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The Role of IMF-Supported Programs

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ABBREVIATIONS

AE	Advanced Economy
AFR	African Department (IMF)
APD	Asia and Pacific Department (IMF)
EME	Emerging Market Economy
EUR	European Department (IMF)
GRA	General Resources Account
LIC	Low-Income Country
MCD	Middle East and Central Asia Department (IMF)
PPP	Purchasing Power Parity
PRGF	Poverty Reduction and Growth Facility
PRGT	Poverty Reduction and Growth Trust
WHD	Western Hemisphere Department (IMF)

EXECUTIVE SUMMARY

Taking a longer-term perspective than the rest of the evaluation (1980–2017), this background paper uses a signal-extraction model to identify a broad range of conditions associated with the initiation of growth surges and the IMF's role in the incidence and contribution of such conditions.

Our initial analysis shows that significant improvements across the spectrum of growth determinants preceded nearly all growth surges and were more likely to generate growth surges when associated with IMF-supported programs. Supporting these findings, our benchmark regression results display a statistically significant, positive relationship between the initiation of growth surges and improvements in several broad growth determinants (i.e., macroeconomic stability, structural reforms, and investments, labor, and productivity) that is strongest in the 2000s. The results suggest that IMF-supported programs increase the likelihood of a growth surge by helping countries implement macroeconomic stabilization and enhance structural reforms and by increasing the likelihood that such policies lead to growth surges. Furthermore, these results imply IMF-supported programs have become increasingly effective at contributing to initiation of growth surges over time, which indicates that the IMF's increasing attention to growth has borne fruit.

Looking ahead, our analysis highlights the importance of macroeconomic stabilization and that structural reforms can have a long-lasting impact on growth. IMF-supported programs therefore need to consider country ownership, focus, and technical support to foster adequate implementation, follow-through, and impact. Ultimately, the IMF should continue to learn from its experiences and apply those lessons to maximize the likelihood that its member countries experience growth surges.

I. INTRODUCTION

1.   The primary macroeconomic goals of IMF-supported programs are "(a) solving the member's balance of payments problem without recourse to measures destructive of national or international prosperity; and (b) achieving medium-term external viability while fostering sustainable economic growth" (IMF, 2002). However, IMF-supported programs often are criticized for an excessive tightening bias that produces lackluster economic growth (see, for example, Przeworski and Vreeland, 2000; Dreher, 2006; Van Waeyenberge and others, 2010; Ghosh, 2019). These concerns, in turn, have fostered an extensive academic literature that generally is inconclusive about the growth impact of IMF-supported programs.[1] For our purposes, however, the notable aspect of this literature is that it focuses on the economic growth of countries during or shortly after IMF-supported programs, rather than their contributions to sustain (or accelerate) economic growth long after a program ends.

2.   Taking an alternative perspective, this paper focuses on growth surges sustained over at least eight years, and the role of IMF-supported programs in the genesis of such surges. In a seminal paper on growth surges, Hausmann, Pritchett, and Rodrik (2005) contend that "accelerating the process of economic growth in a sustained manner is just about the most important policy issue in economics." Their paper is part of an expanding economic literature that aims to identify determinants of sustained growth accelerations, i.e., "growth surges." Although this literature is notable for drawing attention to a fundamental property of growth in developing countries, namely its lack of persistence, it generally ignores the potential role of IMF-supported programs in helping countries institute policies associated with such transitions.

3.   Anecdotal evidence suggests that IMF-supported programs, by supporting successful macroeconomic stabilization, seemingly have played a role in initiating growth surges in some countries where deep-seated distortions and macroeconomic instability long hampered growth. Examples of countries that experienced sustained growth accelerations following IMF-supported programs include Thailand (1985), transition economies (e.g., Romania, 1997; Ukraine, 2003), the Baltic states (Estonia and Lithuania, 1999), and Côte d'Ivoire (2010), among others. This paper takes a more rigorous empirical approach to evaluate the IMF's role in growth surges applying a signal-extraction model to identify conditions associated with the initiation of growth surges and the IMF's role in the impact of such conditions on the likelihood of growth surges.

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[1] Some studies of the growth impact of IMF-supported programs find a positive impact (see, for example, Dicks-Mireaux and others, 2000; Hutchinson, 2004; Bas and Stone, 2014; Bal Gündüz, 2016; Bird and Rowlands, 2017), while some find a negative impact (see, for example, Bordo and Schwartz, 2000; Przeworski and Vreeland, 2000; IEO, 2002; Hutchinson and Noy, 2003; Vreeland, 2003; Easterly, 2005; Barro and Lee, 2005; Butkiewicz and Yanikkaya, 2005; Dreher, 2006), and others find inconclusive evidence (see, for example, Evrensel, 2002; Hardoy, 2003; Atoyan and Conway, 2006; Eichengreen and others, 2008).

