Growth Accelerations Strategies

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Abstract

Setting a country's structural growth rate on a higher path, i.e. sparking and sustaining a growth acceleration can have quantitatively huge implications for national income and, more broadly, for people's wellbeing. We develop a novel statistical framework to identify systematically the set of binding constraints that were unlocked before the 135 growth acceleration episodes that took place between 1962 and 2002 worldwide. We employ this information to characterise the acceleration process, which tends to be preceded by a deep recession and major economic policy changes. Once we combined this information with a set of counterfactual analyses, we find however that successful acceleration strategies should not contain off-the-shelf approaches or necessarily all-encompassing "shock therapy" solutions. On the other hand, they call for a careful tailoring to local conditions. Richer countries tend to experience fewer accelerations, but once these have been ignited, they are better positioned to make the most out of them. Despite standard growth determinants doing a fairly good job at characterising successful accelerations, we note how take-offs remain extremely hard to engineer with a high degree of certainty.

Keywords: growth accelerations, economic growth, economic reform, structural breaks

JEL Classifications: B41, E02, E65, F43, O11

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GROWTH ACCELERATIONS STRATEGIES

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I. Introduction

Achieving and sustaining high growth has been and remains the single most pressing economic policy priority for elected officials all over the world. It is then not surprising that understanding how and why some countries developed faster than others has been on top of economists' minds for now over two centuries.

Over the past three decades, starting with Barro (1991), the economic literature has been characterised by quantitative cross-country analyses that looked for correlates of growth or GDP per capita, and issued blanket policy advice calling for trade liberalisation (Sachs and Warner 1995), domestic financial liberalisation (Levine 1997), opening the capital account (Quinn 1997), improving institutions (Acemoglu et al. 2001), and the likes.

Around the same period, some authors were taking the contrarian view that there is little to be learned from cross-country regressions, because (i) long-term averages hide the fact that growth is highly unstable over time (Easterly et al. 1993; Pritchett 2000); and (ii) growth determinants are highly dependent on specific country circumstances (Rodrik 1995). Addressing (i), Hausmann et al (2005) moved on to analysing structural breaks in growth. Turning to (ii), Hausmann et al (2007) crafted a "diagnostics" framework to identify the binding constraints that hold back a country's growth.

Twenty years later, the research approach of multilateral organisation can be characterised as a tendency to acknowledge the findings of the latter school of thought, only to then engage in (more modern/sophisticated versions of) the old-school cross-country approach (see for example IMF 2015). In this paper, we attempt to strike a better balance between the two world views. To do so, we build a novel cross-country statistical framework, firmly grounded in the principles of growth diagnostics.

Our intuition is simple. Growth accelerations are ultimately structural breaks in growth patterns. As such, in these countries we would expect to observe significant fluctuations in standard growth determinants around the acceleration years, flagging which growth channel was unlocked or category of binding constraint relaxed. For this reason, we call our approach Systematic Diagnostics Framework (or SDF). We then use this information to inform our knowledge about the 135 growth acceleration episodes that took place between 1962 and 2002 worldwide.

The SDF caters for a high degree of country specificity, in both type of policies and growth channels. At the same time, it allows us to win the relativism that could stem from a strict application of the "every country is different" tenet, and scout instead for general principles that a successful acceleration strategy should respect.

In line with the literature (Berg et al. 2012; Hausmann et al. 2005), we analyse the factors contributing to igniting and sustaining an acceleration separately. Relating to the first, we illustrate how take-offs are generally preceded by disproportionate changes in standard growth determinants, in particular significant economic policy changes, and sharp recessions. Using an unsupervised machine learning algorithm, we show how the most frequent combination of factors preceding an acceleration is a large increase in the exploitation of natural resources, supported by other demand-management or supply-side policies, as was the case for example in Vietnam in 1989.

However, once we build a counterfactual analysis, taking into account not only how often acceleration episodes were preceded by certain conditions/policies, but also how often those conditions/policies materialised over time, we note that there is no strictly dominant strategy to ignite a take-off. In general, increasing the number of growth constraints that are relaxed increases the probability of experiencing a take-off only in selected instances, and even then, it represents a somewhat marginal and insignificant probability improvement. Despite standard growth determinants doing a fairly good job at characterising successful accelerations within our framework, we note how take-offs remain extremely hard to engineer with a high degree of certainty.

Simply sparking a growth acceleration is not the whole story. Its capacity to improve a country's economic outcomes, which is what ultimately matters, crucially depends on whether it was sustained and how large the shift in structural growth rates was. In order to quantify the strength of a take-off, we propose a novel application of a matching method that allows us to compare the GDP performance of an accelerating country with a counterfactual based on geographical and production structure proximity. This approach is parsimonious, highly transparent, and can be shown to perform quite well in tracking pre-acceleration growth.

This leads us to our main results. First, no one specific growth strategy seems to prevail on the others in determining acceleration strength. Second, we find that the most successful growth accelerations follow the relaxation of few binding constraints in key dimensions, rather than jointly unlocking several growth channels. We therefore conclude that a successful acceleration strategy should not contain off the shelf approaches or necessarily all-encompassing "shock therapy" solutions. On the other hand, it will call for a careful tailoring to local conditions. Third, our quantitative and qualitative evidence suggests that institutions have a potential role to play in making the most of accelerations, once these have been ignited.

Throughout the paper, we show how these results are robust to a series of alternative formulations of the counterfactual, including by deploying a comprehensive Synthetic Control Model, as in Marrazzo and Terzi (2017). Moreover, we validate our novel SDF approach qualitatively by means of comparison with selected country-specific case studies, and quantitatively by means of simulations aimed at showing that the method is not simply picking up noise, and instead it is detecting characteristics that are specific to the growth acceleration process.

Literature review

Our paper relates most to the strand in the literature that was opened by a seminal contribution by Pritchett (2000), who illustrated how looking at long-term average growth rates is misleading, as countries tend to experience sharp up and down breaks in their growth time-series. A few years after that, Hausmann et al (2005) were the first to employ a Bai-Perron multiple structural break analysis to identify these turning points, and correlate them with standard growth determinants. Since then, the acceleration literature has focussed on a) improving the structural break methodology to identify turning points (Jong-A-Ping and De Haan 2011; Kar et al. 2013; Kerekes 2007); b) exploring different econometric techniques to predict and understand their occurrence, such as panel- or binary regressions (Aizenman and Spiegel 2010; Dovern and Nunnenkamp 2007; Hausmann et al. 2006; Jones and Olken 2008; Jong-A-Ping and De Haan 2011; Prati et al. 2013), Markov switching models (Jerzmanowski 2006; Kerekes 2012), and survival analysis (Berg et al. 2012); and c) focussing on specific world regions (Arbache and Page 2009; Imam and Salinas 2008; Timmer and de Vries 2009). Most recently, Pritchett et al (2016) have attempted to quantify how large the GDP implications of accelerations are vis-à-vis various counterfactuals.

The remainder of this paper is organised as follows: Section II introduces our novel Systematic Diagnostic Framework and shows how it passes several validation tests. Descriptive statistics and a hierarchical cluster analysis are employed in Section III to illustrate key features of the acceleration process. In Section IV, we set up a series of counterfactual analyses to formulate some general principles about growth acceleration strategies. Section V provides some concluding remarks.

II. Methodology

The aim of this section is to introduce our novel Systematic Diagnostic Framework, and to explain its mechanics. We will then proceed to validate our results by means of qualitative comparison with selected country-specific case studies, and quantitative simulations aimed at showing that the method is not simply picking up noise and instead it is detecting characteristics that are specific to the growth acceleration process.

a. Introducing the Systematic Diagnostics Framework (SDF)

From a theoretical standpoint, we start from the central tenet of growth diagnostics, as spelt out in Hausmann, Rodrik, and Velasco (2007), i.e. the idea that, in each country, growth is ultimately constrained by certain factors. For some it is a current account constraint, for others the lack of infrastructure, and so on. If and when the "binding constraints" are relaxed, growth accelerates. Because these binding constraints are extremely hard to identify *ex ante*, much of the subsequent efforts in this strand of literature have focussed on developing heuristic techniques to identify them (Hausmann et al. 2008).

Our intuition is simple. Growth accelerations, as first defined in Hausmann, Pritchett, and Rodrik (2005), are structural breaks in growth patterns. As such, in these countries we would expect to observe significant fluctuations in standard growth determinants around the acceleration years, flagging which category of binding constraint was relaxed. The central finding originating from the growth acceleration literature is that growth, particularly in non-advanced economies, is not a smooth process (Pritchett 2000). By the same token, we want to scout for relatively large sudden changes in variables that the literature has found to be crucial for predicting (medium-term) growth. We then want to explore whether there is a significant co-occurrence between the two classes of breaks and, if so, to what extent. This will inform our knowledge about characteristics of the acceleration process and, implicitly, allow us to draw some general principles about potential growth acceleration strategies.

While preserving the country specificity that underlies growth diagnostics, we want to be able to carry it out within an integrated framework to draw general lessons about the growth acceleration process, and not only understand the specific economic situation of a country. For this reason, we call the statistical framework to do so, Systematic Diagnostics Framework (or SDF). In a sense, our challenge is harder than running a standard country-specific growth diagnostic exercise, because we want to do it in a systematic, and therefore, entirely data-driven framework. However, at the same time, it is also easier, because it should be simpler to identify what triggered a sharp change in growth *ex post*, rather than speculating on the potential bottlenecks in a stagnant economy.

b. The SDF in practice

Our SDF is composed of three steps. First, we select relevant growth determinants, second, we identify breaks in these variables, and third, we pair this information with growth accelerations. We begin by identifying some of the predominant growth theories, and the key variables that they predict as being crucial determinants of (short- to medium-term) growth. In doing so, we build on the growth acceleration literature (in particular Aizenman and Spiegel 2010; Hausmann et al. 2005; Jones and Olken 2008; Jong-A-Ping and De Haan 2011), and the growth determinants literature more broadly (Barro 2003; Durlauf et al. 2008; Moral-Benito 2012; Sala-i-Martin et al. 2004). While understandingly making overt simplifications, we categorise them along the following families[1]:

[1] We note that this is not an uncommon practice in this strand of literature. See for example Jones and Olken (2008), or Hausmann et al (2005)

1. <u>(Political) institutions</u>: Over the last few decades, several growth theories have placed institutions at the centre of the growth process, in particular democracy/political rights (Acemoglu et al. 2001, 2014; Gwartney et al. 1999; Papaioannou and Siourounis 2008; Persson and Tabellini 2006; Rodrik and Wacziarg 2005). Moreover, the growth (acceleration) literature has looked at the impact of (the end of) conflict situations, both civil- and external (Paul Collier and Hoeffler 2004a, 2004b; Hausmann et al. 2005; Hoeffler 2012; Hoeffler et al. 2010). We therefore include the Freedom House Index as a standard measure of democratic institutions, and data on conflicts from the Correlates of War project (Sarkees and Wayman 2010).

2. <u>Economic policy</u>: A view particularly cherished by multilateral organisations is that economic policy is paramount in determining a country's growth trajectory (P. Collier and Dollar 2001; Easterly 2005). Unsurprisingly, practically all papers looking for the determinants of take-offs include indicators of economic reform or policy. We build on Mussa and Savastano (1999), who explain how the IMF's approach for countries in need of a boost out of recessionary situations is a combination of macroeconomic stabilisation, often in the form of demand-restraining measures, and structural reforms. In most cases, this is combined with exchange rate devaluations, to jump-start the economy. For the purpose of our SDF exercise, we will focus on inflation reduction (as in Bruno and Easterly 1998) and effective exchange rate devaluations (from Darvas 2012), on the demand side. On the supply side, we make use of the comprehensive structural reforms database recently developed by Giuliano et al (2013), which covers trade-, product market-, agriculture-, and capital account- liberalisation, together with financial and banking sector reform.

3. <u>Endowments</u>: Some authors in the literature have shown the important role that natural resources can play in fostering growth spurts, particularly over the short and medium run (Brunnschweiler and Bulte 2008; Deaton and Miller 1995; Manzano and Rigobon 2001; Mideksa 2013; Sala-i-Martin et al. 2004). We therefore include in our analysis the World Bank's natural resource rent variable, which is quite comprehensive, including the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents.

4. <u>Luck</u>: Observing how growth is particularly volatile, while economic policy and institutions are relatively stable, Easterly et al (1993) opened a new strand in the literature that wonders whether "good luck" is an important growth determinant, perhaps more so than "good policies" (Blattman et al. 2007; Hamann and Prati 2002). To explore whether this applies to growth accelerations, we focus on two variables: (positive)

terms of trade shocks, in line with the original Easterly et al (1993), and export demand[2], building on Prasad and Gable (1998) and Hamann and Prati (2002).

5. Solow-Swan: In what is perhaps the most standard neo-classical model of long-term growth, Solow (1957) and Swan (1956) show how an acceleration in the rate of growth in GDP per capita (GDPpc) can be achieved in the short run by means of an increase in capital investment. It therefore comes as no surprise that the main papers in the growth acceleration literature all look at the role of investment. For our purposes, we make use of the World Bank's (public and private) investment variable, which encompasses plant, machinery, and equipment purchases; the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.

Table 1. Growth determinants considered in the SDF

Theory	Sub-theory	Variable	Direction
Institutions		Freedom House Index	+
		Conflict (domestic/external)	-
Economic Policy	Demand-side	Inflation	-
		Effective Exchange Rate	-
	Supply-side	Agriculture market liberalisation	+
		Product market liberalisation	+
		Trade liberalisation	+
		Capital account liberalisation	+
		Current account liberalisation	+
		Domestic financial liberalisation	+
Endowments		Natural resource rent	+
Luck		Terms of Trade	+
		Export demand	+
Solow-Swan		Investment (public and private)	+

Table 1 summarises the theories, variables, and the direction with which we expect them to impact GDP, based on the literature[3]. Some of these will not be controversial, as for example investment or terms of trade. Others, like various forms of economic liberalisation or democratic transition, are more moot. As discussed later on in

[2] Starting from bilateral UN COMTRADE data, for each country i, we build this variable as the increase in world weighted imports of the goods that i exports, net of i's exports.

[3] We include Terms of Trade and Real Exchange Rate shocks separately and under different theories. It has been shown that the two do not necessarily co-move, especially in the short-run (Edwards and Van Wijnbergen 1987). Factors such as the currency regime and whether the shock is perceived as temporary or permanent will affect the relationship between the two.

the paper, all alternative heterodox theories or worldviews are not necessarily incompatible with the SDF and will simply be subsumed by the unexplained category of our model.

To identify key "breaks" in these growth determinants, we take inspiration from the statistical approach introduced in IMF (2015) and later employed by Marrazzo and Terzi (2017) to detect large structural reform waves. More specifically, for each variable and country, we look at the whole distribution of one-year positive/negative changes, depending on the variable's direction, and identify as "breaks" those that fall in the top 5th percentile. This approach has the appealing property of not forcing us to make any assumption on the distribution of these changes. Moreover, it detects shocks in a country-specific fashion, based on the country's history, rather than imposing fictitious absolute thresholds for all countries.

For example, inflation reductions are likely to benefit growth through a shift in investor (foreign and domestic) and consumer expectations. A deviation from historical trend is more likely to predict a shift in expectations than the absolute size of the change *per se*. If South Africa sharply reduces inflation in one year from 13.9% in 1992 to 9.7% in 1993 in a country that has barely seen inflation rates above 15% over the past 50 years, this is likely to affect expectations and growth. On the other hand, international investors are unlikely to react if a similar 4 p.p. change took place in Mexico, where inflation has been over 15% for over two decades, and sudden inflation reductions of a larger size have been observed eleven times since 1962[4]. Imposing large arbitrary thresholds (e.g. at least 10 p.p. reduction) or searching for breaks at world-level would yield to a loss of interesting country-specific trends (see Appendix 1 for a more in-depth discussion and Appendix 3 for a robustness check on results introducing global thresholds).

