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Weak Expansions: A distinctive feature of the business cycle in Latin America and the Caribbean

Esteban Pérez Caldentey, Daniel Titelman and Pablo Carvallo

Abstract

Using two standard business cycle methodologies and a comprehensive sample of 83 countries, the paper shows that the Latin American and Caribbean (LAC) business cycle exhibits two distinctive features. First, its expansion performance is shorter and, in general, less intense than that of the rest of the regions considered, and in particular than that of East Asia and the Pacific. Second, LAC tends to exhibit contractions that are not significantly different in terms of duration and amplitude from those of other regions. These specificities of the LAC are also reflected in long-run growth variables such as productivity and investment. Moreover, effects of the contraction in public investment surpass those of the expansion leading to a declining trend over the entire cycle. Two main implications are drawn: (i) Latin America and the Caribbean have learned to weather contractions, but require stronger and longer lasting expansions; (ii) the growth trend is not independent of cycle fluctuations.

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Weak Expansions: A distinctive feature of the business cycle in Latin America and the Caribbean

Esteban Pérez Caldentey, Daniel Titelman and Pablo Carvallo [1]

Introduction

In this paper we use the 'Classical Cycle' and 'Deviation Cycle' standard methodologies to characterize the business cycle for Latin American and the Caribbean in relation to that of other regions of the world, placing the focus of the comparison on East Asia and the Pacific. We characterize the complete cycle and its phases (contraction/expansion) in terms of duration and amplitude for a sample of 83 countries, 44 of which belong to the different developing regions of the world and 39 are classified as high income economies.[2] The analysis is undertaken using quarterly data covering the period 1989 to 2012.[3]

The majority of the results obtained are robust to the use of both the 'Classical Cycle' and 'Deviation Cycle' methodologies. These show that the Latin American and Caribbean cycle displays two distinct features. On the one hand, and most importantly, the Latin American and Caribbean region has weaker expansions relative to other regions of the world. On the other hand, Latin America and the Caribbean have contractions whose duration and amplitude do not differ significantly from those of other developing countries. As a result, the full cycle of expansions and contractions, exhibits, on a general basis, the shortest duration and smallest amplitude among all regions.

The dynamics of the Latin American and Caribbean cycle are not confined exclusively to short-run analysis. These are also reflected in the behavior of variables such as productivity and investment, which are generally identified as determinants of long-run growth.

In particular, the tenuous nature of the expansionary phase of the cycle is reflected in the fact that productivity growth in Latin America and the Caribbean during that cycle tends to be below that of other developing regions, notably East Asia and the Pacific. Moreover, the evidence suggests that as a general rule, the

growth of public capital formation during the expansion is unable to supersede its contraction in the downward phase of the cycle, leading to a declining trend in the level of public investment during the complete business cycle.

The paper is divided into six sections. The first underscores the importance of studying cyclical behavior especially in the case of Latin America and the Caribbean. The second section briefly explains the methodologies and describes the dataset used in the paper. The third and fourth sections concentrate on the stylized facts of the Latin American and Caribbean cycle. The fifth section discusses, albeit in a preliminary fashion, the linkages between the cycle and long-run outcomes. The last section concludes with a reflection on cycle analysis and pinpoints directions for further research on the topic.

1. Why We Should Not Short Shrift the Cycle

Over the past three decades, the performance of Latin America and the Caribbean has been characterized by an increasing degree of volatility in terms of output and investment behavior (among other variables). Moreover, volatility in Latin America and the Caribbean has tended to surpass that of other regions of the world (Titelman, Pérez Caldentey and Mincer, 2008; Calderón and Fuentes, 2012; ECLAC, 2002 and 2012).

At the same time, Latin America and the Caribbean have experienced lower long-run growth in relation to other regions. Table 1 shows the evolution of GDP per capita growth for Latin America and the Caribbean, the Member States of the OECD (high income economies) and selected developing regions of the world for the period 1970-2011.

The evidence indicates that Latin America and the Caribbean had the highest levels of GDP per capita growth in the 1970s decade in relation to other regions, with the exception of East Asia and the Pacific. Thereafter, the region has registered one of the lowest rates of growth of GDP per capita in relation to other developing regions for most of the periods under consideration (1981-1990, 1991-2000, 2003-2007, 2001-2011). Moreover, the growth differential between Latin America and the Caribbean and other regions such as East Asia and the Pacific has widened over time (see table 1).

The most recent period of expansion (2003-2007) does not constitute an exception to this observed trend. During this time Latin America and the Caribbean experienced the highest average rate of growth in over three decades. The regional average per capita growth rate reached 3.7 per cent surpassing not only that of the 1980s lost decade and that registered during the free market structural reform era (1991-2000) (1.4 per cent) but also that of the 1970s (3.2 per cent).

However, on a comparative basis, Latin America and the Caribbean's performance was by no means an exceptional one. In fact the regional rate of growth remained significantly below those of East Asia and Pacific (9.3 per cent), Europe and Central Asia (7.4 per cent) and South Asia (6.6 per cent).

Table 1: GDP Per Capita Growth by Region/Income Grouping, 1971-2011

	East Asia & Pacific	Europe & Central Asia	High income: OECD	Latin America & Caribbean	Middle East & North Africa	South Asia	Sub-Saharan Africa
1971-1980	4.5	…	2.7	3.2	2.7	0.7	0.9
1981-1990	5.7	-1.7	2.7	-0.8	0.2	3.0	-0.9
1991-2000	7.1	-1.7	1.9	1.5	1.8	3.2	-0.4
2003-2007	**9.3**	**7.4**	**1.9**	**3.7**	**3.3**	**6.6**	**2.9**
2001-2011	8.2	4.7	0.9	2.2	2.6	5.3	2.2

Source: World Development Indicators and Global Finance, World Bank (2012)

Part of the explanation, of both the high degree of volatility and low level of long-run growth, lies in the specific features of the Latin American and Caribbean cycle.

Cycle fluctuations and its characteristics define the pattern and nature of volatility. Moreover, in spite of the fact that cycle fluctuations are traditionally associated with a short-period context, these can also impinge on long-run growth by their effects on investment and productivity, among other variables.

In this regard, the cycle itself as well as the policies designed and implemented to confront and manage its fluctuations, are not trend-neutral. From here follows the importance of analyzing, characterizing and identifying the distinguishing features of the Latin American and Caribbean cycle in relation to other developing regions. In the sections that follow, we place particular focus on the comparison with East Asia and the Pacific, which is often used as a benchmark for assessing social and economic progress and development.

2. The Methodological Approach

Business cycles are generally defined as periodic patterns in the fluctuations of macroeconomic variables including output, unemployment, consumption, investment, and prices over months or years.[4] In this sense the cycle can be viewed as a series of turning points (peaks and troughs) with alternating phases of expansion and contraction.

Currently there are two main approaches to the analysis of the business cycle, the Classical Cycle and the Deviation Cycle.[5] The former defines the cycle as a series of turning points in the level of real aggregate economic activity. For the latter, the cycle is defined in terms of the deviations of real aggregate economic activity from its trend (or potential output). Both methodologies can be used to characterize the cycle in terms of duration and intensity. However, due to methodological differences, the Deviation Cycle produces longer contractions than the Classical Cycle and fails to capture the asymmetry of the cycle.[6]

In this paper we use both methodologies to show that our results are not dependent on any given approach. Moreover, to further strengthen our arguments, both methodologies are applied on a comprehensive data set comprising 83 economies worldwide and including all developing regions.