4.   The rest of this paper is organized as follows. Section II provides a select review of related economic literatures. Section III discusses our approach to identifying growth surges. Section IV provides some stylized facts about growth surges and their association with IMF-supported programs. Section V describes our approach to identifying determinants of growth surges and significant improvements in those measures. Section VI highlights results of our empirical analysis. Finally, Section VII concludes with some key lessons for the Fund.

II. SELECT LITERATURE REVIEW

5.   Our approach to assessing the role of IMF-supported programs in initiating growth surges draws on two related bodies of economic literature. The first group aims to identify the determinants of sustained growth accelerations. The second group aims to identify increasing vulnerabilities that may portend an economic crisis. Building on these two bodies of literature, we use a signal-extraction model to identify macroeconomic conditions that may portend a sustained growth acceleration and determine whether those outcomes were associated with IMF-supported programs.

6.   A recent and expanding body of literature aims to identify the determinants of sustained growth accelerations (see, for example, Hausmann, and others, 2005; Kerekes, 2007; Hausmann, and others, 2008; Jones and Olken, 2008; Aizenman and Spiegel, 2010; Jong-A-Pin and de Hann, 2011; Peruzzi and Terzi, 2018; Atsebi, 2019). Although IMF staff have contributed to this literature (see, for example, Gupta and others, 2005; Berg and others, 2012), the selection of determinants generally is limited to various macroeconomic conditions (e.g., external shocks, financial development, macroeconomic stability, and trade liberalization). Thus, the potential role of IMF-supported programs has been embedded implicitly within changes in those determinants that result from government policies.

7.   Separately, the IMF has been a pioneer in using early warning systems, particularly using signal-extraction models, to identify increasing vulnerabilities that may portend an economic crisis (see, for example, Kaminsky, Lizondo, and Reinhart, 1997; Kaminsky, 1999; Shin, 2013; Basu, Chamon, and Crowe, 2017). Interest in and application of such models expanded greatly following the global financial crisis. Yet, to date, early warning systems focus primarily on vulnerabilities that increase an economy's exposure to negative shocks. Growth surges, however, seemingly are predicated on creating certain macroeconomic conditions that increase an economy's exposure to positive shocks. Thus, the methodology underlying early warning systems could be used alternatively to identify macroeconomic conditions that may portend a growth surge.

III. IDENTIFICATION OF GROWTH SURGES

8.   Three types of approach have been used previously in the literature to identify growth surges: (i) a filter-based approach (see, for example, Hausmann and others, 2005; Gupta and others, 2005; Aizenman and Spiegel, 2010; Hausmann and others, 2011; Libman and others, 2019; Atsebi, 2020), (ii) a structural breaks approach (see, for example, Kerekes, 2007; Jones and

Olken, 2008; Berg and others, 2012), and (iii) a combination of the two previous approaches (see, for example, Kar and others, 2013a,b; Munro, 2020). While each approach has its merits, each approach also contains certain drawbacks. The filter-based approach, for example, allows for ad hoc decisions regarding identification criteria that can lead to inconsistency across similar studies. The structural breaks approach, meanwhile, uses a statistical procedure to identify "structural breaks" in a time series independent of other relevant criteria. Thus, a sustained growth acceleration from a period of stable growth would be identified similarly to a strong rebound in growth following a substantial negative shock (e.g., a natural disaster, financial crisis, or war).

9.   Our analysis focuses on a particular type of growth surge, namely a *sustained growth acceleration* that does not start from a cyclical downturn. A filter-based approach, which allows us to determine reasonable criteria, therefore is our preferred method for identifying growth surges. We choose an eight-year period as the minimum period for a growth surge since this is longer than the typical economic cycle. Following broadly the approach used by Hausmann, Pritchett, and Rodrik (2005), our three criteria are:

(a) Growth is rapid: $g_{t,t+n} \geq 3.5$, i.e., the average annual growth rate of real income per capita over the next 8 years is at least 3.5 percent.

(b) Growth accelerates: $\Delta g_{t,n} = g_{t,t+n} - g_{t-n,t} \geq 2.0$, i.e., the average annual growth rate over the next 8 years is at least 2 percent above that during the previous 8-year period.

(c) Growth does not start from a cyclical downturn: $y_{t-1} \geq \max(y_{t-n}, \dots, y_{t-1})$, i.e., the level of income per capita one year before the start of the growth surge is the peak of the previous 8-year period.