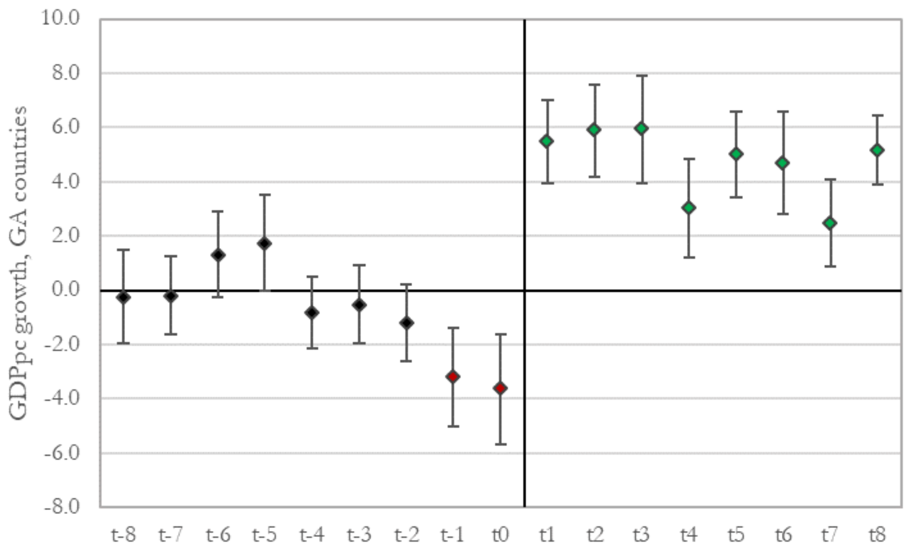
Clearly, our percentile method does not apply to a stable dichotomic variable like conflict. In this specific instance, we adopted the following rule: a break is characterised by at least two years of peace following a situation of conflict that had lasted for at least two years.

We then merged this data with the database of growth accelerations of Kar et al (2013), who eclectically build on several methods introduced since the initial contribution of Hausmann et al (2005). In particular, using a Fit-and-Filter approach based on the Bai-Perron multiple structural break analysis on 125 countries between 1950-2010, the authors identify 135 growth acceleration episodes.

[4] Empirically, Mexico had a variance that was 40-fold that of South Africa (841 vs 20.7). We would then expect different definitions of large "break" from trend.

We flag a variable if a "break" occurred in years [t-2, t] of a growth acceleration ignited at t, and consider it as a signal that the triggers or channels through which the ensuing growth acceleration occurred pertain to a certain growth theory. We choose the interval [t-2, t] after looking at the time profiling of GDPpc growth for the average growth acceleration episode.

Figure 1. Average GDPpc growth rates for Growth Acceleration countries



As is clear from Figure 1, t-1 and t are clear generalised recession years, breaking a longer trend of around-zero average growth (95% CI). This leads us to think that our key variables' breaks are to be located around this time interval. Understanding whether a sudden policy change, say tightening demand policy, at t-2 caused the recession, or the recession prompted a policy change, for example along the lines of the "crisis hypothesis" for structural reforms (Agnello et al. 2015; Lora and Olivera 2004; Williamson 1994), is beyond our interest for this study[5]. We simply note that our baseline timeframe [t-2, t] caters for both[6].

Clearly, some of the variables considered are more related to triggers (e.g. liberalisations), others to channels (e.g. investment). This is perhaps because some growth theories are more interested in the former (e.g. quantifying the impact of economic reforms, irrespective of the channel), others in the latter (e.g. the Solow model, where investment increase is key, irrespective of what triggered it). The SDF allows for both to be flagged independently, or simultaneously, then suggesting both trigger and channel.

[5] As a side note, our case study analysis in Section II.c seem to lend more credibility to the idea that crisis situations led to policies that paved the way for the growth acceleration, rather than policies led to a short-term recession.
[6] As a robustness check, all the results of the paper were replicated for an alternative (longer) 4-year window [t-3,t0]. All findings were confirmed. Results available upon request.

The key output of our SDF exercise is what we call a diagnostics table, displayed in Appendix 2, identifying the variables experiencing a large change in the immediate beforemath of the 135 growth acceleration episodes identified in Kar et al (2013)[7]. The next three sections are aimed at validating these results.

c. Validation through case studies

In the words of Rodrik (2003, p. 10), "*any cross-national empirical regularity that cannot be meaningfully verified on the basis of country studies should be regarded as suspect*". As such, as a first validation test for our novel SDF, we benchmark the performance of the diagnostics table with case studies, for six growth acceleration episodes, spanning five different World Bank regions and four decades (see Table 2).

Table 2. Diagnostics table for six growth acceleration episodes

Theory		Variables	GIN2002	FIN1993	JOR1974	KOR1982	IND1993	IRL1987
Institutions		War end	✓	✗	✗	✗	✗	✗
		FHI	✗	✗	✗	✗	✗	✗
Policy	Demand side	Inflation	✗	✗	✗	✓	✗	✗
		EER shock (-)	✗	✓	✗	✗	✓	✗
	Supply side	Structural reforms	✗	✓	✗	✓	✓	✓
Endowments		Natural resource extraction	✗	✗	✓	✗	✗	✗
Luck		ToT shock (+)	✗	✓	✗	✗	✗	✗
		Boost in export demand	✗	✗	✗	✗	✗	✗
Solow-Swan		Investment (public and private)	✗	✗	✗	✗	✗	✗

Note: Table reports data from the Systematic Diagnostics Framework for 6 growth acceleration episodes. Ticks indicate a top 5th percentile increase in the variable over the period [t-2,t0]. See text for further details.

For Guinea, the SDF flags the end of a long-lasting conflict just ahead of the growth acceleration that took place in 2002. Dixon and Sarkees (2015) confirm that following the 1995 elections, and an attempted coup in 1996, a group of rebels known as Rally of Democratic Forces of Guinea (or RFDG) attacked several cities near the border with Liberia and Sierra Leone. They managed to spread fighting almost up to the capital Conakry, but following a series of battles, hostilities came to an end in 2001. Moreover, Zamfir (2016) argues how reduction of conflict for West African countries since the early 2000s has been "*without doubt a central contributor to growth*".

[7] We note that our SDF method and the resulting flag table somewhat resembles the scoreboard used by the European Commission when monitoring macroeconomic imbalances developing in Member States.

Table 2 shows how for Finland, the SDF suggests that ahead of the 1993 growth acceleration, the country experienced a historically large exchange rate depreciation, structural reforms, and a supportive external environment. According to Seppo et al (2009), Finland entered into a twin crisis in 1991-93, due to the collapse of an important export partner like the Soviet Union (representing roughly 15% of total exports), a credit boom and bust cycle, fuelled by earlier financial liberalisations in the 1980s, and restrictive monetary/fiscal conditions. Following that, Andersen et al (2015) note how the recovery began in 1993 and was mainly export led. They further underline how *"Exports were boosted by exchange rate depreciation and the recovery in the rest of the world*". A point also made by Dornbusch et al (1995). Furthermore, Seppo et al (2009) note how "t*he huge structural change in the Finnish economy was largely a result of the rapid rise of the ICT industry*" and "*the early liberalisation of telecommunication caused a breakthrough in digital communications*". In the early 1990s, "*the Finnish telecom markets were fully liberalised as one of the first in the world*" according to Hirvonen (2004). Finally, Jonung et al (2009) comprehensively remark how "*Finland made a qualitative leap from an economic structure dominated by mostly resource-based heavy industries to one with knowledge-based, mostly ICT, industries as a leading sector*". All this seems very aligned with the picture pained by the SDF.

For Jordan, the SDF identifies a large change in natural resource rents as preceding the 1974 growth acceleration. In analysing the country, Krieger (2001) remarks how "*Jordan enjoyed an economic boom for over a decade after the 1973 war, thanks largely to soaring oil prices*". Note that in this case the SDF did not flag war as a crucial pre-acceleration break, because the 1973 war lasted less than 20 days. We therefore see some confirmation also of our rule-based approach for the conflict variable in Krieger's growth analysis.

Our SDF suggests that behind the 1982 growth acceleration of South Korea were large changes in demand and supply policy. Collins and Park (1989) come to similar conclusions, when they note how "*in 1981, South Korea was the world's fourth largest debtor country and in the midst of an economic crisis*". The country engaged in a sharp macroeconomic adjustment programme based on demand-restraining measures and liberalisations. More in detail, they remark how the "*stabilization plan included monetary and fiscal restraint plus the gradual reduction of price controls, import restrictions, and financial market interventions*".

India experienced a renowned growth acceleration at the beginning of the 1990s and our SDF methodology detected wide-reaching structural reforms, supported by an exchange rate depreciation, just ahead of it. Ahluwalia (2002) notes how, while some reforms were implemented in the 80s, "*it was not until 1991 that the government signalled a systemic shift to a more open economy with greater reliance upon market forces, a larger role for the private sector including foreign investment, and a restructuring of the role of government*". This, combined with a sharp rupee depreciation during the 1991 balance of payment crisis, paved the way for a strong 1990s growth performance. A point also made by Panagariya (2004).

There are many specific explanations as to why Ireland became known as the "Celtic tiger" in the late 80s and throughout the 90s. Most importantly for our purposes, all explanations given tend to fall in the category identified by the SDF of structural policies, from tax- and education reform, to liberalisation of airlines and telecommunications, as discussed by Burnham (2003), or specifically financial liberalisation (Kelly and Everett 2004).

While having no pretence of being comprehensive, our brief qualitative case study analysis suggests that indeed our diagnostics table does a fairly good job at quantitatively flagging variables that country-specific experts have argued were at the origin of the ensuing growth accelerations.

d. Random sampling method

Going beyond individual case studies, on a more aggregate level, a potential concern could be that what we are picking up with the SDF is only noise, and that while it is true that we detect large breaks in key variables, these are somewhat endemic to the decades and world regions we are looking at, and not specifically clustered before growth acceleration episodes.

To dispel this concern, we compare the breaks identified in our diagnostics table before growth acceleration episodes with those preceding a random sample of 135 country-year combinations (so-called "simulated growth accelerations", or SGAs), picked to reflect:

1. the empirical distribution of regions and decades of the real growth acceleration episodes;
2. the fact that in the original Kar et al (2013) study, growth accelerations could not be less than eight years apart from each other.

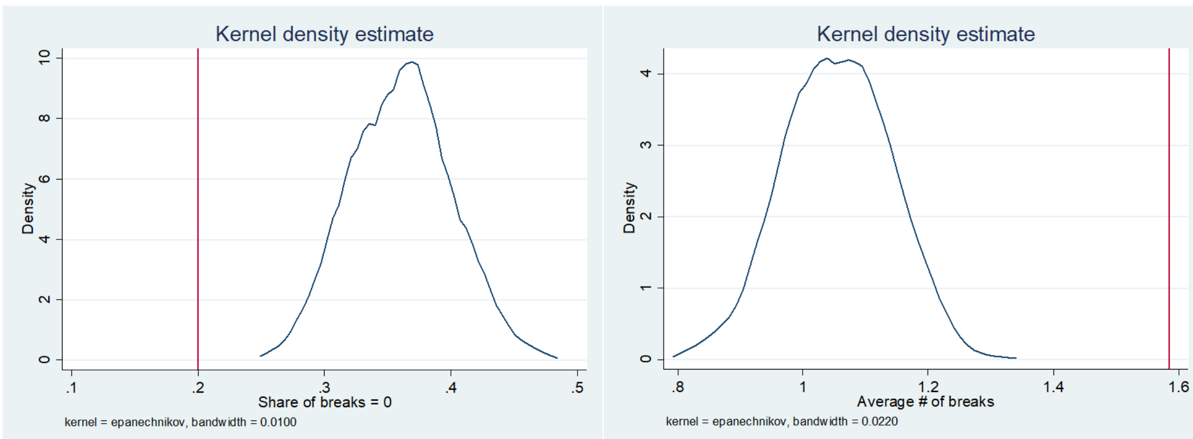
More formally, we compute the matrix $\boldsymbol{S_{rd}}$ containing the count of growth acceleration episodes occurring in each region r and decade d as:

$$\boldsymbol{S_{rd}} = \begin{bmatrix} S_{rd} & \cdots & S_{rd} \\ \vdots & \ddots & \vdots \\ S_{Rd} & \cdots & S_{RD} \end{bmatrix}$$

for $r \in \mathcal{R}$ and $d \in \mathcal{D}$. This tells us for example that there were five take-offs in Latin America in the 70s, two in South Asia in the 80s, and so on. We then randomly extract an SDA with r and d, remove the 8-year window before and after that SGA, and proceed by extracting the next SGA with the same r and d. We continue until S_{rd} SGAs have been extracted for all $\mathcal{R}$ and $\mathcal{D}$, for a total of 135 SGAs.

We repeat this random extraction 500 times, to obtain a full distribution of the average number of breaks, and benchmark it with our real growth acceleration episodes (see Figure 2, RHS). A standard t-test (p-value = 0.002) categorically rejects that growth accelerations are orthogonal to breaks, or else put, that growth accelerations are random events vis-à-vis breaks in standard growth determinants. We also look at the share of simulated growth accelerations preceded by no breaks along all variables considered. In all 500 instances, we obtained a higher share of zero breaks than in our real growth acceleration episodes, suggesting breaks and growth accelerations are indeed associated (Figure 2, LHS).

Figure 2. Share of zero breaks (LHS) and average number of breaks (RHS) preceding simulated growth accelerations



Finally, as an alternative way to test the same hypothesis without looking at averages, but retaining the full distribution of breaks, we ran separate Pearson χ^2 tests on the contingency tables of the number of breaks for the 135 simulated- and real- growth acceleration episodes, repeating it for all 500 instances. In 493/500 cases we rejected at the 5% level that the two were independent, giving us a Fisher p-value=0.014.

All these tests suggest that indeed breaks in key growth determinants and growth accelerations do not happen independently but are rather highly correlated events.

e. Comparison to cyclical growth rebounds

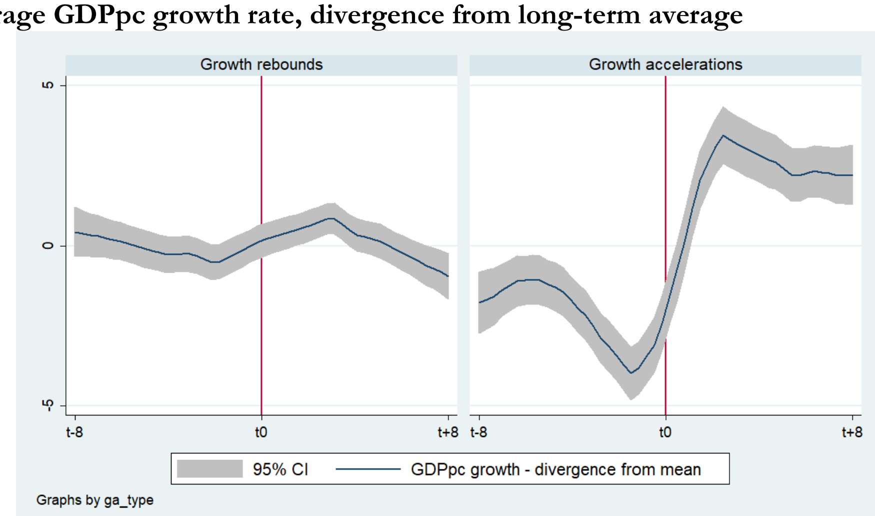
Another potential concern could be that breaks do cluster before acceleration episodes, but because growth accelerations are generally preceded by recessions (as evident in Figure 1). They could then be a characteristic of the business cycle, more than strictly associated with a structural change in growth patterns.

To test whether this is the case, we referred back to the original growth acceleration paper by Kar et al (2013), and replicated a basic version of the fit-and-filter methodology they describe, stripping it however of the "structural" component. More specifically, we identify instances where, excluding our real growth acceleration episodes:

1. growth rates accelerated in one year by at least 3 percentage points (for e.g. from -1% to 2.5%);
2. these episodes are at least 8 years apart;
3. if there is more than one such instance in an 8-year window, we select the largest.