2.1 The Deviation Cycle and the Classical Cycle

The Deviation Cycle, also known as the growth cycle, sees the cycle as a set of serially correlated deviations of a series from its trend (Lucas, 1977; Sargent, 1987; Blanchard and Fisher, 1989; Kydland and Prescott, 1990; Zarnowitz, 1992). According to this approach, any series in levels (y_t) can be decomposed into a trend (μ_t) and cycle component (ψ_t). That is,

$$(1) \quad y_t = \mu_t + \psi_t$$

Assuming that (y_t) is expressed in logarithm and that it admits the log-additive decomposition, growth (or the change in the logarithm of y_t, $i.e, \Delta y_t$) can then be decomposed in turn into a trend and a cycle component.

$$(2) \quad \Delta y_t = \Delta \mu_t + \Delta \psi_t$$

Within this approach, an expansion occurs when growth of the series in question is above trend, i.e.$\Delta y_t > \Delta \mu_t$. Similarly, a recession occurs when the growth of a series is below trend i.e.$\Delta y_t < \Delta \mu_t$. A central aspect of this approach is the construction of the permanent component of the series which is usually derived using some type of filter.[7] On the basis of the above, deviation cycles are then constructed.

The Classical Cycle views the cycle as a set of turning points of a time series representing the level of aggregate economic activity without consideration to a trend (Burns and Mitchell 1946; Harding and Pagan 2002b and 2005; Pagan 2003). The inflection points of the series are then used as a basis to analyze the cycle in terms of a series of indicators such as the duration, intensity of an expansion (trough-to-peak) and a contraction (peak-to-trough), and the degree of coincidence between two given time series. Central to this approach is the identification of the turning points of a series.

The turning points of a series are usually identified using the Bry-Boschan algorithm (1971) developed originally for monthly data and adapted to deal with quarterly observation by Harding and Pagan (2002a).[8] The algorithm consists of identifying local maxima and minima for a given series following a logarithmic transformation using specific censoring rules (Bry-Boschan, 1971; Du Plessis, 2006; Male, 2009).

These include the specification of two quarters for a minimum duration for a single phase, and a minimum duration of five quarters for a complete cycle (Harding and Pagan, 2002). The peak for a series y_t is found when y_t is greater than $y_{t\mp k}$ for $k = 1,2.$ Similarly, the trough for a series is found when is less than for . The algorithm excludes the occurrence of two successive peaks or troughs.

Two other alternative algorithms used in the literature on business cycles to determine turning points are the Calculus and the Okun rule. The Calculus rule identifies a recession (expansion) when the rate of growth of GDP is negative (positive) for at least one quarter. The Okun rule extends the time domain of an expansion or recession to two quarters (See Pagan 2003) (See table 2).[9]

Table 2: Algorithms for the Identification of Turning Points in Classical Cycles

Algorithms	Peak	Trough
Bry-Boschan	$\{(y_{t-2}, y_{t-1}) < y_t > (y_{t+1}, y_{t+2})\}$	$\{(y_{t-2}, y_{t-1}) > y_t < (y_{t+1}, y_{t+2})\}$
Calculus	$\{y_{t-1}, < y_t > y_{t+1},\}$	$\{y_{t-1}, > y_t < y_{t+1}\}$
Okun	$\{(\Delta y_{t-1}, \Delta y_t) > 0;\ (\Delta y_{t+1}, \Delta y_{t+2}) < 0\}$	$\{(\Delta y_{t-1}, \Delta y_t) > 0, (\Delta y_{t+1}, \Delta y_{t+2}) < 0\}$

Source: On the basis of Pagan, 2003; Harding, 2008; Wecker, 1970.

Once the turning points in the series are identified, the business cycle can be characterized in terms of duration and intensity. The duration (D) of an expansion is defined as the ratio of the total number of quarters of expansion to the total number of peaks. That is,

$$(3)\, D = \frac{\sum_{t=1}^{T} S_t}{\sum_{t=1}^{T-1}(1 - S_{t+1})S_t}$$

where, S is a binary variable which takes the value 1 during an expansion and 0 during a contraction.[10] The numerator in equation (3) denotes the total duration of expansions and the denominator measures the number of peaks in the series.

For its part, the intensity or amplitude (A) of the expansion is measured as the ratio of the total change in aggregate economic activity to the total number of peaks. That is,

$$(4)\, A = \frac{\sum_{t=1}^{T} S_t \Delta Y_t}{\sum_{t=1}^{T-1}(1 - S_{t+1})S_t}$$

where, Y is a measure of economic activity (GDP in our cases) and the numerator in (4) is the total change in economic activity.

Using Harding and Pagan's triangle analogy, the ratio of the amplitude to the duration can be thought of as a measure of steepness. Also, the cumulative change (CC) in the expansion (contraction) can then be found by multiplying the product of the duration (D) and the intensity (A) of the expansion (contraction) by 0.5, i.e., CC=0.5*(D*A).

Due to the differences in their definition of the cycle, the Classical and Deviation Cycle methodologies can produce different characterizations of the cycle. Two of these differences are worth noting.

First, the Classical Cycle tends to produce shorter contractions than the Deviation Cycle. This is due to the fact that a downturn in the Classical Cycle occurs when Contrarily, in the Deviation Cycle a downturn occurs when $\Delta y_t - \Delta \mu_t < 0$. This implies that a downward phase in a Deviation Cycle can contain several Classical Cycle recession episodes (See Artis, Maecrellin and Proietti, 2003; and Pagan 2003).[11]

Second, the Deviation Cycle fails to capture the asymmetry between the contraction and the expansion phases. This responds to the fact that the Deviation Cycle is defined as a series of correlated deviations from the trend. As a result, the cyclical component is stationary and this implies the long run average of the cyclical component is zero. That is, the positive and negative deviations will tend to cancel out over time.[12] Thus by the virtue of its own definition, the positive and negative cyclical deviations from trend are symmetric.

Cognizant of these differences, we assess the results of each of these criteria and approaches on the basis of their own terms and logic. It is a question of identifying stylized facts pertaining to the specific behavior of the Latin American and Caribbean cycle in comparison to other regions that are robust to the use of different statistical methodologies.

2.3 The Dataset

In order to ensure adequate geographical representation, a comprehensive sample of 83 countries was used in the analysis. Of these 44 are emerging market economies and 39 are considered developed economies (i.e. high income economies).[13] The analysis is undertaken using quarterly data for the period 1989 to 2012.[14]

The sample of emerging market economies comprise 21 countries belonging to Latin America and the Caribbean, 5 to East Asia and the Pacific, 11 to Europe and Central Asia, 3 to the Middle East and North Africa, 1 to South Asia and 3 to Sub Saharan Africa. The sample of high income economies includes European (23), Asian (4), North American (2), Caribbean (2) and other countries.[15]

As can be seen from Table 3 below, our dataset is, in comparison to other analyses on the subject, one of the largest and most representative, at the regional and also at the Latin American and Caribbean sub-regional level. In contrast to other studies on the subject, it includes most countries of South and Central America as well as Caribbean economies, thus avoiding a sub-regional bias in the results obtained.[16]