10.   More succinctly, we identify growth surges by comparing forward- and backward-looking average per capita income growth rates using the above criteria. Our first two criteria, as well as the requirement that growth surges last a minimum of 8 years (i.e., *n* = 7),[2] are identical to those used in Hausmann, Pritchett, and Rodrik (2005). Our third criteria, however, excludes episodes where the first year(s) of a growth surge reflects a strong cyclical rebound in growth following a substantial negative shock and therefore is more restrictive than that used by Hausmann, Pritchett, and Rodrik (2005).[3]

11.   After identifying the initial set of growth surges, we use two additional criteria to define the start and end dates of a particular episode. Specifically, if the above criteria are met within overlapping 8-year periods then we deem the first instance to be the starting date and the final

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[2] Decreasing the minimum length of growth surges (i.e., *n* < 7) increases the likelihood of misidentifying strong rebounds from substantial negative shocks, while increasing the minimum length of growth surges (i.e., *n* > 7) risks reducing the number of episodes to a level where further analysis becomes difficult.

[3] Their third criteria (i.e., $y_{t+n} \geq max(y_{t-n}, \dots, y_{t-1})$, requires the per capita income level in the final year of a growth surge to exceed the peak of the previous 8-year period.

year of the latter period to be the end date. For example, if the criteria are met in 1980 and 1986 then we would deem the growth surge to start in 1980 and end in 1993 (i.e., 7 years after 1986). Finally, we judge a growth surge to be associated with an IMF-supported program if it began during an IMF-supported program or within two years of its conclusion. Figure 1 displays illustrated examples of countries with growth surges and IMF-supported programs.

IV. SOME STYLIZED FACTS

12.   Applying the above criteria to data from the Penn World Tables on real income per capita at PPP, we identify 132 growth surges in 117 countries from 1980–2017.[4] Figure 2 displays the total number of growth surges, as well as their association with IMF-supported programs, by decade, region, and level of development.[5] Note that given the requirement that a growth surge lasts at least eight years, we do not identify growth surges starting after 2010. In what follows, we use the level of development and income group interchangeably.

13.   As a first cut, it is notable that more than half (i.e., 56 percent) of identified growth surges are associated with an IMF-supported program since 1980 (see Figure 2). There are, however, meaningful differences across time, place, and income group. First, growth surges have been associated with IMF-supported programs increasingly over time from 44 percent in the 1980s to 66 percent in the 2000s. Second, growth surges in regions represented by the African (AFR) and Western Hemisphere (WHD) departments were associated with IMF-supported programs most frequently—77 percent for AFR and 64 percent for WHD—compared to 50 percent in regions represented by the European (EUR) as well as Middle East and Central Asia (MCD) departments and 43 percent in the region represented by the Asia and Pacific (APD) department. Third, growth surges were associated with IMF-supported programs most frequently in low-income countries (LICs) at 79 percent compared to 54 percent in emerging market economies (EMEs) and 21 percent in advanced economies (AEs).

14.   There also exist meaningful differences across place and income group when comparing the two types of IMF-supported program.[6] Growth surges were associated with PRGT-supported programs most frequently in the regions represented by AFR (15) and APD (8), and in LICs (25). In contrast, growth surges were associated with GRA-supported programs most frequently in the regions represented by EUR (13), WHD (12), and MCD (11), and in EMEs (36).[7]

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[4] Table A1 lists all 132 growth surges along with a few descriptive statistics.

[5] Level of development refers to a country's current classification in the World Economic Outlook (WEO), not the classification when a growth surge began.

[6] The Poverty Reduction and Growth Trust (PRGT) replaced the previous trust fund, the Poverty Reduction and Growth Facility (PRGF), in 2009. The PRGF, meanwhile, was established in 1986. The lack of growth surges associated with PRGT/PRGF-supported programs in the 1980s therefore is due, in part, to its limited existence during that decade.

[7] For an overview of the different types of facilities included in the PRGT and GRA samples, please see the IMF's factsheet on IMF Lending (https://www.imf.org/en/About/Factsheets/IMF-Lending).