This process led us to identify 143 episodes, which we call "growth rebounds" (GRs), having a cyclical, more than structural, component to them given they did not make the cut for fully-fledged accelerations in Kar et al (2013). Figure 2 shows how the GDPpc growth profiling of GRs differs from that of growth accelerations, by means of a nonparametric kernel-weighted local polynomial fit. While the former are clearly cyclical fluctuations around a long-term average, the latter were growing below average, experienced a deep recession, and sprung to a higher structural growth rate.

Figure 2. Average GDPpc growth rate, divergence from long-term average



We then apply our standard Pearson χ^2 test to the contingency tables of the number of breaks preceding GRs and growth accelerations. We firmly reject (p-value=0.003) that GRs experience a comparable break pattern in medium-term growth determinants as growth acceleration episodes. The average number of breaks was 25% lower for GRs vis-à-vis accelerations, and they were preceded by no breaks 36% more times than real take-offs.

III. Characterising growth accelerations

Reading through the evidence stacked up in the last three data validation sections, it looks indeed like breaks in growth determinants identified by the SDF methodology are specific characteristics of growth take-offs. In this

Section, we will look for patterns in these characteristics, by means of descriptive statistics and a basic unsupervised machine learning clustering algorithm.

a. Descriptive statistics

Before engaging in more quantitative analyses of effective growth acceleration strategies, we start by reviewing some descriptive statistics originating from the diagnostics table. In doing so, we will focus on an indicator that we call "incidence", defined as the percentage of growth acceleration episodes displaying large breaks in a variable that falls under the umbrella of a certain theory, as described in Section IIb and Appendix 2. Note that incidence levels do not necessarily add up to 100%, as an acceleration episode can be preceded by breaks in multiple dimensions.

i. Theories

First, we look at how different theories stack up against each other in characterising growth acceleration episodes. Table 3 displays the number of take-offs that were preceded by large breaks in variables pertaining to a specific theory, and its incidence.

Table 3. Incidence by growth theory

Theory	Count	Incidence
Policy	80	0.59
Luck	37	0.27
Endowments	31	0.23
Institutions	18	0.13
Solow-Swan	13	0.10
Unexplained	27	0.20

Note: Table contains absolute number and percentages of growth acceleration episodes displaying a break in each theory.

At first sight, the policy perspective seems vindicated. Large economic policy changes precede almost 60% of growth acceleration episodes. The multilateral view seems therefore vindicated. Within our framework, and with a larger dataset of episodes, the finding of Hausmann et al (2005) that "*most growth accelerations are not preceded […] by major changes in economic policies*" does not seem confirmed[8]. To be sure, their finding had already been questioned by the literature (Jong-A-Ping and De Haan 2011; Prati et al. 2013). Moreover, this should not surprise given our emphasis on country-specific breaks and the fact that we are employing a more granular and wide-reaching economic reform database.

[8] To be sure, this finding had already been questioned by Jong-A-Ping and De Haan (2011).

Economic policies are followed at a distance by strikes of luck, which precede slightly more than one fourth of take-offs. *Prima facie*, at least for sparking growth accelerations, the Easterly et al (1993) finding that "good luck" matters more than "good policy" does not seem vindicated.

Endowment shocks follow suit. Large moves towards democracy or end of a conflict do not seem to have a predominant role in anticipating growth accelerations. This finding is in line with Jones and Olken (2008) for example, who finds a role for conflict only in growth collapses but not accelerations, and a non-significant role for institutional variables like democracy and rule of law.

Finally, large sudden investment programmes seem to precede only one in ten growth acceleration episodes. Again, this confirms the statistical findings of Jones and Olken (2008), who were using a more canonical binary regression methodology. We note that 20% of our growth accelerations was not preceded by any large break in standard growth determinants. We call these "unexplained" (within the SDF framework) and could potentially encompass countries that resorted to other tools, to heterodox policies, or to small incremental changes.

ii. Geography

We further slice the data along the geographical dimension, to see whether some theories are more associated with growth accelerations than others in different areas of the world, based on World Bank classifications. From here onwards, we split demand- and supply-side policies, as it is also interesting to get a better sense of the incidence of each. We consider this (sub-) theory level as the one striking the most appropriate balance between allowing for country-specific differences, in line with Hausmann et al (2007), and drawing some general lessons about the acceleration process.

Table 4. Incidence by growth (sub-)theory and geographical grouping

	East Asia & Pacific	Europe & Central Asia	Latin America & Caribbean	Middle East & North Africa	South Asia	Sub-Saharan Africa
Demand-side policy	**0.55**	**0.56**	0.49	0.40	0.25	0.28
Supply-side policy	0.40	**1.00**	0.49	0.40	**0.63**	0.34
Luck	0.30	0.44	0.17	0.40	0.38	0.26
Endowments	0.15	0.44	0.20	0.30	0.00	0.26
Institutions	0.15	0.22	0.06	0.20	0.13	0.15
Solow-Swan	0.05	0.00	0.09	0.10	0.38	0.09
Unexplained	0.20	0.00	0.17	0.20	0.13	0.26
count	20	9	35	10	8	53
share	0.15	0.07	0.26	0.07	0.06	0.39

Note: Table contains percentages of growth acceleration episodes within each region displaying a break in each (sub-)theory. Bold indicates a share higher than 50%.

While large demand policy changes often anticipated growth accelerations taking place in East Asia, Europe, Latin America and the Middle East, this was less true in South Asia and Sub-Saharan Africa. Large structural reforms were implemented around every growth acceleration episodes taking place in Europe (Cyprus in the 70s, UK, Portugal and Ireland in the 80s, Poland, Albania, Finland, and Bulgaria in the 90s), while only roughly in a third of Sub-Saharan Africa's take-offs.

European and the Middle Eastern growth accelerations display some commonalities. Luck had a high incidence in both, as did institutional variables and natural endowments. No growth acceleration taking place in South Asia was preceded by endowment shocks, and only a handful of Latin American acceleration episodes was preceded by large institutional shocks. Interestingly, investment shocks were rare, as we had identified already at the aggregate level in Table 3, in most instances, with the exception of South Asia (specifically, in Bangladesh and India).

iii. Decades

Another interesting angle that we felt worthwhile exploring, was to look at how the incidence of different (sub-)theories changes across time (Table 5). Possibly due also to issues of limited data availability, Kar et al (2013) do not identify many acceleration episodes in the 60s. Among those few, structural reforms display the highest incidence.

Table 5. Incidence by growth (sub-)theory and decade

	1960	1970	1980	1990	2000
Supply-side policy	**0.33**	0.19	0.46	0.59	**0.52**
Institutions	0.00	0.10	0.10	0.19	0.22
Solow-Swan	0.13	0.10	0.03	0.11	0.17
Luck	0.20	0.29	0.36	0.30	0.13
Demand-side policy	0.13	0.24	**0.49**	**0.68**	0.13
Endowments	0.00	**0.48**	0.23	0.27	0.09
Unexplained	0.40	0.29	0.18	0.08	0.22
count	15	21	39	37	23
share	0.11	0.16	0.29	0.27	0.17

Note: Table contains percentages of growth acceleration episodes within each decade displaying a break in each (sub-)theory. Bold indicates the largest share in the decade.

In the 70s, during years of the oil price boom, it is perhaps not surprising that endowments played the lion share. The 80s, and particularly the 90s, were the years when worldwide high inflation was progressively brought under control. Most growth accelerations were indeed preceded by large demand-policy changes. Finally, in the 2000s, demand-policy loses relevance, while structural reforms take the lion share.

iv. Income level

Highly related to the different geographical patterns is the incidence of the various theories by income level. We split growth acceleration episodes based on their global income per capita quartile. One overall interesting finding is that least-developed- and lower middle-income countries seem to have resorted to all sorts of policies when they were successful in spurring a growth acceleration, while upper-middle-income countries and advanced economies tended to be more focussed on structural reforms and, in any case, less focussed on institutional changes and investment boosts (Table 6).

Table 6. Incidence by growth (sub-)theory and income quartile

Quartiles	1st	2nd	3rd	4th
Supply-side policy	0.40	0.44	**0.59**	**0.75**
Demand-side policy	0.37	0.44	0.47	0.25
Luck	0.30	0.31	0.22	0.25
Endowments	0.25	0.25	0.19	0.25
Institutions	0.17	0.13	0.06	0.00
Solow-Swan	0.13	0.09	0.06	0.00
Unexplained	0.21	0.16	0.19	0.25
counts	63	32	32	4
share	0.48	0.24	0.24	0.03

Note: Table contains percentages of growth acceleration episodes within each income quartile displaying a break in each (sub-)theory. Bold indicates values of 50% or above.

A famous quote from Tolstoy's Anna Karenina is "*Happy families are all alike; every unhappy family is unhappy in its own way*". This seems to apply well also to growth acceleration episodes, where wealthier countries seem to have few similar growth channels, while poorer countries do not display a clear pattern. The question could however be whether poorer countries' acceleration episodes are characterised by a combination of multiple breaks, while rich countries have followed more targeted approaches. This is a matter we now turn to.

v. Number of breaks

In this section, we look at the number of theories that are flagged by the SDF in the pre-acceleration period (Table 7). At an aggregate level, we notice that aside from the 20% not experiencing a break (what we had characterised as "unexplained" above), a third of accelerations was preceded by only one break, 23% by two and 20% by three. Only few episodes went beyond that. Looking at the disaggregation by income quartiles, we see that this general pattern is broadly confirmed across all wealth groupings.

Table 7. Number of breaks by income quartile

		Quartiles			
# of breaks	*perc.*	1st	2nd	3rd	4th
0	0.20	0.21	0.16	0.19	0.25
1	0.33	0.29	0.34	0.38	0.25
2	0.23	0.24	0.28	0.19	0.25
3	0.20	0.24	0.16	0.19	0.25
4	0.02	0.02	0.03	0.03	0.00
5	0.02	0.02	0.03	0.03	0.00
tot	1.00	1.00	1.00	1.00	1.00

Note: Table contains percentages of growth acceleration episodes grouped by numer of breaks displayed, overall and subdivided by income quartile groups.

b. Hierarchical clustering

As a first descriptive analysis of growth strategies, we want to see whether certain growth-associated variable breaks tend to cluster together, and therefore whether there are packages that are more frequently associated with the inception of a growth acceleration (e.g. structural reforms and strikes of luck). We therefore ran a hierarchical cluster analysis as a form of unsupervised machine learning on growth acceleration episodes (or, strictly speaking, on the diagnostics table in Appendix 2). We set the number of clusters = 7, the idea being that if the six theories (plus the residual "unexplained") were fully independent, they would cluster exactly along those lines.

More formally, consider two growth acceleration episodes i and j, $i, j \in \mathbb{E} = \{1, \dots, 135\}$. Each of them can be explained by one of seven options, i.e. we can define $G_i = \{s_1, \dots, s_7\}$ where s_h is an indicator function and therefore takes values in $\{0,1\}$ for the six theories that can display breaks in our SDF, plus the residual "unexplained". By this logic, we can define a measure of similarity between two growth accelerations as:

$$J_{i,j} = \frac{M_{11}(i,j)}{M_{01}(i,j) + M_{10}(i,j) + M_{11}(i,j)}$$

where $M_{hk}(i,j)$ is the number of theories that are h in growth acceleration episode i and k in growth acceleration episode j. This is formally known as the Jaccard similarity coefficient between binary vectors. For example, Albania 1992 is preceded by breaks in all theories but one, and therefore $G_{ALB} = \{1,1,1,1,0,1,0\}$. Botswana 1982 is preceded by breaks in demand policy and luck, hence $G_{BWA} = \{1,0,0,1,0,0,0\}$. The Jaccard similarity between these two episodes is thus $J_{ALB,BWA} = 0.4$ computed as:

$$J_{ALB,BWA} = \frac{2}{5}$$

The distance between growth acceleration episodes ($d_{i,j} = 1 - J_{i,j}$) is then used on a complete-linkage hierarchical clustering algorithm, where the distance between two groups $\mathcal{A}$ and $\mathcal{B}$ is defined as the maximum distance between their elements:

$$d(\mathcal{A},\mathcal{B}) = \max(d_{i,j} : i \in \mathcal{A}, j \in \mathcal{B})$$

The results of this exercise are displayed in Table 8. The first three cluster encompass almost 70% of all take-offs. Cluster 1 is composed by countries whose acceleration was preceded by a sharp increase in natural resource rents, generally supported by other economic policies: demand or supply. An example of this is Vietnam 1989, where the government launched a wide-reaching reform package in 1986 known as *Doi Moi* (renovation), designed to "*transform the economy from a central planning subsidy economy towards a 'socialist-oriented market economy' that would combine state intervention and free-market incentives and rules, where private businesses and foreign-owned enterprises were to be encouraged"* (Nguyen et al. 2014, p. 5). At the same time, the authors note how "*new industries emerged, especially with the discovery of oil (made possible through joint ventures between the state and foreign oil companies) which increased government revenues and accounted for the greatest share of Vietnamese exports*".

Table 8. Incidence of growth (sub-)theories by cluster

Clusters	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Endowments	**1.00**	0.00	0.00	0.07	0.08	0.13	0.00
Demand policy	**0.57**	**0.56**	**1.00**	0.00	0.25	0.13	0.00
Supply policy	0.43	**1.00**	0.32	0.29	**0.58**	**0.63**	0.00
Luck	0.36	0.00	**0.53**	**1.00**	0.00	0.38	0.00
Institutions	0.07	0.00	0.00	0.14	**1.00**	0.25	0.00
Solow-Swan	0.07	0.07	0.05	0.00	0.00	**1.00**	0.00
Unexplained	0.00	0.00	0.00	0.00	0.00	0.00	**1.00**
counts	28	27	19	14	12	8	27
share	0.26	0.25	0.18	0.13	0.11	0.07	0.25

Note: Table displays percentages of growth acceleration episodes displaying a break in each theory, for each hierarchical cluster. Bold indicates values of 50% and above. See text for further details.

Cluster 2 could be considered the "economic policy cluster", centred around a combination of demand and supply measures. An example of this is Korea 1982, as discussed in the case study section above. Cluster 3 is characterised by a combination of economic policy and luck. A poster child for this cluster would be Portugal 1985, where high inflation was brought under control and important liberalisation reforms were implemented. All of this was supported by external export demand. Among the less frequent combinations, Cluster 4 was broadly centred around luck, and Cluster 5 was characterised by a combination of institutions and structural reforms, of the sort investigated by Giavazzi and Tabellini (2005). Finally, Cluster 6 was centred around combinations of investment and reforms. As a side note, it should come as no surprise that Cluster 7 contains all the "unexplained" cases, as these are by construction orthogonal to all other cases.

IV. Growth acceleration strategies

In this Section, we move beyond simple descriptive statistics, to analyse successful growth strategies while taking into account different forms of counterfactuals. In line with Hausmann et al (2005), we look separately at igniting growth accelerations, and making the most out of them i.e. sustaining them.

a. Igniting a growth acceleration

In the previous Section, our primary metric for descriptive statistics was incidence. Thinking through an analytical framework of necessary and sufficient conditions, incidence relates to the extent to which a growth channel is 'necessary' to explain an acceleration process but says little about whether it is 'sufficient'. This is what we aim to address in this section, therefore adding a layer of basic counterfactual analysis. Specifically, we compute a new metric that we call 'effectiveness', which takes into account not only how often take-off episodes were preceded by a certain break, but also how often that type of break took place overall in the time-series of acceleration countries.

More formally, for each of our six sub-theories h, we computed the total number of breaks for each country c that experienced at least one acceleration. $\forall\, c, h$, we then calculated how many breaks were followed by a growth acceleration within two years, i.e. in the period [t, t+2], for a break occurring at t. Consequently, the effectiveness of sub-theory h can be measured as the proportion of breaks that were followed by a growth acceleration.

At this stage, the attentive reader will have realised that the denominator in our effectiveness score defines an implicit counterfactual, and therefore the assumptions underlying its definition are worth a brief discussion. In particular, we are focussing on breaks in growth acceleration countries. The reason for this is that one could sensibly assume that not all world countries can exhibit a growth acceleration. As a matter of fact, Pritchett (2000) already detailed how take-offs are not a typical characteristic of advanced economies.