Table 3: Data Sample for Selected Studies on Business Cycles

	Countries	EME	EME Regions						DC	Period/periodicity	Variables
			EAP	ECA	MENA	SSA	SA	LAC			
Pérez Caldentey, Titelman and Carvallo (2012) (Current paper)	83	**44**	**5**	**11**	**3**	**3**	**1**	**21**	**39**	**1989.1-2012.2 Quarterly**	**GDP**
Titelman, Pérez Caldentey and Carvallo (2011)	63	37	4	8	2	1	1	20	31	1990-2010 Quarterly	GDP, C, I, X, M, G
Male (2009)	35	27	2	4	4	5	3	9	8	1960.1-2005.4 Quarterly	Industrial & agricultural output
Du Plessis (2006)	24	2	1	…	…	1	…	2	22	1970.1-2005.1 Quarterly	GDP, C, I, π, r, FS
Cashin (2004)	10	6	…	…	…	…	…	6	4	1963-2003 Yearly	GDP
Craigwell and Maurin (2012)	3	3	…	…	…	…	…	3	…	Quarterly	GDP
Calderón & Fuentes (2012)	65	32	5	9	3	2	…	13	34	1970.1-2010.2 Quarterly	GDP
Calderón & Fuentes (2010)	45	19	4	1	…	1	1	12	16	1980.1-2006.2 Quarterly	GDP
Rand & Tarp (2002)	15	14	1	…	1	5	2	5	1	1960.1-1999.4 Quarterly	Industrial production Index
Pérez Caldentey & Pineda (2011)	134	104	19	20	13	15	5	32	31	1950-2011 Yearly	GDP, GDP per capita

Note: EME = emerging market economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; MENA = Middle East and North Africa; SSA= Sub Saharan Africa; SA= South Asia; LAC = Latin America and the Caribbean; DC = Developed countries. In our approach, developed countries are high income countries; GDP = Gross Domestic Product; C = private consumption; G = government consumption; I = gross formation of fixed capital; X = exports; M = imports; π = inflation, r = nominal rate of interest, FS = measure of the fiscal stance.
The periodicity refers to the widest data range used in each specific paper.
Source: Financing for Development Division (2012)

3. The Stylized Facts of the Expansionary and Contractionary Phases of the Latin American and Caribbean Cycle

In comparison to other developed and developing regions of the world, the business cycle of expansions and contractions of Latin America and the Caribbean displays two distinctive features. First the region, as a general rule, has weaker expansions than other developing regions and in particular than East Asia and the Pacific. Second, Latin America and the Caribbean have, on average, contractions in terms of duration

and amplitude which tend to converge to those of other countries, both developed and developing countries. These results are robust to the business cycle methodology used.[17] Both of these stylized facts are analyzed in detail in the sections that follow.

3.1 The Expansionary Phase of the Cycle

The comparative analysis of expansions using the two cycle methodologies show that Latin America and the Caribbean have shorter and less intense expansions relative to other regions of the world.

In terms of duration, the Classical Methodology (using the Bry-Boschan algorithm) shows that Latin America and the Caribbean expansionary periods span, on average, a period of 14 quarters (three and half years).[18] With the exception of the Middle East and North Africa (one year), Latin America and the Caribbean's expansion performance is shorter than that of the rest of the regions considered, and in particular than that of East Asia and the Pacific. In the case of the latter region expansions last nearly seven years, that is, almost five years longer than in the case of Latin America and the Caribbean. For the high income countries, the duration of the expansion is also longer (6 years or roughly two more years than in the case of Latin America and the Caribbean). The Deviation Cycle methodology corroborates the result that with the exception of the Middle East and North Africa, Latin America and the Caribbean has one of the shortest expansions among the developing world (Table 4).

 The cycle analysis of the most recent expansion does not alter our conclusions. For the majority of the Latin American and Caribbean countries, the most recent expansion began in the early 2000s and ended with the Global Financial Crisis (2009). It was one of the longest and most intense expansions in over three decades. However, this expansion episode falls short both in terms of duration and amplitude when compared to the last expansion episode of other regions and in particular to that of East Asia and the Pacific (26.5 quarters and 29.8 per cent for Latin America and the Caribbean, and 40 quarters and 53.9 per cent for East Asia and the Pacific respectively).[19]

Table 4: Duration and Amplitude of the Expansionary Phase of the Cycle for Selected Regions of the World, 1990-2012

(Quarterly data)

Duration (In quarters)

	Classical Cycle			Deviation Cycle
	Bry-Boschan	Calculus	Okun	Bry-Boschan
East Asia and the Pacific	32.5	7.7	27.0	9.3
Europe and Central Asia	25.0	4.4	22.5	8.7
Latin America and the Caribbean	13.6	4.4	10.8	7.5
Middle East and North Africa	3.5	5.4	35.5	5.8
South Asia	…	48.0	…	8.5
Sub-Saharan Africa	37.5	2.4	11.0	8.0
High Income	25.0	5.8	16.0	7.8

Amplitude (In percentages)

	Classical Cycle			Deviation Cycle
	Bry-Boschan	Calculus	Okun	Bry-Boschan
East Asia and the Pacific	39.0	11.1	29.2	5.8
Europe and Central Asia	43.8	10.1	39.4	9.1
Latin America and the Caribbean	26.3	8.1	16.2	5.8
Middle East and North Africa	15.6	9.5	33.0	4.0
South Asia	…	85.6	…	3.2
Sub-Saharan Africa	41.0	9.0	12.9	3.9
High Income	26.8	6.4	14.3	4.5

Source: Authors' own calculations based on official information.

Note: … denotes not available.

In line with the above results, Latin America and the Caribbean also exhibits one of the weakest output gains in the expansionary phase of the cycle. This result holds mostly for the Classical Cycle methodology in its different turning point algorithms.

The Classical Cycle (using the Bry-Boschan algorithm) shows that on average, Latin America and the Caribbean register a 26.3 per cent increase in output. This contrasts with the experience of our benchmark region, East Asia and the Pacific, which records a 39 per cent output gain (50 per cent above that of Latin America and the Caribbean). In the case of the Deviation Cycle, Latin America and the Caribbean's amplitude during the expansionary phase is similar to that of East Asia and the Pacific and is below that of Europe and Central Asia.

The weaker performance of the Latin American and Caribbean economies relative to other regions in the expansionary phase of the cycle is underscored when viewed in terms of the cumulative gain in output. Figure 1 shows the gain in cumulative output of East Asia and the Pacific and high income countries relative to that of Latin America using an average of all criteria used in the paper[20]. East Asia and the Pacific have a gain in output that is almost thrice that of Latin America and the Caribbean. For its part, the gain in output of the high income economies grouping is 10 per cent higher relative to that of Latin America and the Caribbean (Figure 1)

Figure 1: Average Cumulative Output Gain of East Asia and the Pacific and the High Income Country Grouping Relative to Latin America and the Caribbean, 1990-2012
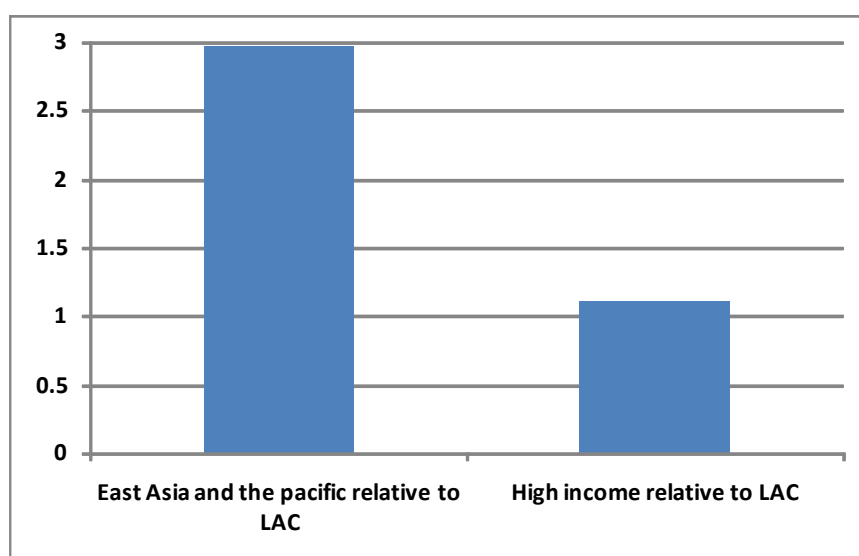
Note: Refers to the average of the Bry-Boschan, Calculus, Okun and Cycle Deviation for the period 1990-2012.