Figure 1. Example Countries with Growth Surges and IMF-Supported Programs
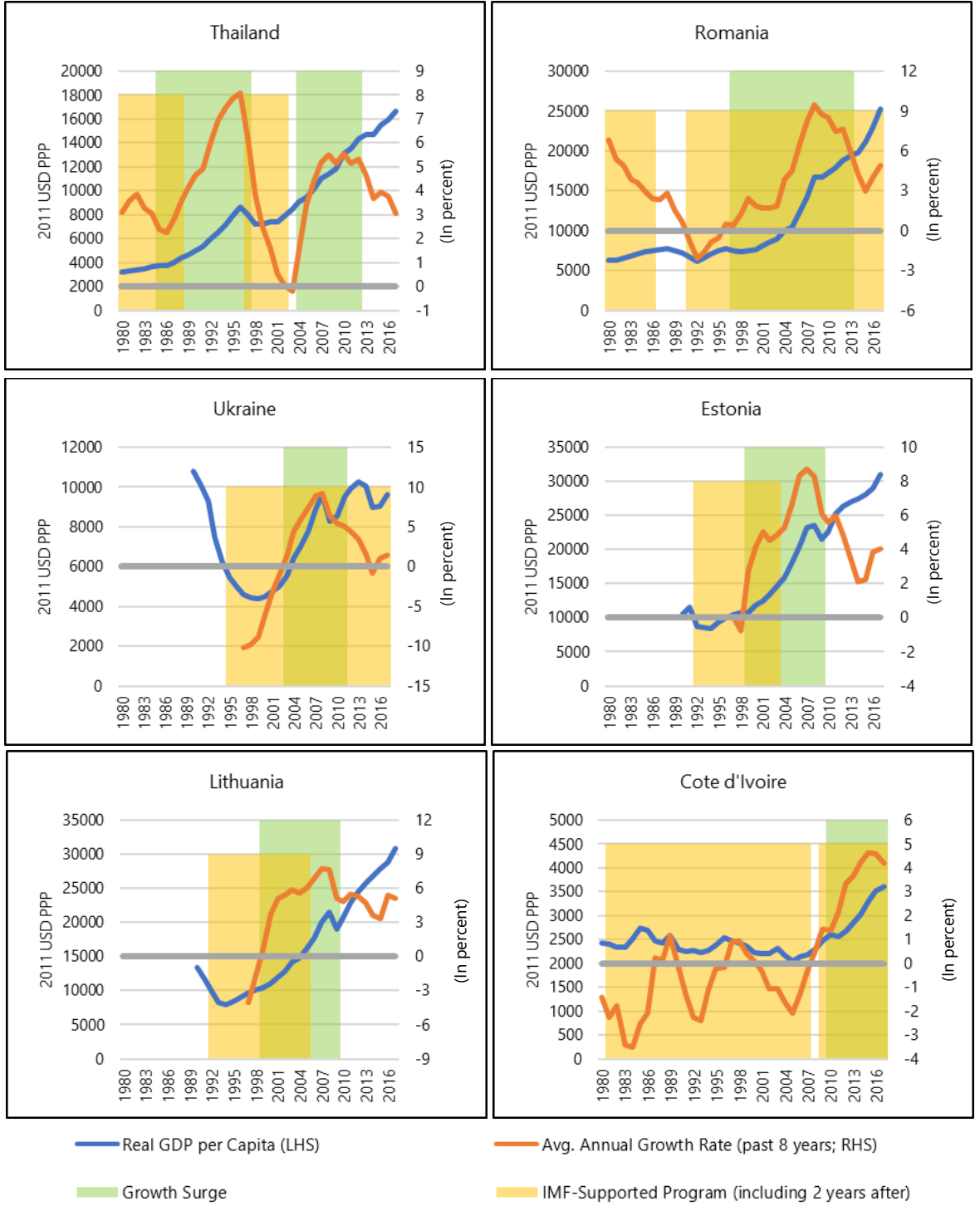
Source: Authors' calculations.