Table 9 compares the ranking of different (sub-)theories based on incidence and effectiveness. The way to read this is that demand breaks preceded 40% of acceleration episodes, but only 11.4% of demand breaks were followed by a growth acceleration.

Table 9. Incidence and effectiveness by (sub-)theory

Incidence		Effectiveness	
Supply	0.452	Endowments	0.124
Demand	0.400	Demand	0.114
Luck	0.274	Supply	0.109
Endowments	0.230	Institutions	0.107
Institutions	0.133	Luck	0.070
Investment	0.096	Investment	0.056

Note: Incidence indicates the share of growth acceleration episodes displaying that (sub-)theory break. Effectiveness is computed as the ratio between the number of growth accelerations preceeded by a specific break, and the number of times such a break occured over the whole time series. See text for further

An interesting comparison comes from endowment and luck. Looking at incidence only, 27% of accelerations were preceded by breaks in variables pertaining to luck: a higher number than the break in natural resource rents. However, a high number of luck breaks occurred without a growth acceleration following suit. As such, the effectiveness score of endowments is actually almost twice as large as that of luck. Translating this table in the language of policymaking, based on past acceleration cases, an authoritarian government with the sole objective of quickly sparking a growth acceleration is, *ceteris paribus,* better off boosting natural resource extraction than improving the country's democratic credentials.

The sceptical reader could be concerned that the country-specific way in which we have identified breaks in the baseline could be distorting our results. In particular, a concern could be that because we refrained from using arbitrary thresholds (e.g. at least 10 p.p. inflation reduction), in some instances what we identified as a "break" were changes that were large in relative historical terms, but actually small in absolute terms. Appendix 3 introduces as a robustness check a quantitative threshold, imposing that "breaks" fall in the top quartile of variable changes ever recorded in our database. Both incidence and effectiveness results are largely preserved, confirming the solidity of our SDF approach.

Pushing the logic of Table 9 further in the direction of growth acceleration strategies, we comprehensively looked at the two-way interaction between growth channels, and their effectiveness (Table 10). On the diagonal, we have breaks in one dimension followed by breaks in the same dimension, e.g. large liberalisations, followed by a further deep liberalisation break. The most successful combinations to spark a growth acceleration seem to be (1) demand-side policies followed by a boost in natural resource extraction, (2) an increase in resource extraction followed by structural reforms, (3) democratisation/end of conflict followed by a boost in natural resource extraction, (4) structural reforms followed by demand-side policies, or (5) structural reforms followed by democratisation/end of conflict. While these top acceleration strategies carry what looks like a small effectiveness, we note that they represent roughly an 8-fold increase vis-à-vis the unconditional probability of experiencing a take-off in a given year[9] (1.43%). A further sign that standard growth determinants are relevant for growth accelerations.

While there are no strictly dominant strategies in Table 10, reading through the general results of this analysis, in most instances structural reforms seem to be the best bet as a first move to ignite a growth acceleration, if supporting measures will follow suit; while a boost in natural resource extraction seems the best complement to support ongoing relaxations of binding constraints.

We note how this type of analysis links very well with discussions related to sequencing (Murrell 1996; Nsouli et al. 2002), specifically of demand- and supply measures. For example, our analysis suggests that structural reforms followed by demand-side policies like an EER depreciation to kickstart the economy, were more effective than the converse. This analysis can also connect to the literature on the relationship between institutional quality and natural resources (see for example Mehlum et al. 2006). With the goal of sparking an acceleration, Table 10 seems to confirm the general patterns in the literature, as it is (roughly three times) better to move towards democracy first and have a natural resource extraction boom later, rather than the converse.

Table 10. Effectiveness by combination of (sub-)theories

		Second stage					
	Effectiveness	Demand-side policy	Endowments	Institutions	Luck	Investment	Supply-side policy
First stage	Demand-side policy	4.64	**10.39**	3.92	3.92	5.63	10.00
	Endowments	9.71	0.00	3.57	2.52	3.92	**11.24**
	Institutions	5.88	**11.54**	1.79	1.56	0.00	7.58
	Luck	5.33	3.26	1.92	1.33	2.56	7.09
	Investment	5.26	0.00	3.57	4.11	0.43	4.72
	Supply-side policy	**12.31**	10.29	**10.34**	6.06	3.66	3.76

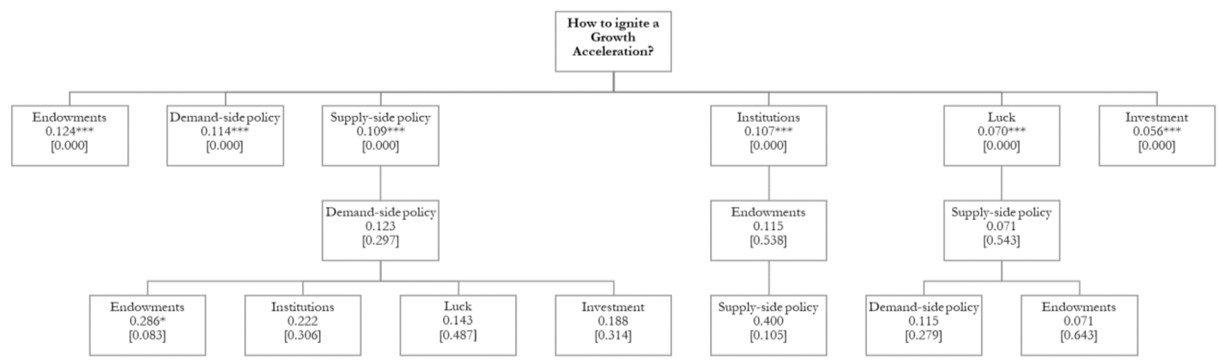
Note: Table displays effectiveness probability values, computed as the ratio between the number of growth accelerations preceeded by specific break combinations, and the number of times such a break occured over the whole time series. Diagonal axis implies two breaks within the same dimension occurred in sequence. Top-5 growth strategies in bold. See text for further details.

As discussed above, Table 10 is built by comparing the occurrence of break combinations before growth accelerations, with their occurrence over the whole time-series in countries that experienced at least a growth acceleration. In Appendix 4, as a robustness check, we expand the latter, to include their occurrence across all countries worldwide and show that our assumption on the counterfactual is not crucial. While individual numbers obviously differ, the overall ranking and therefore the key messages conveyed by Table 10 are preserved.

[9] Assuming no acceleration took place in the preceding eight years.

Figure 3 summarises graphically the findings of this section, displaying the effectiveness of individual theory breaks, and those of the combinations that allow to increase that effectiveness scoring. In probability terms, experiencing an endowment break carries a 12.4% probability of sparking a growth acceleration. A large supply-side reform wave, a 10.9% probability. However, having implemented reforms, subsequently implementing demand-side policies like depreciating the exchange rate or bringing inflation under control, can push that probability up to 12.3%, and 18.8% if that is then followed by a boost in investment. The p-values in parentheses test whether each effectiveness score is larger than that in the previous stage[10]. In general, it looks like increasing the number of growth constraints that are relaxed increases the probability of experiencing a take-off only in selected instances, and even then, it represents either a marginal probability improvement or one that is not statistically significant. This is a pattern that we will observe also in the next section, when looking at the "strength" of accelerations.

Figure 3. Effectiveness by individual and combined (sub-)theory



Note: Coefficients indicate the effectiveness score, p-values in square brackets originate from a one-sided binomial probability test to check whether the effectiveness improvement in statistically significant vis-à-vis the previous stage. For stage 1, the improvement is tested against the unconditional probability of experiencing an acceleration. * p<0.10 ** p<0.05 *** p<0.01

As a concluding remark to this section, we point out that looking at the sheer numbers of growth acceleration episodes identified by their methodology, Hausmann et al (2005, p. 328) concluded that "*achieving rapid growth over the medium term is not something that is tremendously difficult*". Judging from the small size of the effectiveness coefficients attached to the most well-established growth theories, which seem necessary but hardly sufficient conditions for accelerations, we would come to a different conclusion. While it might be true that these episodes occurred relatively frequently, our analysis suggests that igniting them with a high degree of certainty remains an elusive quest, making them inherently difficult to achieve.

[10] For stage 1, it tests whether the effectiveness is larger than the unconditional probability of experiencing an acceleration: prob=0.0143.

b. Sustaining a growth acceleration

Simply sparking a growth acceleration is not the whole story. Its capacity to improve a country's economic outcomes, which is what ultimately matters, will crucially depend on how 'large' the acceleration was, namely whether it was sustained and how large the shift in structural growth rates was. This is the issue we aim to tackle in this session, building on our SDF approach.

Perhaps with the recent exception of Pritchett et al (2016), one of the limits of the literature hitherto has been the lack of a clear and credible counterfactual when trying to quantify the size of growth accelerations, in order to link it to underlying country characteristics. In line with the underlying spirit of the whole paper, we aim to bridge this gap, employing a method that is country-specific, but at the same time allows for aggregation, to reach widely applicable growth findings.

In a nutshell, we propose to use as a counterfactual to a growth acceleration episode the country within the same region that has the most similar production structure to the country of interest. Our intuition is firmly rooted in the work of Hausmann et al (2007), and the idea that export specialisation patterns will strongly determine your growth performance. Moreover, thanks to the work pioneered by Imbs and Wacziarg (2003) and followed up by others (Cadot et al. 2013; Cadot, Carrère, and Strauss-kahn 2011; Cadot, Carrère, and Strauss-Kahn 2011), we also know that income per capita and export specialisation are closely intertwined. This means our parsimonious approach allows us with a unique metric to detect the country within the same region that has the most similar production structure and a similar income level to the country of interest, providing a credible counterfactual. Our transparent approach also allows to visualise the counterfactual for each acceleration episode, qualitatively assessing its appropriateness.

More formally: consider a growth acceleration episode $i_t \in \mathbb{E} = \{1, \dots, 135\}$. Let us define $\boldsymbol{\phi}_{i,t}$ as the vector of the export shares of i_t. Hence, the vector

$$\boldsymbol{\phi}_{i,t} = \begin{bmatrix} \frac{x_{p,it}}{\mathcal{X}_{it}} \\ \dots \\ \frac{x_{P,it}}{\mathcal{X}_{it}} \end{bmatrix}$$

contains the ratios of total exports of product p ($x_{p,it}$) over total exports ($\mathcal{X}_{it}$), for country i at time t. We then look for a country j_t that solves the following problem:

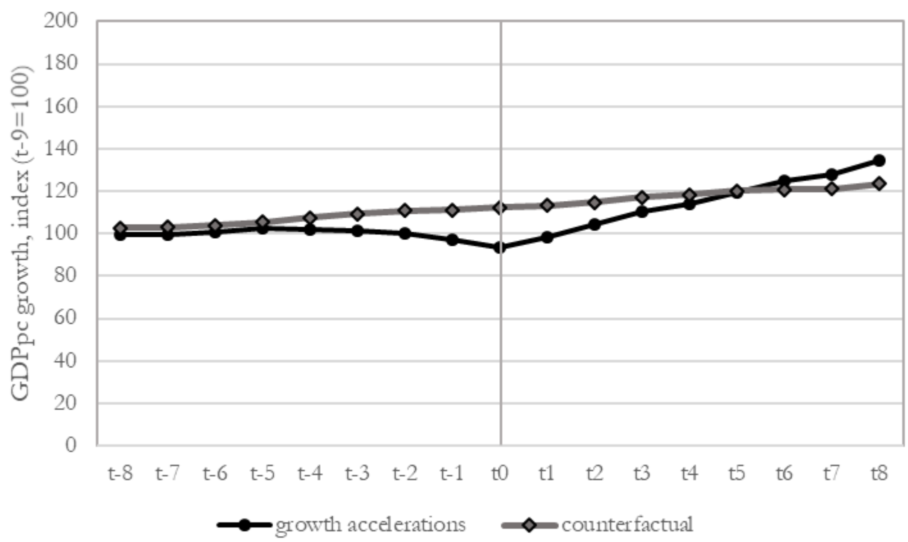
$$\max_j \rho(\boldsymbol{\phi}_{i,t-3}, \boldsymbol{\phi}_{j,t-3})$$

s.t.

$$i, j \in \mathcal{R}$$
$$j_t \notin \mathbb{E}$$

where ρ is the Pearson correlation between export share vectors, and $\mathcal{R}$ is the set of countries belonging to the same World Bank region classification of the growth acceleration episode under analysis. As an example based on a case study presented in Section IIc., our entirely data-driven procedure identifies as a counterfactual for Finland's 1993 growth acceleration, Sweden. We find it reassuring that when Seppo et al (2009) trace their case study of the Finnish experience, they select precisely Sweden as a growth performance benchmark for Finland. The full list of counterfactuals resulting from this exercise is available in Appendix 5, combined with a characterisation of the country-specific acceleration process in Appendix 6.

Figure 4. GDPpc in the average growth acceleration episode, and counterfactual



Also on an aggregate level, our counterfactual approach seems validated. Figure 4 shows the GDPpc growth of the average acceleration episode, and counterfactual. Up to t-5, the counterfactual perfectly tracks our countries of interest[11]. This is particularly remarkable as, conversely from other standard matching approaches, we did not impose this by construction. At t-4, acceleration countries seem to enter into a period of stagnation vis-à-vis their counterfactual, followed by the recession we had already highlighted in Section II. Following that, growth takes off at a faster pace than in the counterfactual.

Before proceeding with the quantitative analysis of what makes accelerations sustained, we want to tackle two obvious potential critiques. The first relates to the fact that geographical proximity could mean that also our

[11] This is true not only on average, and does not depend on the rebasing of the index at t-9. No difference can be detected in the growth rates between the two over the period [t-8, t-5] at a 99% CI level, see Appendix 6.

counterfactuals are experiencing significant breaks in growth theories. This could relate to the fact that because they have a similar export specialisation, they could be exposed to the same strikes of luck – given our definition of the latter. Alternatively, they could be similarly implementing structural reforms, as the relevant literature has shown how these tend to progress in geographical waves (see for example Abiad and Mody 2005). We therefore apply our standard Pearson χ^2 test to the contingency tables of the number of breaks preceding real acceleration episodes and the counterfactuals built on trade similarity and statistically reject (p=0.000) that the two were undergoing comparable breaks. The average number of breaks in the counterfactuals was not different (p=0.464) from our random sampling simulation in Section II. In other words, we cannot exclude that the counterfactual episodes are random based on their breaks: something we could affirm with a high degree of certainty about real growth accelerations.

Another potential critique could be that because we are using counterfactuals in the same region, there could be evident growth spillovers between neighbours[12]. *Prima facie*, we note how the country-specific recession in the accelerating countries before t0 did not affect the growth trajectory of the counterfactual. As growth dependence should be a symmetric relationship, we then find it unlikely that this occurred in the acceleration phase. On a deeper level, we calibrate as a robustness check the Synthetic Control Model (SCM) discussed in Marrazzo and Terzi (2017) to create alternative counterfactuals and compare them to our parsimonious baseline approach. As these SCM counterfactuals are based on linear combinations of multiples countries anywhere in the world, rather than only one regional neighbour, this model is significantly more robust to potential spillovers, albeit at the cost of being more demanding on our data. Moreover, given the wide range of covariates used, it also addresses the potential claim that export specialisation alone is not a good predictor of long-term growth. Reassuringly, Appendix 8 shows how SCM counterfactuals are neither quantitatively nor statistically different from those of our baseline.

Aside from the taxonomy of growth acceleration episodes illustrated in Figure 4, we are interested in understanding what determines their strength. To do so, we need a comprehensive "strength" indicator. Building on Figure 4, our primary metric of choice for this will be computed in line with a diff-in-diff estimator, of the type:

$$\delta_i = \left(Y_{i,8} - Y_{j,8}\right) - \left(Y_{i,0} - Y_{j,0}\right)$$

[12] To reduce this likelihood, we excluded small countries (population < 1 million) from our potential counterfactual sample in the baseline.

where $Y_{i,t}$ is the level of the GDPpc growth index for accelerating country i at time t[13]. In the spirit of a match-and-regress approach (Stuart 2010; Stuart and Rubin 2008), we then used δ_i as the dependent variable in a standard OLS regression with robust standard errors, and tested a set of potential explanators in multiple specifications. The main results are displayed in Table 11[14]. Appendix 10 contains further regression specifications.