The cumulative output gain is computed as the product of the amplitude and duration of the expansion phase of East Asia and High Income economies relative to that of Latin America and the Caribbean.

Source: Authors' own calculations based on official information.

The application of our approach separately to South America, Central America and Mexico does not change the results found at the regional level. The duration of the expansion for South America, Central America and Mexico is 15, 25 and 23 quarters respectively. The amplitude of their expansion reaches 28 per cent, 27 per cent and 26 per cent respectively (Table 5).

**Table 5: Duration and Amplitude of the Expansionary Phase of the Cycle for
Latin America and the Caribbean and its Sub-regions, 1990-2012**

Duration (In quarters)				
	Classical Cycle			Deviation Cycle
	Bry-Boschan	Calculus	Okun	Bry-Boschan
Latin America and the Caribbean	13.6	4.4	10.8	7.5
South America	15.3	4.8	13.1	7.8
Central America	25.0	4.5	27.0	7.5
Mexico	23.0	5.1	11.0	11.3
Amplitude (In percentages)				
	Classical Cycle			Deviation Cycle
	Bry-Boschan	Calculus	Okun	Bry-Boschan
Latin America and the Caribbean	26.3	8.1	16.2	5.8
South America	27.9	7.8	14.7	5.8
Central America	27.0	8.4	29.2	4.9
Mexico	25.6	6.9	15.3	6.2

Source: Authors' own calculations based on official information.

Further corroborating evidence regarding the limited nature of the expansion in Latin America is provided by the disaggregation of this phase of the cycle into its two sub-phases, acceleration and deceleration. Acceleration is defined by a GDP growing at an increasing rate; or in other words, by a first and second positive derivative of the GDP level series. Deceleration refers to a GDP growing at decreasing rates; or in other words, the first derivative of the GDP series in levels is positive while the second derivative is negative.

As shown in Figure 2, Latin America and the Caribbean have one of the weakest rates of growth for both the acceleration and deceleration sub-phases in comparison to other developing and developed regions. The average rate of growth in the acceleration phase reaches 5.5 per cent for Latin America and the Caribbean, while for other regions such as East Asia and the Pacific it reaches roughly 7 per cent. In a similar way, Latin America also experiences a slower deceleration phase than other regions, with the exception of Middle East and North Africa and Sub Saharan Africa.

Figure 2: Average Rate of Growth of GDP During the Acceleration and Deceleration Sub-phases of the Cycle for Selected Developing Regions of the World, 1990-2012
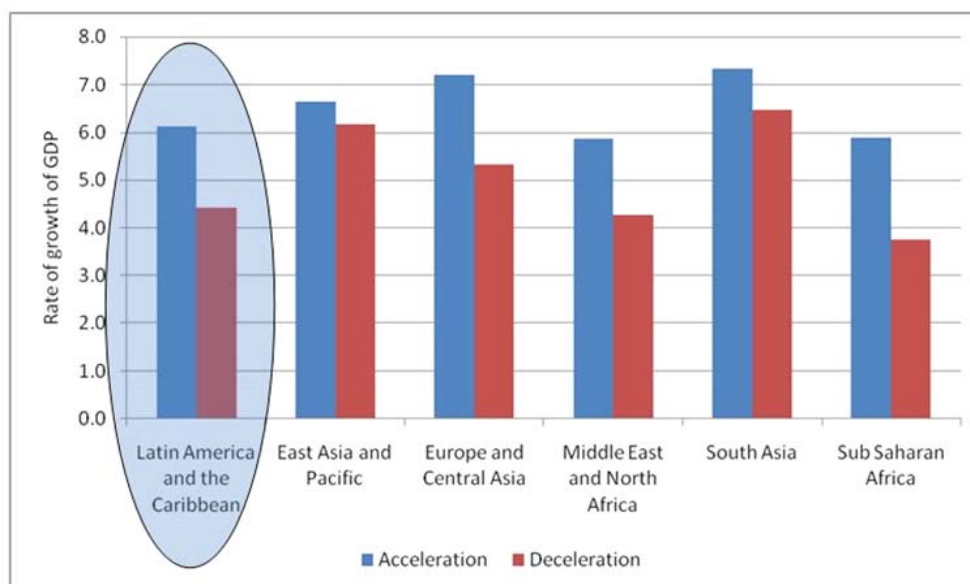
Source: Authors' own calculations based on official information.

3.2 The Contraction Phase of the Economic Cycle

In contrast to the results obtained for the expansions, the duration and intensity of the contraction for Latin American and Caribbean countries tend to conform to those found for other regions according to both the Classical and Deviation Cycle methodologies.

In the case of the Classical Cycle methodology, the Bry-Boschan algorithm estimates that with the exception of the Middle East and North Africa, the duration of contractions last less than a year. These range between 2.7 to 3.8 quarters (that is, between 8 and 11 months). The duration of contractions for Latin America and the Caribbean, Europe and Central Asia, and East Asia and the Pacific are very similar, lasting between 3.3 and 3.8 quarters, or between 10 to 11 months.

The Okun and Calculus criterion yields a higher degree of uniformity in the duration of contractions among developing regions, and according to both, the experience of Latin America and the Caribbean also conforms to the results found for other developing regions (Table 6).

Table 6: Duration and Amplitude of the Contractionary Phase of the Cycle for Selected Regions of the World, 1990-2012

(Quarterly data)

| Duration (In quarters)				
	Classical Cycle			Deviation Cycle
	Bry-Boschan	Calculus	Okun	Bry-Boschan
East Asia and the Pacific	3.3	1.6	2.2	4.8
Europe and Central Asia	3.8	1.6	3.3	5.3
Latin America and the Caribbean	3.8	1.6	3.3	6.0
Middle East and North Africa	7.3	1.2	2.8	6.5
South Asia	…	1.0	…	6.7
Sub-Saharan Africa	2.7	1.3	2.5	5.3
High Income	4.0	1.7	3.4	6.3
Amplitude (In percentages)				
	Classical Cycle			Deviation Cycle
	Bry-Boschan	Calculus	Okun	Bry-Boschan
East Asia and the Pacific	-10.6	-3.7	-4.4	-5.8
Europe and Central Asia	-11.6	-4.6	-7.1	-9.6
Latin America and the Caribbean	-4.6	-2.1	-3.2	-6.2
Middle East and North Africa	-7.0	-1.2	0.3	-3.8
South Asia	…	-0.2	…	-2.9
Sub-Saharan Africa	-7.1	-1.7	-1.4	-3.8
High Income	-4.9	-1.3	-2.2	-4.3

Source: Authors' own calculations based on official information.
Note: … denotes not available.

The application of the deviation cycle methodology corroborates the above findings. Contractions tend to last for a similar length of time and Latin America and the Caribbean is not an exception to this rule.[21]

Moreover, as explained earlier, due to the fact that the Deviation Cycle approach sees the cycle as a stationary process, whereby the deviations from trend cancel each other out over time, it does not capture the asymmetry of the cycle. Indeed as shown in Figure 3 below, the duration of the expansion relative to that of the contraction is very similar for all regions nearing a value of one (i.e., the expansions last as long as the duration). This contrasts with the Classical Methodology where the contraction and the expansion are independent events. The standard deviation for the duration of the contraction using the Classical Cycle methodology equals 2.64, while for the Deviation from Trend it is equal to 0.34 (See Figure 3 below).