Figure 2. Growth Surges and Their Association with IMF-Supported Programs
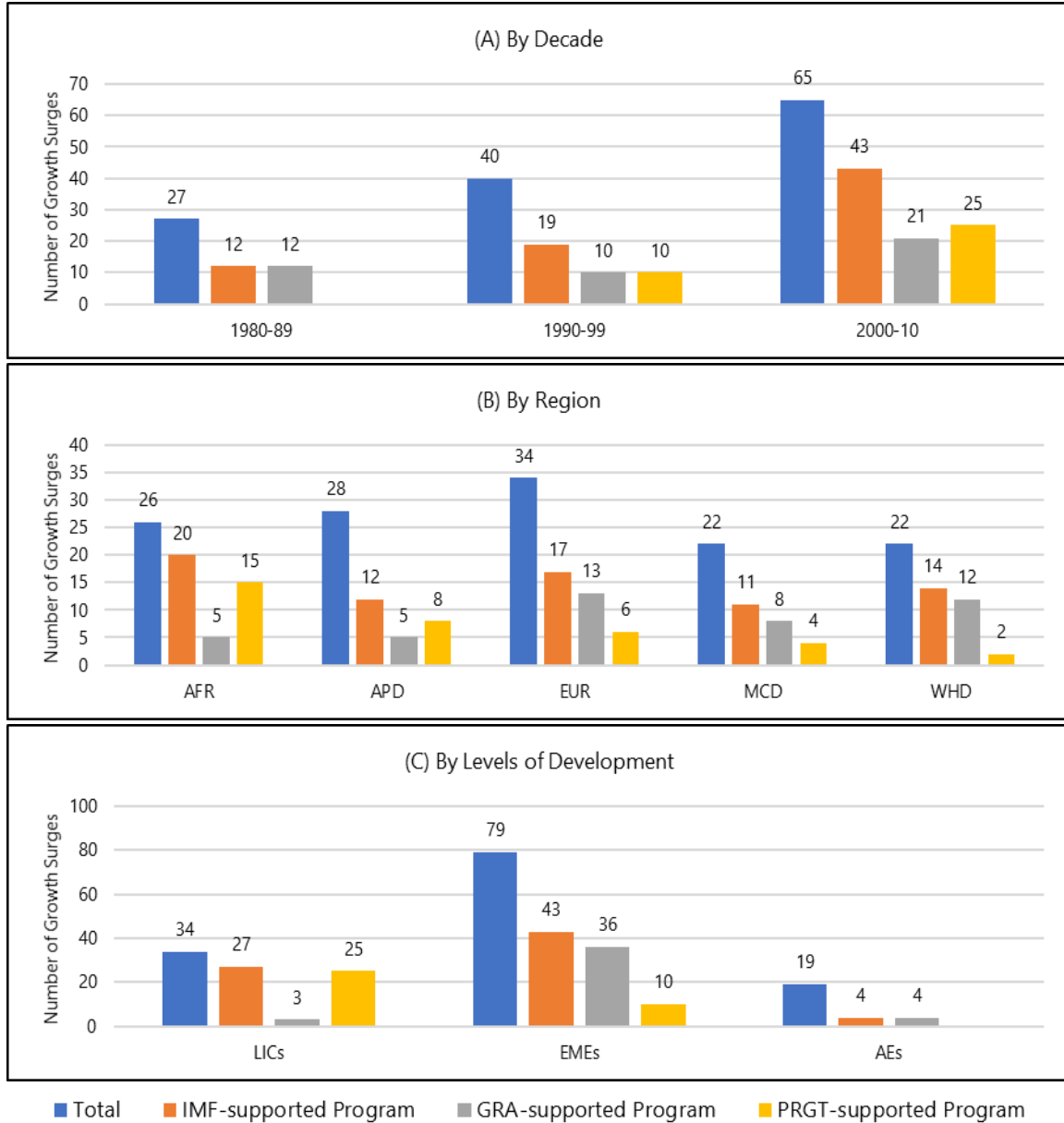
(A) By Decade

(B) By Region

(C) By Levels of Development

■ Total   ■ IMF-supported Program   ■ GRA-supported Program   ■ PRGT-supported Program

Source: Authors' calculations.

Notes: AFR, APD, EUR, MCD, and WHD are shorthand for departments covering Africa, Asia and the Pacific, Europe, the Middle East and Central Asia, and the Western Hemisphere (i.e., the Americas and Caribbean), respectively. LICs, EMEs, and AEs stand for low-income countries, emerging market economies, and advanced economies, respectively. The total number of IMF-supported programs exceeds the sum of GRA-supported and PRGT-supported programs because four programs used a blend of GRA and PRGT resources and are included in both samples (Yemen, 1997; Azerbaijan, 2002; Macedonia, 2002; Sri Lanka, 2003).

15.   Although the above charts provide a sense of the frequency of growth surges across time and region, it's important to acknowledge that growth surges, in general, are relatively rare events. Table 1 presents the unconditional probability of initiating growth surges with and without an associated IMF-supported program.[8]

	With IMF-supported programs				Without IMF-supported programs			
	Decades				Decades			
Regions	1980–89	1990–99	2000–10	1980-2010	1980–89	1990–99	2000–10	1980-2010
AFR	0.008	0.017	0.055	0.026	0.006	0.015	0.026	0.015
APD	0.050	0.060	0.176	0.083	0.052	0.060	0.053	0.054
EUR	0.032	0.075	0.196	0.105	0.029	0.039	0.020	0.028
MCD	0.074	0.059	0.207	0.103	0.000	0.055	0.062	0.033
WHD	0.027	0.016	0.072	0.037	0.014	0.015	0.030	0.019
All Regions	0.024	0.032	0.093	0.047	0.019	0.034	0.033	0.028

Table 1. Unconditional Probability of Initiating Growth Surges

Source: Authors' calculations.
Notes: AFR, APD, EUR, MCD, and WHD are shorthand for departments covering Africa, Asia and the Pacific, Europe, the Middle East and Central Asia, and the Western Hemisphere (i.e., the Americas and Caribbean), respectively.