Three sets of interesting findings emerge. The first one regards the role of different (sub-)theories and their respective variables' breaks. No one specific theory seems to prevail on the others in determining growth strength. This is evident by the fact that none of the coefficients associated with individual growth (sub-)theories[15] is significant (specifications 4 and 5). This remains true when all possible interactions between theories are accounted for (specification 6), and when their significance is tested jointly by means of an F-test. In Appendix 10 we test and confirm this claim also when using the different growth strategies identified by our hierarchical cluster analysis in Section III. This finding strongly resonates with a key principle of growth diagnostics, namely the fact that there is no silver bullet to foster growth in all countries, but rather that careful tailoring to local conditions will be needed.

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[13] As has previously emerged throughout the paper, our time-horizon of analysis ends at t+8 due to the way in which growth accelerations are identified in Kar et al (2013). Namely, this is the only time horizon over which we are confident that another structural break (acceleration or deceleration) could not be detected.

[14] Table 7 in Section III showed how 97% of acceleration instances displays less than 4 simultaneous breaks. To ensure broad homogeneity among break groups, in most regression specifications we therefore exclude break outliers so defined. This restriction is far from crucial for our results.

[15] Due to perfect multi-collinearity, we had to exclude investment as a (sub-)theory.

Table 11. Regression output for acceleration strength

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Counterfactual method	baseline	baseline	baseline	baseline	baseline	baseline	baseline	SCM
# of breaks	0.399	16.04	19.73	24.64*	24.27	25.15	25.11**	21.61**
	(0.901)	(0.149)	(0.116)	(0.090)	(0.105)	(0.189)	(0.050)	(0.031)
# of breaks^2		-5.767*	-6.538*	-7.458**	-7.526*	-7.262*	-7.090**	-7.829***
		(0.080)	(0.075)	(0.050)	(0.050)	(0.071)	(0.028)	(0.010)
Income quartile	8.713**	7.521**	10.76*	11.35**	11.02**	10.10***		
	(0.021)	(0.032)	(0.051)	(0.013)	(0.030)	(0.008)		
Human Capital Index			-11.56	-9.558	-9.814		11.57	-4.393
			(0.238)	(0.294)	(0.275)		(0.299)	(0.405)
East Asia & Pacific			-7.819					
			(0.397)					
Europe & Central Asia			-11.29					
			(0.429)					
Latin America & Caribbean			4.903					
			(0.566)					
Middle East & North Africa			-8.260					
			(0.703)					
South Asia			-20.19*					
			(0.065)					
Demand policies				-1.187	-0.113	-8.920		
				(0.903)	(0.992)	(0.557)		
Endowments				0.767	1.730	-9.357		
				(0.944)	(0.882)	(0.668)		
Institutions				5.827	7.276	13.833		
				(0.702)	(0.650)	(0.767)		
Luck				-4.019	-2.730	18.530		
				(0.783)	(0.861)	(0.526)		
Supply policies				-10.03	-9.333	-19.102		
				(0.417)	(0.457)	(0.287)		
Recession depth					-0.0670		-0.646*	-0.234
					(0.786)		(0.051)	(0.128)
Constant	7.013	4.477	17.67	12.10	13.62	-0.653	2.265	26.32***
	(0.507)	(0.673)	(0.253)	(0.409)	(0.417)	(0.956)	(0.920)	(0.010)
p-value of F-test on break type	-	-	-	0.946	0.943	-	-	-
N	111	106	101	101	101	111	32	93
R-sq	0.049	0.073	0.120	0.097	0.099	0.303	0.317	0.106
LatAm only	No	No	No	No	No	No	Yes	No
Incl all break interactions	No	No	No	No	No	Yes	No	No
Excl break outliers	No	Yes	Yes	Yes	Yes	No	No	Yes

Note: Acceleration strength computed based on geographical and production proximity (baseline) and Syntetic Control Method (SCM). Post-matching OLS regression coefficients, p-values based on robust standard errors in parentheses, * p<0.10 ** p<0.05 * p<0.10. Interaction coefficients omitted. See text for further details

The second class of findings relates to the number of breaks. Interestingly, there seems to be evidence suggesting a concave relationship between number of breaks and strength of the acceleration (see specifications 2-7, and Appendix 9). This seems particularly true when zooming in on Latin America (specification 8) and remains true when including geographical dummies (specification 3) or controlling for the depth of the recession at t0 (specification 6). This result was quantitatively similar but even more significant when using SCM-generated counterfactuals (specification 8). This resonates with another key principle of growth diagnostics, namely that it is better to focus on few key binding constraints (Rodrik 2009). Interactions between constraints in the economy imply that relaxing multiple constraints at the same time might actually produce sub-optimal results.

The third and final class of finding relates to the role of income level. All specifications show a positive relationship between the strength of the acceleration and income per capita[16]. Reading this finding through the eyes of the literature, a way to rationalise this result relates to the fact that income per capita is proxying for the quality of institutions. Theoretically, Rodrik (2004) explains how sustaining a growth acceleration will crucially depend on this variable, much more than igniting one. Empirically, Jerzmanowski (2006) shows in a Markov Switching Model how "*weak institutions do not rule out growth take-offs but limit their sustainability*". In principle, a second way to interpret this finding relates to the dynamics illustrated by our case studies in Section II: Finland. In that instance, country-specific experts underlined how the country's high education levels allowed it to capitalise on the leap forward in ICT, which was at the heart of Finland's structural growth change. Generalising this principle, we could suppose that income per capita is proxying for education levels, which in turn, once a growth acceleration was sparked, determines whether a country is capable of capitalising on it and making it sustainable. However, this hypothesis does not stand confirmed once we control for human capital[17] in our OLS regression (Specifications 3-5, 7 and 8).

V. Concluding remarks

Setting a country's structural growth rate on a higher path, i.e. sparking and sustaining a growth acceleration can have quantitatively huge implications for national income and, more broadly, for people's wellbeing. Pritchett et al (2016) estimate that the top 20 accelerations in the past six decades had a net present value of 30 trillion dollars: twice the size of US GDP. Two subsequent growth accelerations in China alone contributed to 98% of the reduction in global poverty between 1981-2005 (Chen and Ravallion 2010).

In this paper, we developed a novel statistical framework to improve our understanding of the 135 acceleration processes that took place between 1962-2002 worldwide, and contribute to develop some key principles aimed at helping countries devise successful acceleration strategies. We illustrate how growth accelerations are generally preceded by disproportionate changes in standard growth determinants, in particular sharp economic policy changes. After various counterfactual analyses, we reach three general conclusions.

[16] This is equally true whether we use income quartiles, as in Table 11, or log GDPpc, as in Appendix 10.
[17] Human Capital Index as defined in the Penn World Tables, based on years of schooling and returns to education.

First, looking at the effectiveness of individual determinants, or their combinations, we find no strictly dominant strategy to ignite a growth acceleration. Likewise, no one specific growth theory seems to prevail on the others in determining acceleration strength. Second, we find that the most successful growth accelerations follow the relaxation of few binding constraints in key dimensions, rather than jointly unlocking several growth channels. We therefore conclude that a successful acceleration strategy should not contain off-the-shelf approaches or necessarily all-encompassing 'shock therapy' solutions. On the other hand, it will call for a careful tailoring to local conditions. Third, our quantitative and qualitative evidence suggests that institutions have a potential role to play in making the most of accelerations, once these have been ignited.

At the same time, we note how growth accelerations are extremely hard to engineer with a high degree of certainty. While the growth levers of standard theories seem relevant in contributing to spark accelerations, in roughly 9 out of 10 instances pulling them failed to ignite a take-off. These findings and figures resonate with another highly sought-after seismic growth event: successful start-ups. The management literature and business angel community are well aware of the characteristics that successful start-ups share, including access to seed funding, human and technical capital, access to professional networks, and so on. However, even among start-ups that were scrutinised for these characteristics and received venture capital, three out of four fail[18]. Just like in this instance, increasing the predictability of these growth acceleration events will surely remain a profitable research venue for the years to come.

[18] https://www.wsj.com/articles/SB10000872396390443720204578004980476429190

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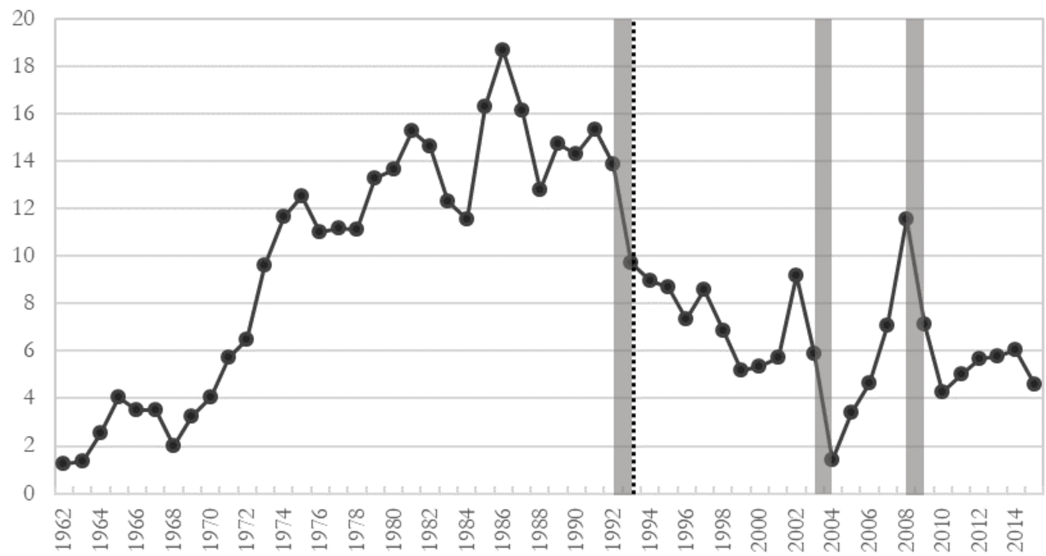
Appendix 1. Two case studies on country-specific breaks

In this Appendix, we aim to show how the identification of our country-specific breaks works in practice. To do so, we focus on two growth determinants (inflation and export demand) for the two acceleration countries that displayed the smallest pre-acceleration breaks in absolute terms. These were South Africa, where we categorised as break a yearly downward change in inflation of -4.2 p.p.; and Portugal, where +18 p.p. is the smallest export demand break preceding a growth acceleration episode. We begin with the analysis of South Africa's inflation track record. Figure 1 shows how, by emerging market standards, the country displays a relatively moderate high inflation profile. In particular, inflation grew above double-digit level in the 70s and 80s but was interestingly brought significantly down just ahead of the growth acceleration of 1993 (dotted line).

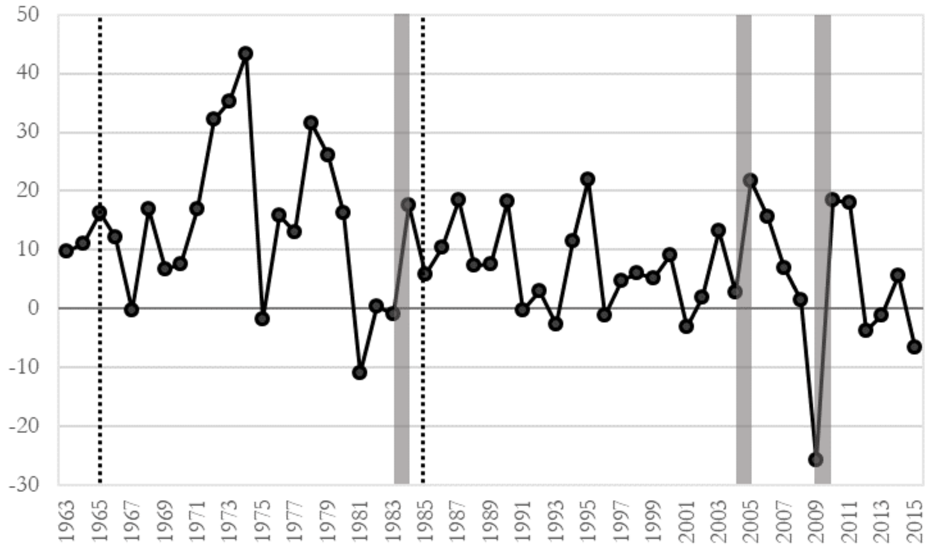
Figure 1. Inflation rate, South Africa



We cross-check our findings with expert studies on South Africa. Studying the relationship between inflation and growth in South Africa, Nell (2000) searches for the optimal inflation rate bracket and concludes there is strong evidence to support the contention that double-digit inflation (and in particular levels above 10%) should be avoided. Moreover, studying the country's growth pickup in the early 1990s, an IBRD/World Bank report suggests that "*macroeconomic stability has been a key factor in encouraging foreign capital, stimulating more investment, innovation, technological progress, and growth in TFP*" (Faulkner Christopher Loewald 2008, p. 31). This goes crucially in line with our argument that shifts in private sector expectations, on which the success of policy measures hinges, are highly country-specific.

Moving on to Portugal, Figure 2 shows our indicator of export demand. This variable displays a high level of volatility. However, on a closer look, we note how it tracks well US recessions as the well-known 1973-75 oil crisis or the 2009 Great Recession. It also captures the 1980 recession due to the Fed's sharp interest rate increase, and 1981/92 recession following the Iranian revolution and subsequent oil crisis. Our SDF approach flags the global economic recovery that preceded Portugal's 1985 growth acceleration (dotted line).

Figure 2. Export demand, % change, Portugal



Country-specific reports confirm this finding. Nunes (2015, p. 20) notes in particular how the international recovery created a positive background, which "*contributed to the second most important period of Portuguese real convergence to the European standards of living*".