Figure 3: Asymmetry of the Duration of the Cycle Based on the Deviation from Trend and Classical Cycle Analysis for Selected Regions of the World, 1990-2012
(Averages based on quarterly data)
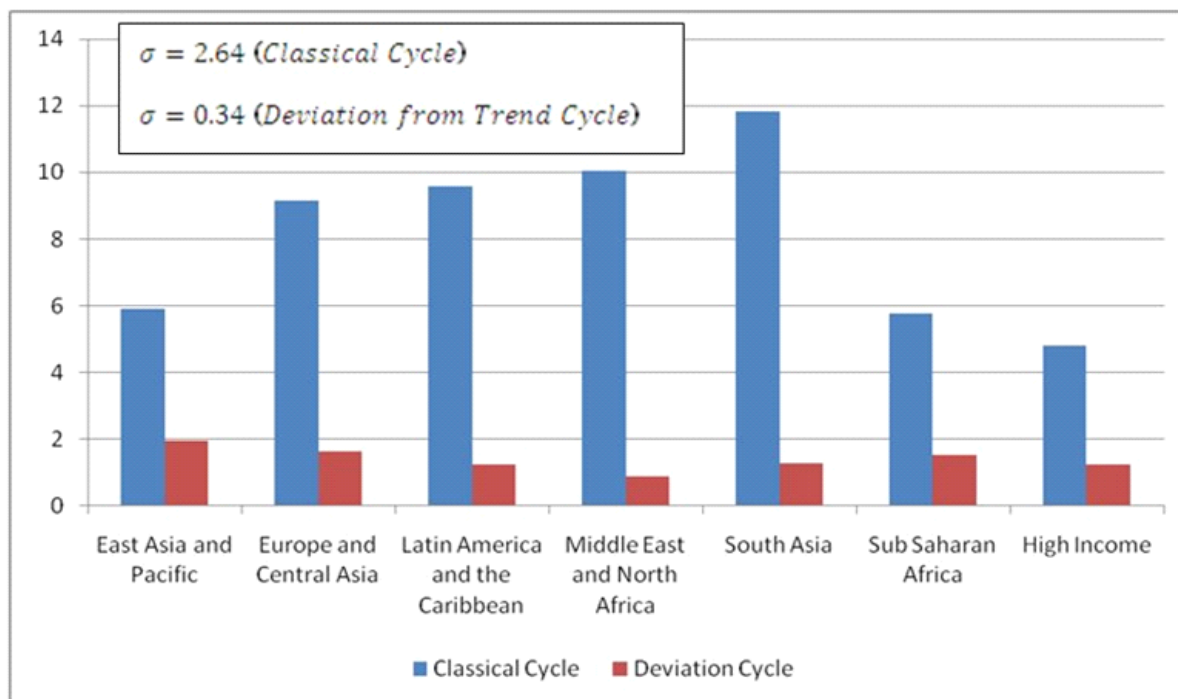
Source: Authors' own calculations based on official information.

In line with these results, contractions do not prove to be more intense in the case of Latin America and the Caribbean in relation to other regions. As shown in Table 8 above, according to the Bry-Boschan algorithm used in the Classical Cycle approach, Latin America and the Caribbean have the smallest amplitude of contractions among all developing and developed regions. The average amplitude of the contractions equals 4.6 per cent for Latin America and the Caribbean. This nears that of the high income country grouping (4.9 per cent) and falls below that of East Asia and Pacific (10.6 per cent), Europe and Central Asia (11.6 per cent), Middle East and North Africa (7.0 per cent) and Sub Saharan Africa (7.1 per cent).

According to the two other criteria (Calculus and Okun), the amplitude of the contraction in Latin America and the Caribbean is below that of East Asia and the Pacific, and Europe and Central Asia.

The findings of the Deviation Cycle approach are not as clear cut. The intensity of the contraction for Latin America and the Caribbean is below that of Europe and Central Asia, similar to that of East Asia and the Pacific, and surpasses that of the rest of the regions.

A more detailed analysis for Latin America by sub-regions (South America, Central America, Caribbean) indicates that the dispersion of the amplitude in the case of a contraction is higher than of an expansion. South America and Mexico seem to have more pronounced and sharper contraction relative to Central America and the Caribbean. In the cases of South America and Mexico, the amplitude is equal to 7.1 per cent and 7.9 per cent using the Bry-Boschan criterion and 2.4 per cent and 2.6 per cent using the Calculus criterion. For their part, the respective amplitudes for Central America and the Caribbean using both criteria are 3.8 per cent, 5.4 per cent; 1.2 per cent and 3.1 per cent respectively (Table 7).[22]

Table 7: Amplitude of the Contractionary Phase of the Cycle for Latin America and the Caribbean and its Sub-regions, 1990-2012

(In percentages using quarterly data)

	Bry-Boschan	Calculus
Latin America and the Caribbean	-4.6	-2.1
South America	-7.1	-2.4
Central America	-3.8	-1.2
México	-7.9	-2.6
Caribbean	-5.4	-3.1

Source: Authors' own calculations based on official information.

This difference at the sub-regional level is explained by the fact that the strongest and most intense crises in the period under study — the Mexican crisis (1994-1995), the Asian crisis (1997-1998), the Russian crisis (1998) and the Argentine crisis (2001-2002) — had their epicentre in Mexico or South America.

4. The Complete Latin American and Caribbean Cycle of Expansions and Contractions

Both of the stylized facts analysed above (weaker expansions and convergent contractions) imply that the complete Latin American and the Caribbean cycle, exhibits for the most part, the shortest duration and smallest amplitude in relation to other regions.

The length of the duration of an entire cycle using the Classical Cycle methodology (and as a reference, the Bry-Boschan criterion) is roughly 17 quarters for Latin America and the Caribbean. This is below that found for high income countries (29 quarters) and also for the majority of developing regions. In the particular case of East Asia and the Pacific, our benchmark, the cycle lasts 36 quarters, that is, almost five years longer than that of Latin America and the Caribbean (Table 8).

These results do not change in any significant manner when the comparison is undertaken using the Deviation Cycle analysis. This shows that with the exception of the Middle East and North Africa, Latin America and the Caribbean has the shortest cycle of all the regions included in the exercise. [23]

Table 8: Duration of the Complete Cycle on a Regional Basis, 1990-2012

(In quarters)

Region	Classical Cycle			Deviation Cycle
	Bry-Boschan	**Calculus**	**Okun**	**Bry-Boschan**
East Asia and the Pacific	35.8	9.3	29.2	14.0
Europe and Central Asia	28.8	6.1	25.8	13.9
Latin America and the Caribbean	**17.4**	**6.0**	**14.1**	**13.5**
Middle East and North Africa	10.8	6.5	38.3	12.3
South Asia	…	49.0	…	15.2
Sub-Saharan Africa	40.2	3.7	13.5	13.3
High Income	29.0	7.5	19.4	14.1

Source: Authors' own calculations based on official information.

Note: … denotes not available.

At the same time that Latin America exhibits the shortest duration of cycles, it also displays, the smallest amplitude, that is the shortest distance between the intensity of the contraction and that of the expansion according the Classical Cycle methodology. Taking East Asia and the Pacific as a reference point, the amplitude of its cycle is 60 per cent greater than that of Latin American and the Caribbean cycle (Table 9).