16.   Reflecting the rarity of growth surges, the unconditional probability of a growth surge starting in a given year, for the entire data set, is 3.6 percent. From this low level, the unconditional probability of a growth surge associated with an IMF-supported program is substantially higher at 4.7 percent than without an associated IMF-supported program at 2.8 percent (see Table 1). There are also important differences in the unconditional probabilities across decades and regions. For example, the unconditional probability of initiating a growth surge was substantially higher when associated with an IMF-supported program in the 2000s (i.e., 9.3 percent per year). Looking at the regional breakdown, the overall unconditional probabilities are highest in regions represented by APD, EUR, and MCD. Moreover, the unconditional probabilities in these regions were considerably higher when associated with an IMF-supported program in the 2000s (i.e., 17.6 percent, 19.6 percent, and 20.7 percent per year, respectively).

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[8] The unconditional probability of growth surges with an IMF-supported program is calculated by the number of growth surges associated with an IMF-supported program over the number of years of IMF-supported programs, excluding non-starting years of growth surges. Similarly, the unconditional probability of growth surges without an IMF-supported program is the number of growth surges without an IMF-supported program over the number of years where an IMF-supported program was not in place, excluding non-starting years of growth surges. We exclude the non-starting years of growth surges because, by definition, a growth surge cannot start then.

V. DETERMINANTS OF GROWTH SURGES

17.   Our analysis, so far, has defined and identified growth surges, displayed differences in the number of growth surges across decades, regions, and levels of development, and shown that growth surges begin more frequently when associated with an IMF-supported program. From a policy perspective, however, the most relevant questions are:

(a) What changes in macroeconomic conditions portend a growth surge?

(b) To what extent can those changes predict growth surges?

(c) To what extent does an IMF-supported program aid in bringing about important changes in macroeconomic conditions that predict growth surges?

18.   To begin answering these questions, we hypothesize that growth surges generally occur after a country eliminates or eases its "binding constraints," consistent with the literature on growth surges. Examples of binding constraints include high levels of debt, deficits, and inflation, as well as insufficient infrastructure or substantial corruption. Further, we hypothesize that significant changes in these macroeconomic conditions, rather than attaining a particular level, are sufficient to initiate a growth surge.

19.   We initially identify determinants of growth based on these hypotheses. The existing literatures on growth and growth surges identify countless variables as relevant. We group a significant portion of those identified variables into the following six broad categories of growth determinants, where the data sources and descriptive statistics of individual determinants within each category are listed in Appendix Tables A2 and A3, respectively:[9]

(a) *External Factors and Endowments*[10]*:* The first category captures the effects of "good luck," including more favorable external conditions and discoveries of natural resources. The measures used to capture these effects are: (i) trading partners' growth, (ii) terms of trade, (iii) the nominal US monetary policy rate, (iv) volatility of S&P 500 index returns, and (v) total natural resource rents.

(b) *Institutions*[11]*:* The second category captures the effects of varying institutional quality, which affect the economic actions of private and public actors. The measures used to

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[9] This practice is uncommon in the literature but was applied in Peruzzi and Terzi (2018) and Atsebi (2020). Following this practice, however, allows us to use a much more extensive set of variables relative to other studies.

[10] An extensive literature details the importance for growth of external factors (see, for example, Edwards and Van Wijnbergen, 1987; Easterly and others, 1993; Barro, 2003; Hamann and Prati, 2002; Gupta and others, 2005; Atsebi, 2020) and natural resources endowments (see, for example, Manzano and Rigobon, 2001; Mehlum and others, 2006; Sala-i Martin and others, 2004; Mideksa, 2013; Atsebi, 2020).

[11] Institutional factors often are deemed critical for growth, either due to a direct impact or indirect impact on other determinants (see, for example, Acemoglu and others, 2001; Hamann and Prati, 2002; Barro, 2003; Gupta and others, 2005; Mehlum and others, 2006; Jong-A-Pin and de Haan, 2011; Berg and others, 2012; Giuliano and others, 2013; Atsebi, 2020).

capture these effects are indexes of: (i) government accountability, (ii) civil liberties, (iii) political corruption, and (iv) rule of law.

(c) *Macroeconomic Stability*[12]*:* The third category captures the effects of macroeconomic stability. The measures used to capture these effects are: (i) the end of financial crises and normal recessions, (ii) public debt, (iii) the current account balance, (iv) inflation, and (v) the real effective exchange rate.

(d) *Structural Reforms*[13]*:* The fourth category captures reforms designed to enhance the efficiency of different sectors within an economy. The measures used to capture these effects are indexes of reforms related to: (i) agriculture, (ii) product markets, (iii) the labor market, (iv) the financial sector, (v) trade, (vi) the current account, and (vii) the capital account.

