic regulation; and the need to boost investment in gross fixed capital formation. Historically, rates of gross fixed capital formation in Latin America have been lower than those of other developing regions — particularly in terms of investment in machinery and equipment, which is usually associated with productivity. As a result, productivity cannot be maintained at sustainable levels.

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Annex A1

Table A1.1
Description of the selected variables and their respective periods of analysis

Dimension	Variable	Description	Period
Domestic growth conditions	Economic growth	Annual growth of gross domestic product (GDP) at constant local currency market prices.	1966–2014 for all countries.
	Gross fixed capital formation	Includes land improvements; plant, machinery and equipment purchases; construction of roads, railroads, schools, offices, hospitals, private residential housing and buildings.	1966–2014 for all countries, except Brazil 1970–2014.
	Inflows of foreign direct investment (FDI)	Net investment inflows to acquire a long-term organizational interest (10% or more of the voting shares) in an enterprise operating in an economy other than that of the investor. Includes the sum of equity capital, reinvested earnings and other short-term and long-term capital.	Argentina, Colombia, Mexico and Peru 1970–2014; Brazil and Chile 1975–2014; Costa Rica 1977–2014; Ecuador 1976–2014; the Bolivarian Republic of Venezuela 1970–2013.
International engagement	International trade	Sum of exports and imports of goods and services measured as a percentage of GDP.	1966–2014 for all countries.
	High-tech exports	High-tech exports of R&D-intensive products, such as aerospace, computers, pharmaceuticals, scientific instruments and electrical machinery.	Argentina 1992–2014; Brazil 1989–2014; Chile 1990–2014; Colombia 1991–2014; Costa Rica 1994–2013; Ecuador 1990–2014; Mexico 1989–2014; Peru 1992–2014; the Bolivarian Republic of Venezuela 1990–2014.
	FDI outflows	Cross-border investment associated with a resident that has control, or a significant degree of influence, over the management of an enterprise in another economy. Includes the sum of equity capital, reinvested earnings and other types of capital. Ownership of 10% or more of the ordinary shares of voting capital is the criterion for determining the existence of a direct investment relationship.	Argentina, Brazil and Colombia 1970–2014; Chile and Costa Rica 1976–2014; Ecuador 1980–2014; Mexico 1979–2014; Peru 1981–2014; the Bolivarian Republic of Venezuela 1980–2013.

Source: Prepared by the authors, on the basis of World Bank, World Development Indicators [online database] <http://databank.worldbank.org/data/home.aspx> [accessed on 26 May 2016].