Table 9: Amplitude of the Complete Cycle on a Regional Basis, 1990-2012

(In percentage using quarterly data)

Region	Classical Cycle			Deviation Cycle
	Bry-Boschan	**Calculus**	**Okun**	**Bry-Boschan**
East Asia and the Pacific	49.6	14.8	33.5	11.6
Europe and Central Asia	55.4	14.7	46.6	18.7
Latin America and the Caribbean	**30.9**	**10.3**	**19.3**	**12.0**
Middle East and North Africa	22.5	10.6	32.7	7.7
South Asia	…	85.8	…	6.1
Sub-Saharan Africa	48.0	10.6	14.3	7.7
High Income	31.7	7.8	16.6	9.9

Source: Authors' own calculations based on official information.
Note: … denotes not available.

5. Cycles and Long-run Outcomes: Conceptual issues and some preliminary evidence

The specific characterisitcs of the cycle for Latin America and Caribbean countries, and in particular the weak nature of expansions, are not confined to short-run analysis. They are also reflected in the bahavior of variables such as productivity and investment, which have an impact on long-run growth trajectories. In this sense we follow the more recent literature which establishes a connection between cyclical fluctuations and long-term outcomes (Dickens and Madrick, 2010; Dutt and Ros, 2009; Aghion, Hemous, and Kharroubi 2010, ; IMF, 2009; European Commission (EC), 2009).[24]

Table 10 shows the duration and amplitude of the expansion of labor productivity for Latin America and the Caribbean countries in comparison to the rest of the countries included in our sample. Independently of the cycle methodology used, and in line with our previous results, Latin America and the Caribbean have for the most part one of the shortest expansions in productivity growth.

Table 10: Duration and Amplitude of the Expansionary Phase of the Labour Productivity Cycle for Selected Regions of the World Using the Classical Cycle Methodology, 1990-2012

(Yearly data)

Duration (In years)		
	Bry-Boschan	Calculus
East Asia and the Pacific	4.3	4.3
Europe and Central Asia	5.5	5.5
Latin America and the Caribbean	3.8	3.8
Middle East and North Africa	3.3	3.3
South Asia	4.8	4.7
Sub-Saharan Africa	2.6	2.6
High Income	6.3	6.3
Amplitude (In percentages)		
	Bry-Boschan	Calculus
East Asia and the Pacific	23.4	23.4
Europe and Central Asia	33.7	33.7
Latin America and the Caribbean	13.6	13.6
Middle East and North Africa	17.2	17.2
South Asia	16.0	15.2
Sub-Saharan Africa	8.5	8.5
High Income	17.7	17.6

Note: Labor productivity refers to labour productivity per person employed in 2011 US$ (converted to 2011 price level with updated 2005 EKS PPPs).
Source: Authors' own calculations based on official information.

In this regard, the differences between the cumulative gain (the product of the amplitude and the duration) in productivity between Latin America and the Caribbean and East Asia and the Pacific are worth highlighting. The cumulative gain in labor productivity during the expansionary phase of the cycle is 25 per cent for Latin America and the Caribbean and twice this figure (50 per cent) in the case of East Asia and the Pacific.

Jointly with the fact that Latin America and the Caribbean experience weaker expansions than other regions and in particular than East Asia and the Pacific, this type of evidence may help to explain the reason why the countries of East Asia and the Pacific have been able to sustain over time a high GDP growth path relative to the case of Latin America and the Caribbean. This is shown in figure 4, which plots the trend of GDP for the period 1960-2010 for both regions.

Whereas the East Asia and Pacific region has been able to maintain a rising trajectory throughout the period, Latin America and the Caribbean experience a structural break in the 1980s, due most likely to the effects of the Debt Crisis, from which the region has not been able to recover in the following two decades. At a more detailed level of analysis, the figure shows that the GDP trend between 1960 and the early 1980s (period I) of Latin America and the Caribbean is similar to that in East Asia and the Pacific. Then, starting with the lost decade of the 1980s, it tends to decline and does not recover in the 1990s or the first decade of the 2000s, meaning that in this sub-period growth rates are lower than those before the debt crisis (period II).

Figure 4: Trend GDP for Latin America and the Caribbean and East Asia and the Pacific, 1960-2010
(Annual logarithmic data)
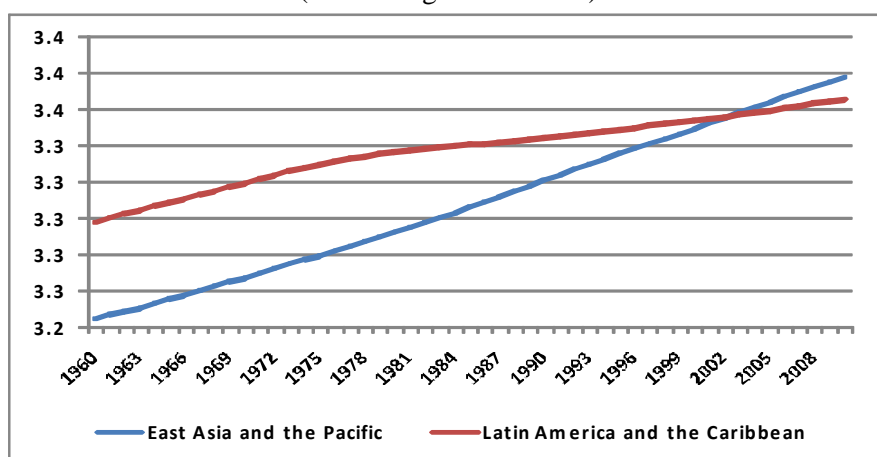
Note: The computations were undertaken using the Deviation Cycle methodology.

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of World Bank, "World Development Indicators" and "Global Finance" [online] http://www.gfmag.com/.

The long lasting effects of crisis are seen in the structural break in the region's GDP trend. At the same time, the weak nature of recoveries is underscored by the fact that the economic policies implemented in the two decades after the crisis did not reverse those effects. Even in the period of the fastest growth witnessed by Latin America and the Caribbean over the past 30 years (2003-2008), the countries of the region, with few exceptions, did not succeed in reversing the structural break or improving the trend. This is unlike what happened in Asia: the 1997 crisis, one of the severest to hit the countries of East Asia, did not change the path of trend GDP.

An additional piece of evidence linking the fluctuations of the cycle to long-run growth is provided by the behavior of public investment which is also clearly asymmetric, with drops during recessions being much sharper than increases during upswings. As shown in Table 11 considering data for six countries in the region, public investment in infrastructure fell by an average of 36 per cent in the downswing of the business cycle.[25]

Declines in public infrastructure investment tend to be sharper than any increase during the recovery phase. In the sectors considered, the contraction is on average 40 per cent greater than the subsequent expansion. In the power and telecommunications sectors, the difference between the decline in investment during a contraction and the increase during the expansion is even greater (35 per cent increase and -52 per cent decline for power sector and 28 per cent and -58 per cent for the telecommunications sector respectively). Such a pattern has negative impacts on capital accumulation over time.

Table 11: Latin America (Selected countries): Duration and amplitude of expansions and contractions of the cycle of public investment in infrastructure, 1980-2010
(Yearly data)

	Expansion		Contraction	
	Duration	Amplitude	Duration	Amplitude
Total	2.7	25.6	2.2	-35.6
Power sector	1.9	34.7	2.0	-51.5
Roads and railways	2.1	32.3	1.7	-33.1
Telecommunications	1.8	28.1	1.9	-58.0
Water and sanitation	1.6	24.2	1.7	-23.8

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures from the countries.