(e) *Trade Diversification and Quality*[14]*:* The fifth category captures the effects from the diversification and quality of a country's trading partners and tradable products. The measures used to capture these effects are: (i) export quality, (ii) import quality, (iii) product diversification, and (iv) partner diversification.

(f) *Investments, Labor, and Productivity*[15]*:* The sixth and final category captures the long-run growth effects of investment, human capital, and productivity. The measures used to capture these effects are: (i) domestic investment (combining private and public), (ii) foreign direct investment, and (iii) a human capital index.

20.   Using the individual measures of growth determinants within each category, we identify significant improvements in each measure at an individual country level. To do so, we employ a signal-extraction model which uses the country-specific distribution of changes in each individual indicator to identify independent thresholds in the upper tail of the distribution beyond which a

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[12] Macroeconomic stability generally is considered a prerequisite for sustaining and enhancing growth (see, for example, Dornbusch and others, 1995; Bruno and Easterly, 1998; Mussa and Savastano, 1999; Collier and Hoeffler, 2004; Easterly, 2005; Gupta and others, 2005; Berg and others, 2012; Darvas, 2012; Libman and others, 2019; Atsebi, 2020).

[13] Structural reforms, and the capacity to implement such reforms, are critical to eliminating "binding constraints" on growth (see, for example, Mussa and Savastano, 1999; Ahluwalia, 2002; Panagariya, 2004; Gupta and others, 2005; Giuliano and others, 2013; Prati and others, 2013; IMF, 2019; Libman and others, 2019; Atsebi, 2020).

[14] Increasing the diversity of a country's tradable products and trading partners often is cited a means for improving a country's level of development (see, for example, Hausmann and others, 2007, 2011; Berg and others, 2012; Cadot and others, 2013; Atsebi, 2020).

[15] Standard exogenous growth models (see, for example, Solow, 1956; Swan, 1956; Gupta and others, 2005) and endogenous growth models (see, for example, Romer, 1986, 1987; Lucas, 1988; Barro, 1991; Joshua, 2015; Gupta and others, 2005; Atsebi, 2020) explain long-run growth by focusing on capital accumulation, population growth, and technological progress.

"signal" is issued.[16] The threshold that divides the distribution into two parts, with and without a signal, is determined endogenously by minimizing the sum of type I and type II errors.[17] Further, our thresholds are defined in terms of percentiles, rather than absolute values, for consistent cross-country comparison.[18]

21.   Table 2 provides an illustration of the signal-extraction method in matrix form.[19] The left-hand side of the matrix reflects the two parts of the distribution for each individual country-specific indicator. For any given year, there is one value in the distribution for each individual country-specific indicator. When that value rises above the threshold, i.e., in the upper tail of the distribution, it produces a signal. When that value falls below the threshold, no signal occurs. The top of the matrix reflects whether a growth surge began, or not, in a given year for an individual country.

Table 2. Illustration of the Signal-Extraction Method		
	Growth Surge (t)	**No Growth Surge (t)**
Signal (t-h, t)	A (true positive)	B (false alarm or type I error)
No Signal (t-h, t)	C (miss or type II error)	D (true negative)
Source: Authors' representation.		

22.   This matrix reveals four possible outcomes for each data point (see Table 2). The most common outcome, given the relative infrequency of signals and growth surges, is that no signal occurs and no growth surge begins shortly thereafter (i.e., a true negative). The second most common outcome, given the selected method, is that a signal occurs and a growth surge begins shortly thereafter (i.e., a true positive). Since significant improvements in our variables often take time to affect growth, we consider signals to be valid if a growth surge begins within the next five years (i.e., h=4). The other two outcomes are type I and type II errors. Type I errors (i.e., false

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[16] This strategy does not apply to dichotomous variables like the end of financial crises or normal recessions. In this case, we use the year in which the end of the financial crisis or normal recession occurred as the signal. Separately, we multiply the values of determinants where a significant increase harms growth, such as public debt and inflation, by minus (-1) so that improvements in these determinants also fall in the upper tail of their distribution.

[17] A lower threshold (the model sends fewer signals) is associated with an increase of type II errors or missed crises, but at the same time, a decrease of type I errors or false alarms. A higher threshold (the model sends more signals) is associated with a decrease of type II errors or missed crises, but at the same time, an increase of type I errors or false alarms. The thresholds are determined endogenously between the 70th and 90th percentiles.

[18] The thresholds are data dependent and thus differ between individual indicators for a given country and between countries. The thresholds, however, are restricted to be constant over time for each country-specific individual indicator. As a result, possible time variation in the relationship between underlying drivers and growth surges may not be fully accounted for.