Appendix 2. Diagnostics table

			Institutions		Policy								Endowment	Luck		Solow-Swan
					Demand side		Supply side									
#	country	year	war	fh	infl	reer	ref 1	ref 2	ref 3	ref 4	ref 5	ref 6	nat resources	ToT	X demand	inv
1	GTM	1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	KOR	1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	MWI	1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	PRT	1964	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0
5	GHA	1966	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0
6	BGD	1967	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0
7	BRA	1967	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0
8	COL	1967	0	0	**1**	**1**	0	0	0	0	0	0	0	0	0	0
9	IDN	1967	0	0	**1**	**1**	0	0	0	0	**1**	0	0	0	0	**1**
10	CHN	1968	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0
11	DOM	1968	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
12	GAB	1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	NGA	1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	SGP	1968	0	0	0	0	0	0	0	0	**1**	0	0	0	**1**	0
15	ZWE	1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	ECU	1970	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
17	HND	1970	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0
18	LSO	1970	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0
19	MYS	1970	0	0	**1**	0	0	0	0	0	0	0	**1**	**1**	0	0
20	BFA	1971	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0
21	DZA	1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	MUS	1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	PRY	1971	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0
24	HTI	1972	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	LKA	1973	0	0	0	0	0	0	**1**	0	0	0	0	0	**1**	0
26	SEN	1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	JOR	1974	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0
28	MLI	1974	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0
29	CYP	1975	0	0	**1**	**1**	0	0	**1**	0	0	0	**1**	0	0	0
30	CHL	1976	0	0	**1**	**1**	0	0	**1**	0	**1**	**1**	0	0	**1**	**1**
31	CMR	1976	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	COG	1976	0	0	0	**1**	0	0	0	0	0	0	**1**	0	**1**	0
33	EGY	1976	0	**1**	0	0	0	0	**1**	0	0	0	**1**	**1**	**1**	**1**
34	CHN	1977	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0
35	BEN	1978	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0

			Institutions		Policy								Endowment	Luck		Solow-Swan
					Demand side		Supply side									
#	country	year	war	fh	infl	reer	ref 1	ref 2	ref 3	ref 4	ref 5	ref 6	nat resources	ToT	X demand	inv
36	LAO	1979	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37	TCD	1980	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	UGA	1980	0	**1**	0	0	0	0	0	0	0	0	**1**	0	**1**	0
39	GBR	1981	0	0	0	0	0	0	0	**1**	**1**	**1**	**1**	0	0	0
40	GNB	1981	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0
41	BGD	1982	0	0	0	0	0	0	0	**1**	0	0	0	**1**	0	**1**
42	BWA	1982	0	0	**1**	0	0	0	0	0	0	0	0	**1**	0	0
43	KHM	1982	**1**	0	0	0	0	0	0	0	0	0	0	0	**1**	0
44	KOR	1982	0	0	**1**	0	0	0	**1**	0	0	**1**	0	0	0	0
45	LBN	1982	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0
46	GHA	1983	0	0	**1**	0	0	0	**1**	0	0	0	0	**1**	0	0
47	NPL	1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	ZMB	1983	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	PNG	1984	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	ARG	1985	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0
51	NAM	1985	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0
52	PHL	1985	0	0	**1**	**1**	0	0	0	0	**1**	0	0	0	0	0
53	PRT	1985	0	0	**1**	**1**	0	0	0	**1**	0	0	0	0	**1**	0
54	URY	1985	0	0	0	**1**	0	0	**1**	0	**1**	0	0	0	0	0
55	VEN	1985	0	0	0	**1**	0	0	**1**	0	0	0	0	**1**	0	0
56	BOL	1986	0	0	**1**	**1**	0	0	0	0	**1**	**1**	0	**1**	**1**	0
57	CHL	1986	0	0	0	0	0	**1**	**1**	0	0	0	0	0	0	0
58	JAM	1986	0	0	0	**1**	0	0	0	**1**	0	**1**	**1**	**1**	**1**	0
59	LSO	1986	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
60	MOZ	1986	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0
61	GAB	1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	IRL	1987	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0
63	MYS	1987	0	0	0	**1**	0	0	0	0	0	**1**	0	0	0	0
64	NER	1987	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	NGA	1987	0	0	0	**1**	**1**	0	**1**	0	**1**	0	0	0	0	0
66	SLV	1987	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
67	THA	1987	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
68	FJI	1988	0	0	0	**1**	0	0	0	0	0	0	**1**	0	**1**	0
69	GTM	1988	0	0	**1**	**1**	0	0	0	**1**	**1**	0	0	0	0	0
70	IRN	1988	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71	UGA	1988	**1**	0	0	0	0	0	**1**	0	0	0	0	0	0	0
72	MEX	1989	0	0	**1**	0	0	0	**1**	0	0	**1**	**1**	0	0	0

			Institutions		Policy								Endowment	Luck		Solow-Swan
					Demand side		Supply side									
#	country	year	war	fh	infl	reer	ref 1	ref 2	ref 3	ref 4	ref 5	ref 6	nat resources	ToT	X demand	inv
73	SYR	1989	0	0	**1**	**1**	0	0	0	0	0	0	**1**	0	0	0
74	TTO	1989	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0
75	VNM	1989	0	0	0	**1**	**1**	0	0	0	0	0	**1**	0	0	0
76	GUY	1990	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
77	CHN	1991	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
78	CRI	1991	0	0	0	**1**	0	0	0	0	0	**1**	0	0	0	0
79	DOM	1991	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0
80	IRQ	1991	0	0	0	**1**	0	0	0	0	0	0	0	**1**	0	0
81	JOR	1991	0	**1**	**1**	**1**	0	0	0	**1**	0	**1**	0	0	0	0
82	POL	1991	0	**1**	**1**	0	**1**	0	**1**	0	0	**1**	**1**	0	**1**	0
83	ALB	1992	0	**1**	0	**1**	0	0	0	0	**1**	0	**1**	**1**	**1**	0
84	ETH	1992	**1**	**1**	**1**	0	**1**	0	0	0	0	0	0	0	0	0
85	PER	1992	0	0	**1**	0	**1**	**1**	**1**	**1**	**1**	**1**	0	0	0	0
86	AGO	1993	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	**1**
87	FIN	1993	0	0	0	**1**	0	**1**	0	0	0	0	0	**1**	0	0
88	IND	1993	0	0	0	**1**	0	0	**1**	**1**	**1**	0	0	0	0	0
89	MNG	1993	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0
90	TGO	1993	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91	ZAF	1993	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0
92	AFG	1994	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0
93	BEN	1994	0	0	0	**1**	0	0	**1**	0	0	0	**1**	0	0	0
94	CMR	1994	0	0	0	**1**	**1**	0	0	0	0	0	0	0	0	0
95	COG	1994	0	0	0	**1**	0	0	**1**	0	0	0	**1**	0	0	**1**
96	DZA	1994	0	0	**1**	0	0	0	0	0	0	**1**	0	0	0	0
97	HTI	1994	0	0	0	**1**	0	0	0	0	0	0	**1**	**1**	0	0
98	LBR	1994	0	0	0	0	0	0	0	0	0	0	**1**	0	**1**	0
99	RWA	1994	0	0	**1**	0	0	0	**1**	0	0	0	**1**	0	0	0
100	ZMB	1994	0	0	**1**	0	**1**	**1**	0	0	0	0	0	0	0	0
101	CUB	1995	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102	GMB	1995	0	0	0	0	0	0	0	0	0	0	0	0	0	0
103	MAR	1995	0	0	0	0	0	0	0	**1**	**1**	**1**	0	0	**1**	0
104	MOZ	1995	**1**	0	0	0	0	0	**1**	**1**	0	**1**	**1**	0	0	0
105	NIC	1995	0	0	0	**1**	0	0	0	0	0	0	0	0	**1**	0
106	BGD	1996	0	0	**1**	0	0	**1**	**1**	0	0	0	0	0	0	**1**
107	CAF	1996	0	0	**1**	**1**	0	0	**1**	0	0	0	**1**	0	0	0
108	SDN	1996	0	0	**1**	0	0	0	0	0	0	0	0	0	**1**	**1**
109	BGR	1997	0	0	0	0	0	0	**1**	0	0	0	0	0	0	0

			Institutions		Policy								Endowment	Luck		Solow-Swan
					Demand side		Supply side									
#	country	year	war	fh	infl	reer	ref 1	ref 2	ref 3	ref 4	ref 5	ref 6	nat resources	ToT	X demand	inv
110	KHM	1998	**1**	0	0	0	0	0	**1**	0	0	0	0	0	0	0
111	ECU	1999	0	0	0	**1**	0	**1**	0	**1**	0	0	0	0	0	0
112	SLE	1999	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0
113	BDI	2000	**1**	0	**1**	**1**	0	0	0	0	0	0	0	0	0	0
114	TCD	2000	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0
115	TZA	2000	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
116	AGO	2001	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0
117	ARG	2002	0	0	0	**1**	0	**1**	0	0	0	0	**1**	0	0	0
118	BRA	2002	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0
119	COL	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	ETH	2002	**1**	0	0	0	0	0	0	**1**	0	0	0	0	0	0
121	GHA	2002	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0
122	GIN	2002	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
123	HKG	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
124	IND	2002	0	0	0	0	0	0	0	0	0	**1**	0	0	0	**1**
125	LAO	2002	0	0	**1**	0	0	**1**	0	0	0	0	0	**1**	0	0
126	MDG	2002	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0
127	MRT	2002	0	0	0	0	0	**1**	0	0	0	0	0	**1**	0	0
128	MWI	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
129	NAM	2002	**1**	0	0	0	0	**1**	0	0	0	0	0	0	0	**1**
130	PAN	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
131	PRY	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
132	RWA	2002	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0
133	TTO	2002	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**
134	URY	2002	0	0	0	0	0	**1**	0	0	0	0	0	0	0	0
135	VEN	2002	0	**1**	0	0	0	**1**	0	0	0	0	0	0	0	0

Appendix 3. Global thresholds in break identification

Although, as we discussed in Appendix 1, even the smallest breaks seem to be confirmed in their relevance based on country-specific expert reports, in this Appendix we aim to introduce a more robust quantitative stress testing of our results. In particular, for continuous variables that feed into the SDF, we compute the global distribution of uni-directional changes. We then compute the 75th percentile level (see Table 1).

Table 1. SDF variables and global thresholds

Theory	Sub-theory	Variable	Direction	75th pct worldwide
Institutions		Freedom House Index	+	n.a.
		Conflict (domestic/external)	-	n.a.
Economic Policy	Demand-side	Inflation	-	-5.72
		Effective Exchange Rate	-	-8.78
	Supply-side	Agriculture market liberalisation	+	n.a.
		Product market liberalisation	+	n.a.
		Trade liberalisation	+	n.a.
		Capital account liberalisation	+	n.a.
		Current account liberalisation	+	n.a.
		Domestic financial liberalisation	+	n.a.
Endowments		Natural resource rent	+	3.19
Luck		Terms of Trade	+	6.25
		Export demand	+	35.34
Solow-Swan		Investment (public and private)	+	2.83

Notes: 75th percentile values are computed over the world changes in the variable, in the direction of interest. Dichotomic or categorical variables are excluded. See text for further details.

We then impose that a break must fulfil two conditions: a relative one, namely (i) to be in the top 5th percentile of a country's time series, but also (ii) to fall in the top quartile of global changes in that variable. As a practical example, a large inflation reduction must then be larger than 75% of the 3591 inflation reduction episodes that ever took place globally (i.e. larger than 5.72 p.p.), natural resource extraction rent must increase by at least 3.19 p.p. of GDP to be considered a break, and so on.

Table 2 replicates incidence and effectiveness as in the baseline, and then benchmarks it against this new specification. Clearly, as the conditions to be classified as a break have increased, incidence could only be smaller or equal than the baseline. However, even for the theories where a reduction is observed, this is minimal and the rank order of sub-theories is preserved. When looking at effectiveness, the baseline results are practically unaltered. This result should not surprise: as small changes occur mainly in advanced economies, and in our baseline computation of the effectiveness denominator only acceleration countries are considered, both numerator and denominator are minimally affected by our new absolute thresholds.

Table 2. Incidence and effectiveness, baseline and robustness check

	incidence			effectiveness	
	baseline	baseline + absolute thresholds		baseline	baseline + absolute thresholds
Supply	0.452	0.452	Endowments	0.124	0.136
Demand	0.400	0.370	Demand	0.114	0.115
Luck	0.274	0.237	Supply	0.109	0.109
Endowments	0.230	0.170	Institutions	0.107	0.107
Institutions	0.133	0.133	Luck	0.070	0.071
Investment	0.096	0.074	Investment	0.056	0.049
Unexplained	0.200	0.222			

Notes: Absolute thresholds impose that the breaks belong to the top world quartile of changes in that variable. Incidence indicates the share of growth acceleration episodes displaying that (sub-)theory break. Effectiveness is computed as the ratio between the number of growth accelerations preceeded by a specific break, and the number of times such a break occured over the whole time series. See text for further details.

Appendix 4. Effectiveness by combination of (sub-)theories

		Second stage					
	prob. of GA	Demand-side policy	Endowments	Institutions	Luck	Investment	Supply-side policy
First stage	Demand-side policy	2.50	6.11	2.27	2.03	3.25	6.34
	Endowments	6.37	0.00	2.33	1.58	2.53	**7.75**
	Institutions	3.33	**6.98**	1.07	1.00	0.00	4.50
	Luck	2.87	2.13	1.10	0.63	1.44	3.69
	Investment	3.15	0.00	2.33	2.19	0.24	2.89
	Supply-side policy	**7.84**	**7.22**	**6.90**	3.00	2.22	2.30

Note: Table displays effectiveness probability values, computed as the ratio between the number of growth accelerations preceeded by specific break combinations, and the number of times such a break occured over the whole cross section. Diagonal axis implies two breaks within the same dimension occurred in sequence. Top-5 growth strategies in bold. See text for further details.

Appendix 5. Counterfactuals based on export-shares

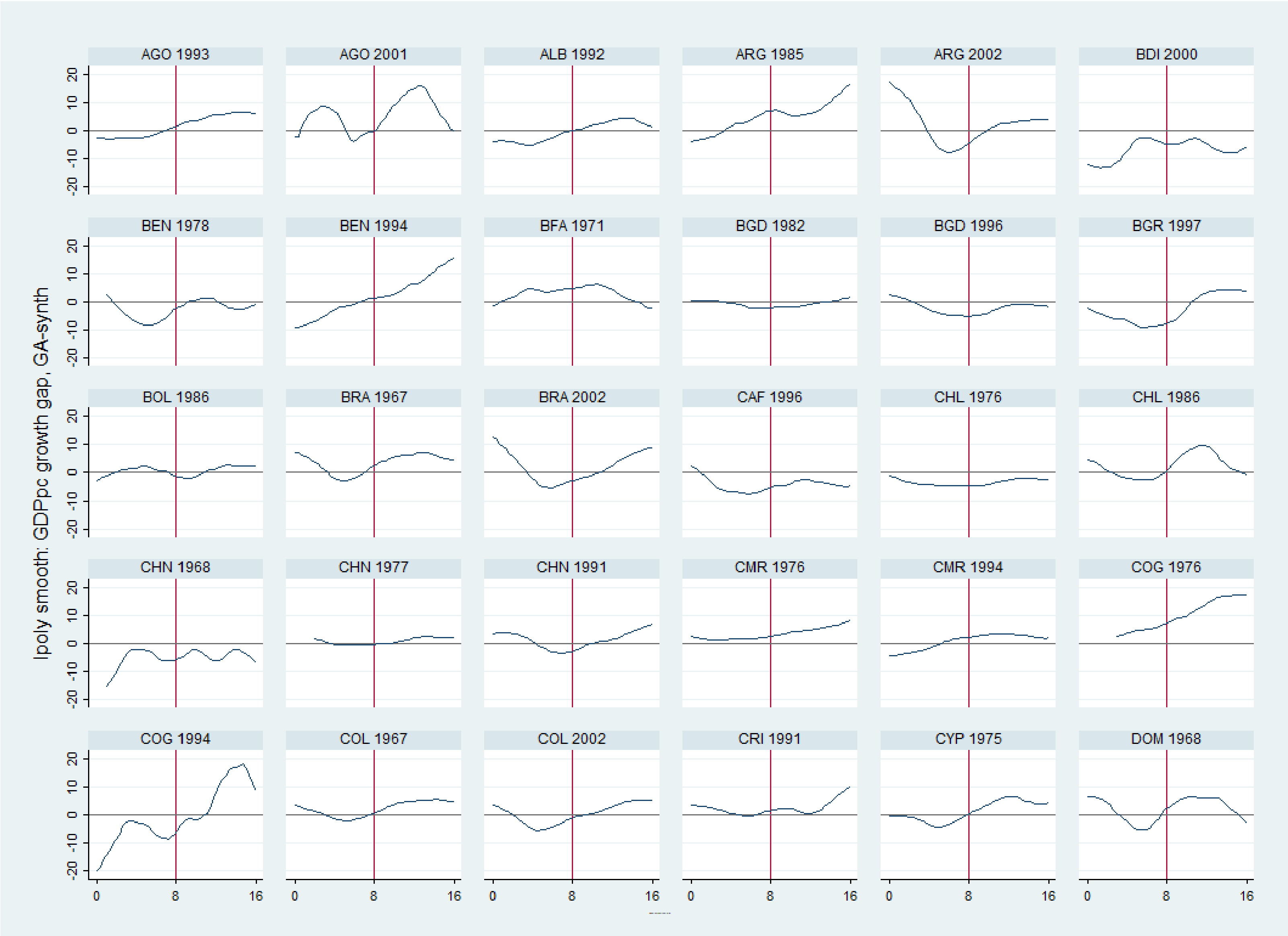
#	country	year	counterfactual	region
1	AGO	1993	GIN	Sub-Saharan Africa
2	AGO	2001	NER	Sub-Saharan Africa
3	ALB	1992	TUR	Europe & Central Asia
4	ARG	1985	ECU	Latin America & Caribbean
5	ARG	2002	MEX	Latin America & Caribbean
6	BDI	2000	UGA	Sub-Saharan Africa
7	BEN	1978	SDN	Sub-Saharan Africa
8	BEN	1994	TCD	Sub-Saharan Africa
9	BFA	1971	NER	Sub-Saharan Africa
10	BGD	1982	PAK	South Asia
11	BGD	1996	LKA	South Asia
12	BGR	1997	DNK	Europe & Central Asia
13	BOL	1986	COL	Latin America & Caribbean
14	BRA	1967	SLV	Latin America & Caribbean
15	BRA	2002	MEX	Latin America & Caribbean
16	CAF	1996	MLI	Sub-Saharan Africa
17	CHL	1976	MEX	Latin America & Caribbean
18	CHL	1986	PER	Latin America & Caribbean
19	CHN	1968	HKG	East Asia & Pacific
20	CHN	1977	VNM	East Asia & Pacific
21	CHN	1991	IDN	East Asia & Pacific
22	CMR	1976	BDI	Sub-Saharan Africa
23	CMR	1994	BDI	Sub-Saharan Africa
24	COG	1976	AGO	Sub-Saharan Africa
25	COG	1994	MRT	Sub-Saharan Africa
26	COL	1967	SLV	Latin America & Caribbean
27	COL	2002	MEX	Latin America & Caribbean
28	CRI	1991	COL	Latin America & Caribbean
29	CYP	1975	ITA	Europe & Central Asia
30	DOM	1968	SLV	Latin America & Caribbean
31	DOM	1991	COL	Latin America & Caribbean
32	DZA	1971	IRN	Middle East & North Africa
33	DZA	1994	SAU	Middle East & North Africa
34	ECU	1970	SLV	Latin America & Caribbean
35	ECU	1999	BOL	Latin America & Caribbean
36	EGY	1976	SAU	Middle East & North Africa
37	ETH	1992	BDI	Sub-Saharan Africa
38	ETH	2002	UGA	Sub-Saharan Africa
39	FIN	1993	SWE	Europe & Central Asia
40	FJI	1988	AUS	East Asia & Pacific