Note: The Bry-Boschan algorithm was used for identifying the turning points.

The contraction in investment can have short-run effects on aggregate demand, but it also has an impact on the long-run trajectory of the economy. This is due not only to the fact that public investment contributes to the growth of the economy but also to the fact that investment decisions in general are often irreversible ('once installed, capital has little or no value unless used in production') and this characteristic provides a link between the decisions taken in the short run with medium and long-run outcomes.

Irreversibility can often become an important factor in the decision not to invest in the downward phase of the cycle due, for example, to the growing risks associated with the current and future macroeconomic context. In this sense, a downward phase of the business cycle can be associated with a low capital accumulation which in turn results in furthering the decline in investment, undermining not only the job creating capacity of the economy but also its recovery potential.

6. Conclusion: Where we are and thoughts for further research

This paper shows that independently of the methodology adopted, the Latin American and Caribbean cycle exhibits two distinctive features. The first and the most important one is that Latin America and the Caribbean register weaker expansions, than those of other regions and in particular than those of the East Asian and Pacific region. The most recent expansion (2003-2007,) which is by far one of the most intense in the history of the region, does not alter this conclusion, in the sense that during this period too, Latin America and the Caribbean's rate of growth remained below that of other developing regions. A second distinctive feature is that Latin America and the Caribbean's contractions conform in terms of duration and amplitude to those of the rest of the world.

Weaker expansions and convergent contractions imply, as a result, that the complete cycle of expansions and contractions tends to be shorter and with a smaller amplitude for Latin America and the Caribbean relative to other regions of the world.

Traditionally, cycle patterns are viewed as short-run demand-led phenomena with no bearing on growth trends. However, this paper argues that the specificities of the cycle are not only relevant to the short run. They are also reflected in the behavior of variables such as productivity and investment which are linked to long-run growth performance.

In the particular case of Latin America and the Caribbean, the behavior of both productivity and investment reflect the weak nature of the region's expansions. In fact, the study of the particularities of the cycle, including weak expansions in output and productivity, may be central to explain, at least in part, the reason why the region has not been able to sustain growth concomitantly with other regions and in particular with East Asia and the Pacific.

The findings presented in this paper open important avenues to further explore and analyze the short and long-term performance of Latin America and Caribbean economies.

First cycle analysis should increase its focus on the nature and behavior of expansions. Sustaining evidence is provided by the fact that contractions tend to be somewhat homogeneous across regions in terms of duration and amplitude. However, this is not the case of expansions. Expansions are heterogeneous in terms of duration and amplitude. Improving our understanding of the differences in the expansionary dynamics of countries and regions can further our understanding of the differences in their rates of growth and levels of development, including those of Latin America and the Caribbean.

Second, as it is well established, the management of the cycle affects the short-run fluctuations of economic activity and hence volatility. But in addition, it is not trend neutral. Hence, the effects of aggregate demand management policies may be more persistent over time and less transitory than currently thought. This provides a justification to reconsider the usefulness of stabilization policies and their effects, from a short and long-run view, including their potential trade-offs, and to re-think how to articulate and coordinate what are currently called demand side with supply side policies.

Notes

1 Financing for Development Division, UN Economic Commission for Latin America and the Caribbean (ECLAC). The opinions expressed here are the authors' own and may not coincide with those of ECLAC. An earlier version of this paper was presented at the ECLAC workshop 'Policies for Sustained Growth with Equality' (29-30 October 2012, Santiago, Chile). We wish to thank the participants for the useful comments received during the presentation and discussion of the paper and in particular Cecilia Vera for the very useful suggestions on how to improve the coherence and main arguments of the paper. We are also grateful to John Rand and Finn Tarp (University of Copenhagen) for sharing the computer codes for the Bry and Boschan algorithm procedure in Mat Lab.

2 In our categorization of developing economies, we include low and middle income economies following the World Bank Classification.

3 Data for the period 1980 to 2012 was not available for all the countries included in our study. See the annex for the countries included and time period covered.

4 The standard definition is provided in the classical text by Burns and Mitchell (1946, p.3): "Business Cycles are a type of fluctuation found in the aggregate economic activity of nations that organize their work mainly in business enterprises: a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, and revivals which merge into the expansion phase of the next cycle; this sequence of changes is recurrent but not periodic; *in duration business cycles vary from more than one year to ten to twelve years; they are not divisible into shorter* cycles of similar character with amplitudes approximating their own." See Medio (2008) for a review of business cycle theories.

5 Other approaches include the rocking horse view championed by Ragnar Frisch and the growth rate cycle. Frisch's approach built on Knut Wicksell and distinguished between the propagation and the impulse problem. As he put it: "There need not be any synchronism between the initiating force or forces and the movement of the swinging system. This fact has frequently been overlooked in economic cycle analysis. If a cyclical variation is analyzed from the point of view of a free oscillation, we have to distinguish between two fundamental problems: first, the propagation problem; second the impulse problem" (Frisch: 1933, p. 171). See Pagan (2003) and Zambelli (1999) for a critique. The growth refers to fluctuations in the growth rate of economic activity. Within this approach an expansion/recession is defined as a prolonged increase (decline) in economic activity. The Economic Cycle Research Institute (ECRI) provides growth rate chronologies (http://www.businesscycle.com). According to the ECRI, the

rate of growth is computed as $(2) \left[\dfrac{y_t}{\sum_{j=0}^{s-1} \frac{y_{t-j}}{s}} \right]^{\frac{2s}{(s+1)}}$ where s is the number of observations. See Artis et al.

(2003).

6 This follows Pagan (2003).

7 Including the band-pass (i.e., Baxter and King), Hodrick-Prescott and model-based filters.

8 By far the majority of recent Classical Cycle analyses (including the authors mentioned in Table 2) use the Bry-Boschan method.

9 As can be seen from the definition, the Calculus criterion tends to produce a higher frequency of expansions and contractions than the Bry Boschan or the Okun criteria simply because its threshold to identify whether a series is in a contraction or an expansion phase is comparatively less demanding. It requires only one observation where the growth of the series in question is negative ($\Delta y_t < 0$) , whereas the Bry Boschan and Okun require two consecutive observations.

10 Similarly, the duration and amplitude for contractions are computed using $c_{i,t} = 1 - s_{i,t}$.

[11] A Deviation Cycle considers as a recession not only the case in which $\Delta y_t < 0$ as in the Classical Cycle, but also when $\Delta y_t > 0$ and $|\Delta \mu_t| > |\Delta y_t|$. In this sense, these methods are not strictly comparable. Pagan (2003, p. 17) states that "…those statistics gathered about the business cycle by Burns and Mitchell and the NBER have no immediate relevance to those of the [the Deviation Cycle]." In this paper, the aim of using different methodologies is mainly to show that the results obtained are robust to different methodologies. Even though we make comparisons in the text among methodologies, the guiding principle is to assess them on their own logic and development.

[12] In the Deviation Cycle, the cyclical component is stationary. Stationarity is not an issue in the Classical Cycle approach.

[13] As noted above, our analysis includes only low income, upper income and low middle income countries as part of the category of emerging market economies. This marks a difference between our approach and other studies that tend to include countries such as Singapore and Hong Kong as emerging market economies and thus end up comparing the performance of middle income countries such as those of Latin America with both middle income and high income countries indistinctively.

[14] Data for the period 1989 to 2012 was not available for all countries. See Annex for a detailed overview of the countries included and respective time periods. Quarterly GDP was used for all countries in the sample with the only exception of Barbados. In the case of Barbados, due to data limitations, GDP was proxied by tourist arrivals. In Barbados, tourist arrivals and GDP (for the periods for which data is available for both variables) display a high degree of coincidence (including turning points) and association (very high and significant correlation coefficient).

[15] The other countries include Cyrpus, Israel, Macao and Malta. The Caribbean countries include Barbados, Belize, the Dominican Republic, Grenada, Jamaica, St. Lucia, and Trinidad and Tobago.

[16] The Calderón and Fuentes (2010, 2012) study includes only one country from Central America, Costa Rica, which may help to explain that their results seem to be representative mostly of the South American cycle.

[17] The results by region refer to medians in order to deal with outliers and because the distribution of the observation in terms of amplitude and duration (except perhaps for the duration of the contraction) are skewed.

[18] The Bry-Boschan algorithm to identify turning points was used for both Classical and Deviation Cycle methodologies. These were obtained using MatLab with the help of computer codes provided by Professors John Rand and Finn Tarp (University of Copenhagen). Stata was used for the identification of turning points using the Okun and Calculus algorithms and to compute the cycle indicators.

[19] These numbers refer to the duration and amplitude of a single episode. They refer to the numerator of the duration and amplitude formulas (Eqs. 3 and 4 above) and in this sense are not strictly comparable to the rest of the cycle indicators provided in the paper. In the case of Europe and Central Asia, the duration and amplitude of the last expansion episode are also greater than those of Latin America and the Caribbean (36.5 quarters and 63.2 per cent).

[20] Using only the Deviation Cycle methodology the cumulative again in output is also larger for East Asia and the Pacific in relation to Latin America and the Caribbean.

[21] However, this methodology, as explained in section 1.1, tends to produce longer contractions across all regions than the Classical Cycle methodology (See Pagan, 2003, on this point). Indeed, contractions according to this methodology tend to last for at least five quarters in most cases.

[22] The Caribbean includes the Dominican Republic.

[23] Throughout the paper, the Deviation Cycles are computed using the Hodrick Prescott filter. Some authors suggest that the difference in duration, especially between developed and developing economies, is due to a lack of homogeneity in the data, and in particular of using industrial activity indices for developing countries and GDP

data for developed countries. See Male (2009) and Du Plessis (2006). Our results are not affected by the use of GDP or of an index of industrial production. Using the latter measure, Latin America and the Caribbean still exhibits the shortest full cycle duration.

[24]   Part of this literature sustains that shocks such as wars, natural disasters, financial crisis and in general contractions in economic activity can lead to income per capita divergence by causing permanent losses in trend output and lower long- run growth. The specificities and transmission mechanisms include among others, the effect of aggregate demand fluctuactions on the capital stock, investment and labor (e.g., Dutt and Ros, 2009; IMF, 2009), financing constraints (Aghion et al., 2010), or the impact on total factor producticity or the permanent destruction of human capital (EC, 2009). Another transmission mechanism is volatility (Ramey and Ramey, 1995; Turnovsky& Chattopadhyay, P, (2003), 1998; Yigit, 2003).

[25]   Argentina, Brazil, Chile, Colombia, Mexico and Peru, which account for 85.5 per cent of the region's GDP between them.

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ANNEX. List of countries included and respective time domain for GDP

	First observation	Last observation		First observation	Last observation
East Asia and Pacific			**Sub Saharan Africa**		
China	1993:Q1	2012:Q1	Botswana	1994:Q1	2011:Q4
Indonesia	1997:Q1	2012:Q2	Mauricio	2000:Q1	2012:Q1
Malaysia	1989:Q1	2012:Q1	South Africa	1989:Q1	2012:Q2
Filipinas	1989:Q1	2011:Q4	**High Income**		
Thailand	1993:Q1	2012:Q1	Australia	1989:Q1	2012:Q2
Europe and Central Asia			Austria	1989:Q1	2012:Q1
Bulgaria	2002:Q1	2011:Q4	Barbados	1990:Q1	2012:Q2
Belorussia	1992:Q1	2012:Q1	Belgium	1989:Q1	2012:Q1
Georgia	1996:Q1	2011:Q4	Brunei	2003:Q1	2011:Q4
Kyrgyzstan	2000:Q1	2012:Q1	Canada	1989:Q1	2012:Q2
Latvia	1990:Q1	2012:Q1	Croatia	1993:Q1	2012:Q1
Lithuania	1993:Q1	2012:Q1	Cyprus	1995:Q1	2012:Q1
Rumania	1998:Q1	2012:Q1	Czech Republic	1994:Q1	2012:Q1
Russia	1995:Q1	2012:Q1	Denmark	1989:Q1	2012:Q1
Turkey	1989:Q1	2012:Q1	Estonia	1993:Q1	2012:Q1
Ukraine	2001:Q1	2012:Q1	Finland	1989:Q1	2011:Q4
Macedonia, FYR	2004:Q1	2012:Q1	France	1989:Q1	2012:Q2
Latin America & the Caribbean			Germany	1989:Q1	2012:Q2
Argentina	1990:Q1	2012:Q2	Hong Kong	1989:Q1	2012:Q1
Bolivia	1990:Q1	2012:Q1	Hungary	1995:Q1	2012:Q1
Brazil	1990:Q1	2012:Q2	Ireland	1997:Q1	2012:Q2
Belize	2000:Q1	2012:Q1	Island	1997:Q1	2012:Q2
Chile	1989:Q1	2012:Q1	Israel	1989:Q1	2012:Q2
Colombia	1994:Q1	2011:Q4	Italy	1989:Q1	2012:Q2
Costa Rica	1991:Q1	2012:Q1	Japan	1989:Q1	2012:Q2
Dominican Rep.	1992:Q1	2012:Q1	Luxemburg	1995:Q1	2012:Q1
Ecuador	1990:Q1	2012:Q1	Macao	1998:Q1	2012:Q1
El Salvador	1990:Q1	2012:Q1	Malta	1996:Q1	2011:Q4
Guatemala	2001:Q1	2012:Q1	Netherlands	1989:Q1	2012:Q2
Grenada	2000:Q1	2012:Q2	New Zealand	1989:Q1	2012:Q2
Jamaica	1996:Q1	2012:Q1	Norway	1989:Q1	2012:Q1
Mexico	1990:Q1	2012:Q2	Poland	1995:Q1	2012:Q1
Nicaragua	1994:Q1	2012:Q1	Portugal	1989:Q1	2011:Q4
Panama	1996:Q1	2012:Q1	Rep. of Korea	1989:Q1	2012:Q1
Paraguay	1994:Q1	2012:Q1	Singapore	1989:Q1	2011:Q4
Peru	1989:Q1	2012:Q2	Slovakia	1993:Q1	2012:Q1
Saint Lucia	2000:Q1	2012:Q2	Slovenia	1992:Q1	2012:Q1
Uruguay	1997:Q1	2012:Q2	Spain	1989:Q1	2012:Q2
Venezuela	1993:Q1	2012:Q2	Sweden	1989:Q1	2012:Q1
Middle East and North Africa			Switzerland	1989:Q1	2012:Q1
Jordan	1992:Q1	2011:Q4	Trinidad and Tobago	2000:Q1	2012:Q1
Morocco	1990:Q1	2011:Q4	United Kingdom	1989:Q1	2012:Q2
Tunisia	2000:Q1	2010:Q4	United States	1989:Q1	2012:Q2
South Asia					
India	1996:Q4	2011:Q4			

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