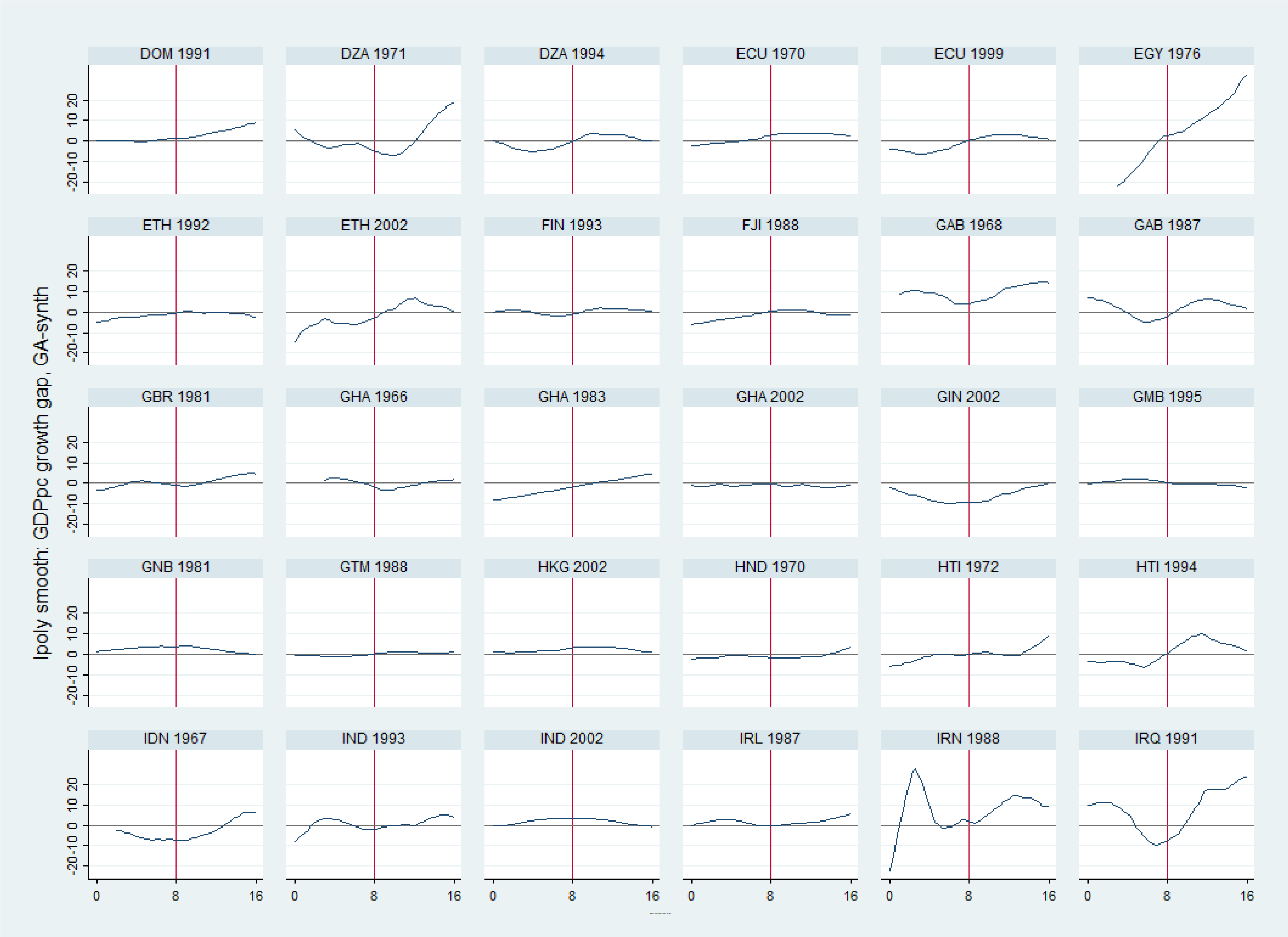
#	country	year	counterfactual	region
41	GAB	1968	TCD	Sub-Saharan Africa
42	GAB	1987	AGO	Sub-Saharan Africa
43	GBR	1981	NOR	Europe & Central Asia
44	GHA	1966	RWA	Sub-Saharan Africa
45	GHA	1983	RWA	Sub-Saharan Africa
46	GHA	2002	MLI	Sub-Saharan Africa
47	GIN	2002	MLI	Sub-Saharan Africa
48	GMB	1995	SEN	Sub-Saharan Africa
49	GNB	1981	LBR	Sub-Saharan Africa
50	GTM	1988	COL	Latin America & Caribbean
51	HKG	2002	JPN	East Asia & Pacific
52	HND	1970	SLV	Latin America & Caribbean
53	HTI	1972	SLV	Latin America & Caribbean
54	HTI	1994	COL	Latin America & Caribbean
55	IDN	1967	THA	East Asia & Pacific
56	IND	1993	LKA	South Asia
57	IND	2002	LKA	South Asia
58	IRL	1987	BEL	Europe & Central Asia
59	IRN	1988	SAU	Middle East & North Africa
60	IRQ	1991	SAU	Middle East & North Africa
61	JAM	1986	COL	Latin America & Caribbean
62	JOR	1974	ISR	Middle East & North Africa
63	JOR	1991	TUN	Middle East & North Africa
64	KHM	1982	MNG	East Asia & Pacific
65	KHM	1998	IDN	East Asia & Pacific
66	KOR	1982	VNM	East Asia & Pacific
67	LAO	1979	VNM	East Asia & Pacific
68	LAO	2002	VNM	East Asia & Pacific
69	LBN	1982	SAU	Middle East & North Africa
70	LBR	1994	MRT	Sub-Saharan Africa
71	LKA	1973	PAK	South Asia
72	MAR	1995	LBN	Middle East & North Africa
73	MDG	2002	UGA	Sub-Saharan Africa
74	MEX	1989	ECU	Latin America & Caribbean
75	MLI	1974	TCD	Sub-Saharan Africa
76	MNG	1993	LAO	East Asia & Pacific
77	MOZ	1986	AGO	Sub-Saharan Africa
78	MOZ	1995	BFA	Sub-Saharan Africa
79	MRT	2002	SEN	Sub-Saharan Africa
80	MUS	1971	MOZ	Sub-Saharan Africa
81	MWI	2002	ZWE	Sub-Saharan Africa
82	MYS	1970	THA	East Asia & Pacific
83	MYS	1987	IDN	East Asia & Pacific

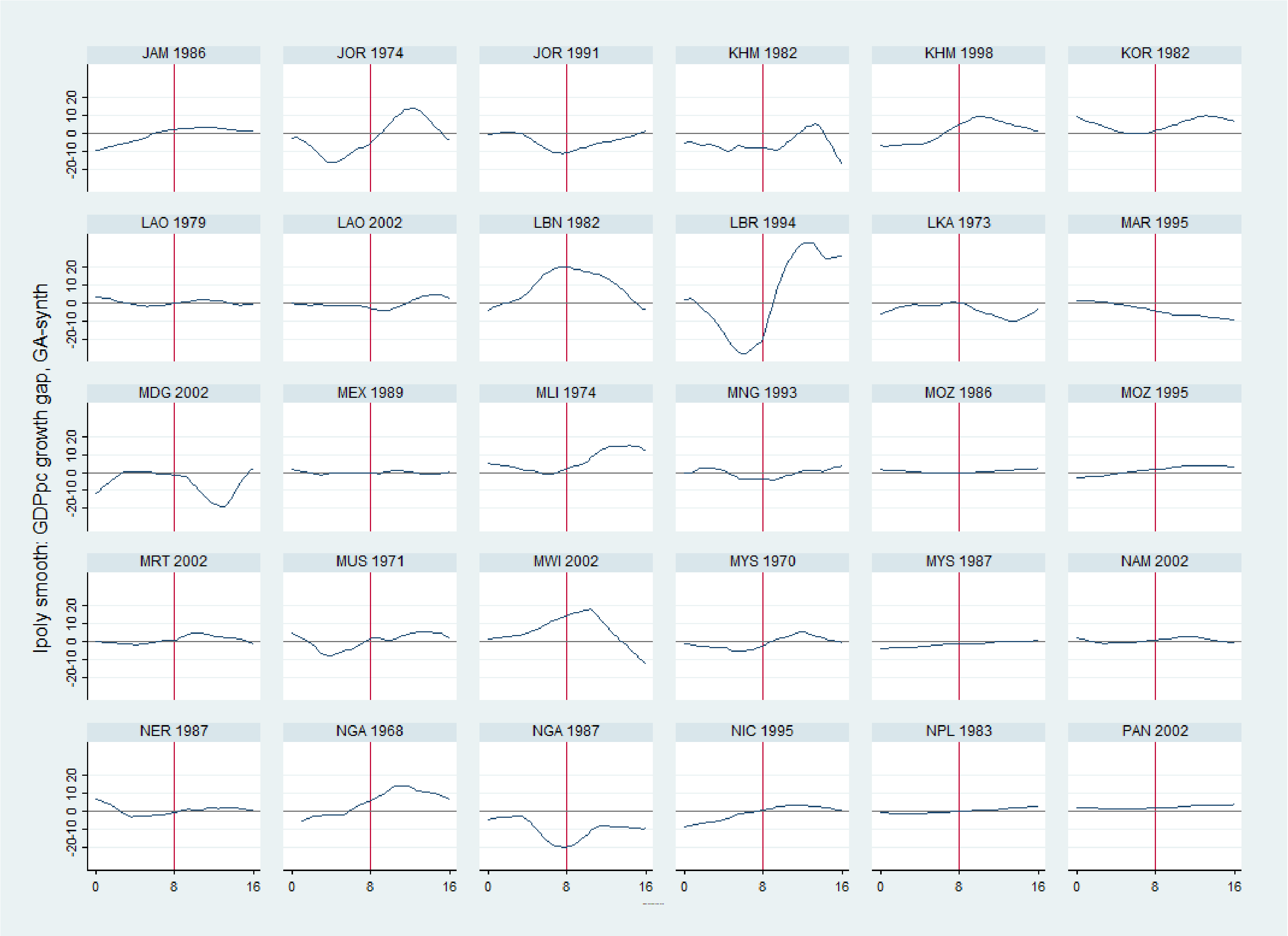
#	country	year	counterfactual	region
84	NAM	2002	MLI	Sub-Saharan Africa
85	NER	1987	AGO	Sub-Saharan Africa
86	NGA	1968	NER	Sub-Saharan Africa
87	NGA	1987	AGO	Sub-Saharan Africa
88	NIC	1995	COL	Latin America & Caribbean
89	NPL	1983	PAK	South Asia
90	PAN	2002	MEX	Latin America & Caribbean
91	PER	1992	COL	Latin America & Caribbean
92	PHL	1985	SGP	East Asia & Pacific
93	POL	1991	BGR	Europe & Central Asia
94	PRT	1985	ITA	Europe & Central Asia
95	PRY	1971	URY	Latin America & Caribbean
96	PRY	2002	BOL	Latin America & Caribbean
97	RWA	1994	BDI	Sub-Saharan Africa
98	RWA	2002	NER	Sub-Saharan Africa
99	SDN	1996	MLI	Sub-Saharan Africa
100	SEN	1973	TGO	Sub-Saharan Africa
101	SGP	1968	THA	East Asia & Pacific
102	SLE	1999	NER	Sub-Saharan Africa
103	SLV	1987	COL	Latin America & Caribbean
104	SYR	1989	SAU	Middle East & North Africa
105	TCD	1980	CAF	Sub-Saharan Africa
106	TCD	2000	MLI	Sub-Saharan Africa
107	TGO	1993	BDI	Sub-Saharan Africa
108	THA	1987	IDN	East Asia & Pacific
109	TTO	1989	ECU	Latin America & Caribbean
110	TTO	2002	MEX	Latin America & Caribbean
111	TZA	2000	UGA	Sub-Saharan Africa
112	UGA	1980	BDI	Sub-Saharan Africa
113	UGA	1988	BDI	Sub-Saharan Africa
114	URY	1985	NIC	Latin America & Caribbean
115	URY	2002	MEX	Latin America & Caribbean
116	VEN	1985	ECU	Latin America & Caribbean
117	VEN	2002	MEX	Latin America & Caribbean
118	VNM	1989	IDN	East Asia & Pacific
119	ZAF	1993	BDI	Sub-Saharan Africa
120	ZMB	1983	MWI	Sub-Saharan Africa
121	ZMB	1994	TCD	Sub-Saharan Africa
122	ZWE	1968	MDG	Sub-Saharan Africa

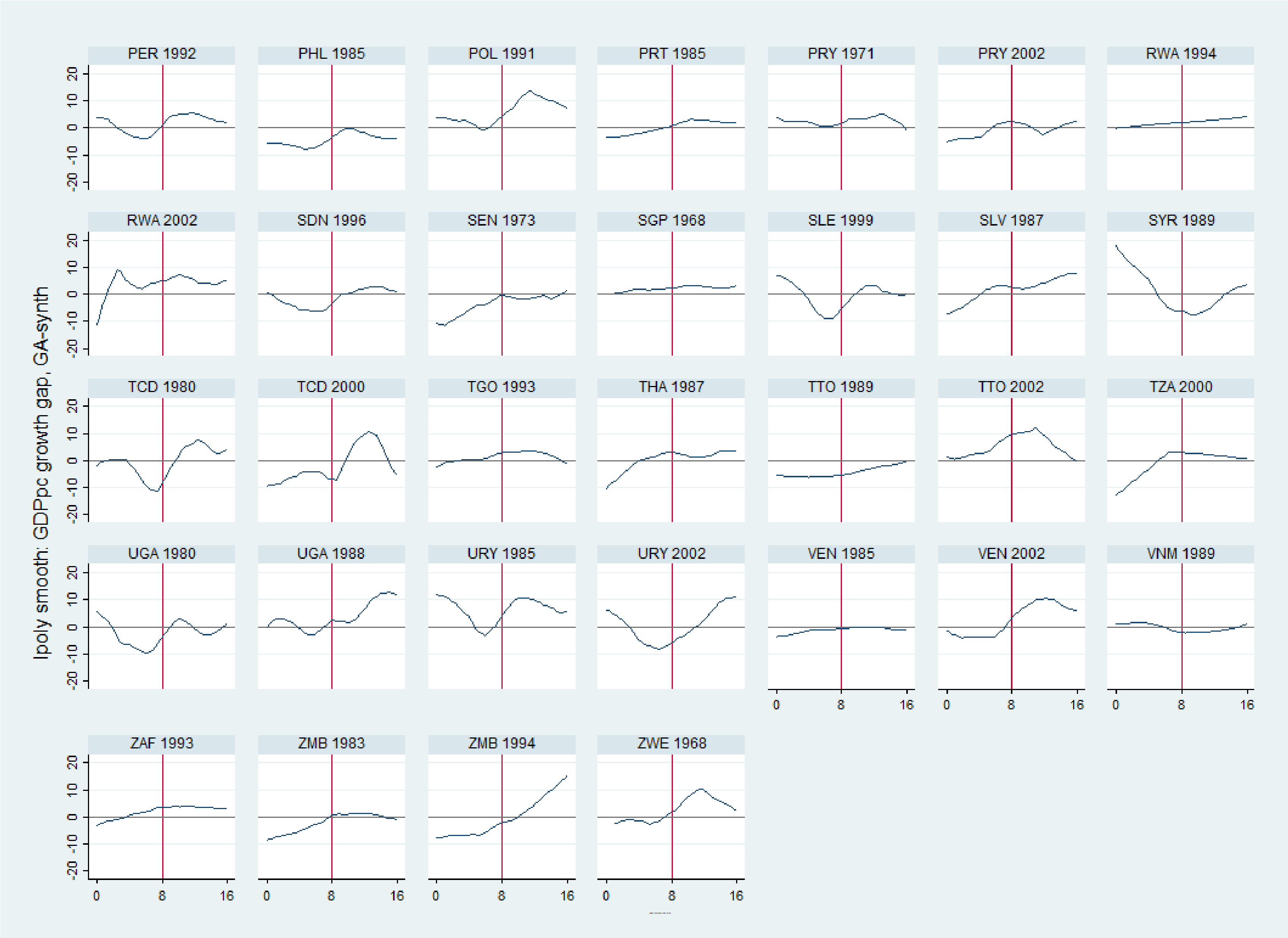
Note: Counterfactuals displaying maximum correlation with the trade share vector of the growth acceleration episode at t-3. See text for further details

Appendix 6. Characterisation of the acceleration process, by episode

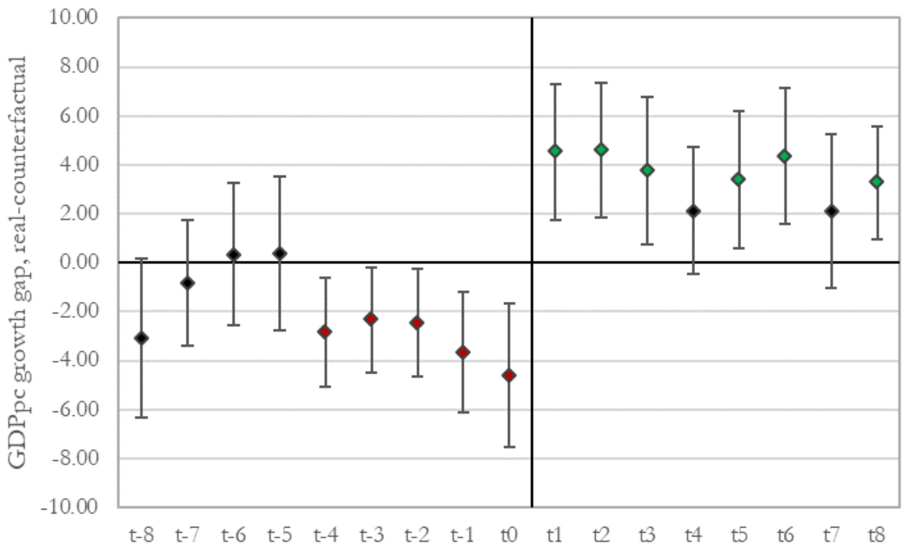



DOM 1991
DZA 1971
DZA 1994
ECU 1970
ECU 1999
EGY 1976
ETH 1992
ETH 2002
FIN 1993
FJI 1988
GAB 1968
GAB 1987
GBR 1981
GHA 1966
GHA 1983
GHA 2002
GIN 2002
GMB 1995
GNB 1981
GTM 1988
HKG 2002
HND 1970
HTI 1972
HTI 1994
IDN 1967
IND 1993
IND 2002
IRL 1987
IRN 1988
IRQ 1991
lpoly smooth: GDPpc growth gap, GA-synth
-20 -10 0 10 20
0 8 16


JAM 1986
JOR 1974
JOR 1991
KHM 1982
KHM 1998
KOR 1982
LAO 1979
LAO 2002
LBN 1982
LBR 1994
LKA 1973
MAR 1995
MDG 2002
MEX 1989
MLI 1974
MNG 1993
MOZ 1986
MOZ 1995
MRT 2002
MUS 1971
MWI 2002
MYS 1970
MYS 1987
NAM 2002
NER 1987
NGA 1968
NGA 1987
NIC 1995
NPL 1983
PAN 2002
lpoly smooth: GDPpc growth gap, GA-synth
-20-10 0 10 20
0
8
16


lpoly smooth: GDPpc growth gap, GA-synth
PER 1992
PHL 1985
POL 1991
PRT 1985
PRY 1971
PRY 2002
RWA 1994
RWA 2002
SDN 1996
SEN 1973
SGP 1968
SLE 1999
SLV 1987
SYR 1989
TCD 1980
TCD 2000
TGO 1993
THA 1987
TTO 1989
TTO 2002
TZA 2000
UGA 1980
UGA 1988
URY 1985
URY 2002
VEN 1985
VEN 2002
VNM 1989
ZAF 1993
ZMB 1983
ZMB 1994
ZWE 1968
-20 -10 0 10 20
0 8 16

Appendix 7. Difference between accelerations and counterfactual growth rates



Appendix 8. Alternative counterfactuals based on the Synthetic Control Method

In order to show that our baseline results are not the product of choosing the export share vector as primary metric to build our counterfactuals, we calibrated the Synthetic Control Method (SCM) discussed at length in Marrazzo and Terzi (2017). The SCM creates counterfactuals that replicate not only a country's pre-acceleration GDP performance, but also the country's investment rate, education levels, population growth, trade openness, and industry share. We chose however not to use this methodology as our baseline as it has some key drawbacks: a wider set of covariates is more demanding on our data and forces us to drop some acceleration episodes. Moreover, the fact that each counterfactual is composed by a linear combination of countries makes it impossible to run our standard statistical tests to show the lack of comparable breaks.

Table 1 shows that the SCM achieves a very good covariate balance, and a standard t-test constantly fails to reject equality between the growth accelerations and their synthetic control.

Table 1. Covariates balance

	Real	Synth	diff	p-value
GDPpc level	3676.4	3521.5	154.9	*0.773*
Investment rate	21.2	21.7	-0.5	*0.680*
Industry share	28.4	25.9	2.5	*0.128*
Trade openness	62.1	57.8	4.3	*0.387*
Population growth	2.2	2.4	-0.2	*0.212*
Secondary education	6.8	6.9	-0.1	*0.936*
Tertiaty education	2.4	2.4	0.0	*0.895*

Notes: Covariates averaged over the period [t-8,t-1] and then averaged across growth acceleration episodes in the first column. The second column averages across synthetic counterfactuals. Third column displays the difference between the two. The fourth shows the p-value of the difference being statistically different from zero.

Table 2 compares average growth rates for the counterfactuals built in the baseline and using the SCM. As can be seen, for each year between t-8 and t+8 we fail to reject that there is any difference between the two at the 5% level. The only exception is t+2 where the SCM suggests a better performance of the counterfactual vis-à-vis the baseline. However, an overall t-test of difference across all time periods again fails to reject any significant difference at the 5% level.

Table 2. Comparison between baseline and SCM counterfactuals

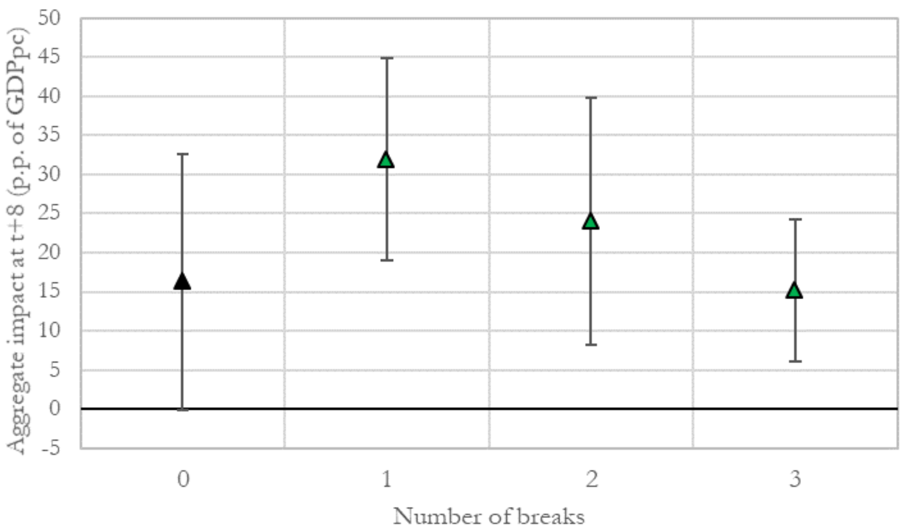
	Matching method			
	Baseline	SCM	diff	p-value
t-8	2.532	1.510	1.022	0.270
t-7	0.426	1.309	-0.883	0.263
t-6	0.823	1.393	-0.570	0.564
t-5	1.376	2.013	-0.636	0.433
t-4	2.032	0.726	1.306	0.087
t-3	1.797	1.103	0.694	0.296
t-2	1.263	1.645	-0.382	0.589
t-1	0.467	0.692	-0.225	0.738
t	0.958	0.920	0.039	0.961
t+1	0.937	1.868	-0.932	0.241
t+2	1.305	2.737	-1.431	**0.044**
t+3	2.171	2.323	-0.152	0.849
t+4	0.894	2.128	-1.234	0.111
t+5	1.602	2.701	-1.099	0.158
t+6	0.347	1.818	-1.471	0.077
t+7	0.353	0.631	-0.279	0.763
t+8	1.899	1.862	0.037	0.963
total	*1.246*	*1.611*	*-0.820*	0.057

Note: Table displaying average growth rate for the growth acceleration counterfactual generated using the baseline method, and the synthetic control method (SCM). P-values for a standard t-test, H0: diff=0. Bold indicates significance at the 5% level.

Appendix 9. Relationship between number of breaks and acceleration strength

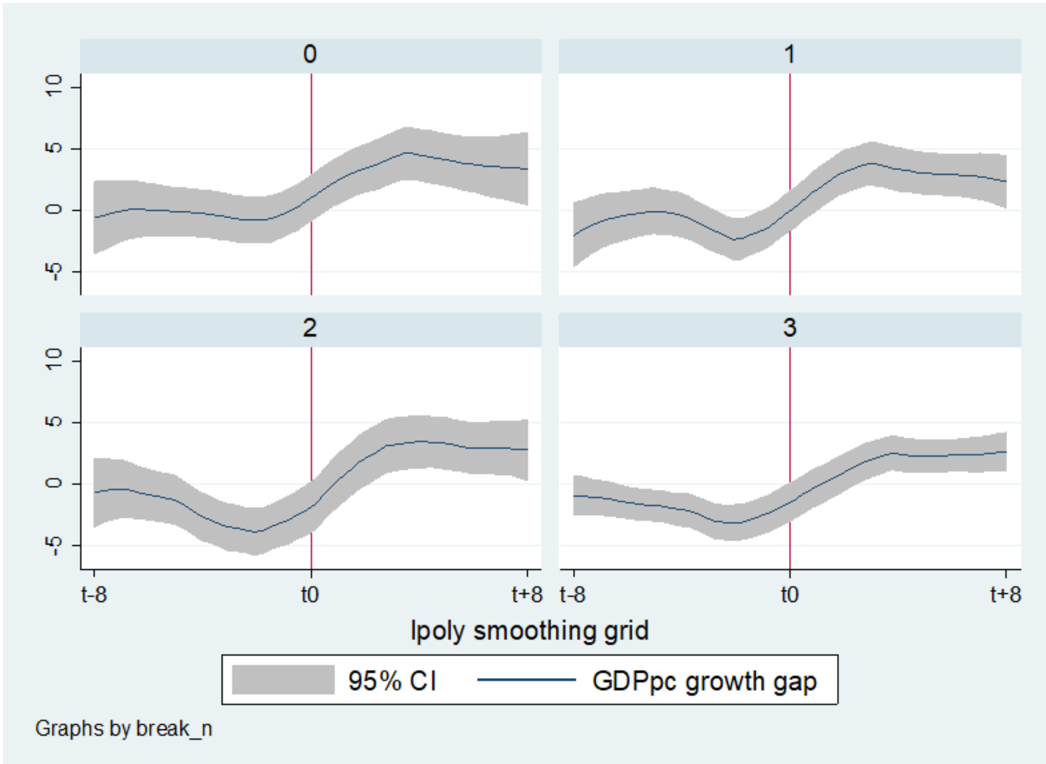
In this Appendix, we want to visualise the relationship between acceleration strength and the number of breaks. To do so, Figure 1 shows the relationship between our strength indicator and the number of breaks, up to 3. As discussed in Section III, this covers 96% of accelerations. Figure 1 shows how the strength of the acceleration increases in the number of breaks, peaks at break=1, and is reduced thereafter.

Figure 1. Relationship between growth acceleration strength and number of breaks



We also ran a local polynomial smoothening algorithm dissecting our data based on the number of breaks. Figure 2 below aims only to visually complement OLS regression results discussed in Section IVb, and shows the growth path for each of the break numbers.

Figure 2. Relationship between growth acceleration strength and number of breaks



Appendix 10. Alternative OLS regression specifications

	(1)	(2)	(3)	(4)	(5)
Counterfactual method	baseline	baseline	baseline	SCM	baseline
# of breaks		23.75	25.14	14.47	26.03*
		(0.101)	(0.192)	(0.210)	(0.078)
# of breaks^2		-7.359*	-7.506*	-6.954**	-7.871**
		(0.060)	(0.060)	(0.025)	(0.048)
Income quartile	11.36**	12.40**			11.14**
	(0.015)	(0.011)			(0.014)
Human Capital Index	-11.46	-7.134			-55.63
	(0.182)	(0.465)			(0.368)
Human Capital Index^2					12.14
					(0.429)
Log GDPpc			7.739**		
			(0.044)		
Cluster 1	22.39				
	(0.179)				
Cluster 2	8.279				
	(0.437)				
Cluster 3	-0.249				
	(0.990)				
Cluster 4	12.60				
	(0.354)				
Cluster 5	9.655				
	(0.377)				
Cluster 6	8.568				
	(0.439)				
Demand policies		-2.101		7.124	0.668
		(0.827)		(0.477)	(0.945)
Endowments		2.402		6.603	-0.240
		(0.826)		(0.512)	(0.982)
Institutions		6.222		18.12	5.288
		(0.672)		(0.211)	(0.734)
Luck		-2.545		4.006	-4.439
		(0.862)		(0.696)	(0.753)
Supply policies		-8.633		0.872	-9.878
		(0.473)		(0.933)	(0.406)
Recession depth				-0.192	
				(0.214)	
Constant	14.00	6.812	-43.38	16.75**	51.63
	(0.313)	(0.678)	(0.191)	(0.028)	(0.346)
p-value of F-test on break type	-	0.945	-	0.869	0.960
N	101	97	111	98	101
R-sq	0.073	0.105	0.282	0.102	0.104
Excl Adv economies	No	Yes	No	No	No
Incl all break interactions	No	No	Yes	No	No
Excl break outliers	Yes	Yes	No	Yes	Yes

Note: Acceleration strength computed based on geographical and production proximity (baseline) and Syntetic Control Method (SCM). Post-matching OLS regression coefficients, p-values based on robust standard errors in parentheses, * p<0.10 ** p<0.05 * p<0.10. Interaction coefficients omitted. See text for further details