[19] The notation t refers to a given year and h refers to the amount of time after a signal that it remains associated with the initiation of a growth surge. Thus, if h=5 then the left-hand side refers to signals (or the lack thereof) during a 5-year period prior to t, when either a growth surge did or did not occur.

alarms) occur when a signal is not followed by a growth surge. Type II errors (i.e., missed signals) occur when a growth surge is not preceded by a signal.

23.   To obtain the optimal threshold, a grid search is performed where the total misspecification error (i.e., the sum of type I and type II errors) is calculated for a range of potential threshold values and the threshold value that minimizes the misspecification error is selected.[20] Table A4 reports the optimal threshold for each sub-indicator as well as other summary statistics, including a couple of performance indicators that will be defined later. Broadly speaking, these results suggest each of the sub-indicators provides useful forecasts of growth surges.

24.   After determining optimal thresholds for each of the sub-indicators, we construct indexes corresponding to the six broad categories of growth determinants using a weighted average of all signals from indicators within each group.[21] The indexes of each broad growth determinant are constructed to reflect significant improvements in the sub-indicators through an increasing value. For instance, the macroeconomic stability index would be higher if a significant reduction in the level of public debt and inflation occurred together, rather than apart.

25.   These six indexes of growth determinants, which reflect significant improvements in their underlying indicators, now can be used to answer our policy relevant questions. As a first step, Table 3 displays the unconditional probability of the growth determinant indexes issuing a signal, with and without an associated IMF-supported program.[22] It shows that the unconditional probability of all broad growth determinants issuing a signal is substantially higher when associated with an IMF-supported program. Since major improvements in external factors and endowments are beyond the control of country authorities and the IMF, the most plausible hypothesis is that IMF-supported programs help bring about considerable improvements in macroeconomic stability and structural reforms. IMF-supported programs also are likely to be associated with broader efforts to support a country by the international community, including the World Bank, regional development banks, and bilateral agencies, and thus may contribute to other determinants like institutions, trade diversification, and productivity.

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[20] According to Table 2, type I errors are defined as B/(B+D) and type II errors are defined as C/(A+C). The optimal threshold therefore implies minimizing the sum of B/(B+D) and C/(A+C).

[21] These indexes, denoted by GD_j where j refers to the broad indexes, are the weighted average of all signals in sub-determinants i where the weights w_i are the predictive powers (1-TME, i.e., the total misspecification error). Thus, $GD_{jt} = \sum_{i=1}^{n} w_i \times d_{it}$ where $d_{it} = 1 \; if \; signal \; and \; 0 \; otherwise$.

[22] The unconditional probability of the growth determinants issuing a signal with and without an associated IMF-supported program is the number of signals over the number of years (with and without an associated IMF-supported program). We exclude the non-starting years of growth surges, again, because a valid signal cannot take place then.

Table 3. Unconditional Probability of Signals

Growth Determinants	With IMF-supported programs		Without IMF-supported programs	
	# Signals	Prob.	# Signals	Prob.
External Factors and Endowments	187	0.133	120	0.043
Institutions	168	0.120	104	0.038
Macroeconomic Stability	188	0.134	113	0.041
Structural Reforms	203	0.145	88	0.032
Trade Diversification and Quality	164	0.117	128	0.046
Investments, Labor, and Productivity	155	0.110	88	0.032
Total Candidate Years	1403		2767	

Source: Authors' calculations.

26.   Similar to the unconditional probability of a growth surge starting in a given year, there are important differences in the unconditional probability of a signal across decades (Table 4). Panel A shows that the unconditional probability of all broad growth determinants issuing a signal is lowest for the 1980s and that minimal difference exists between signals associated with and without IMF-supported programs. At the other end of the spectrum, Panel C shows that the unconditional probability of all broad growth determinants issuing a signal is highest for the 2000s and that the unconditional probability is substantially higher for signals associated with an IMF-supported program. Hence, IMF-supported programs seemingly have become more effective at generating signals over time.

27.   Moving beyond unconditional probabilities, we use the above matrix in Table 2 to define two different performance measures for the broad growth determinants. First, the incidence of an indicator is defined as the share of true positives among all growth surges. Second, the effectiveness of an indicator is defined as the share of true positives among all signals.[23]

28.   Table 5 shows the incidence of the growth determinant indexes with and without an associated IMF-supported program, as well as the difference between the two values. The incidence of each broad growth determinant is very high (i.e., 79 percent and above), independent of an association with IMF-supported programs. In other words, substantial improvements across the spectrum of variables preceded nearly all growth surges. The difference in incidence values between those associated with and without IMF-supported programs, however, are not statistically significant for any of the broad growth determinants.[24]

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[23] Incidence is defined as A/(A+C). Effectiveness is defined as A/(A+B).

[24] Appendix Table A5 and Table A6 display the incidence of the growth determinant indexes by decade and region, respectively, with and without an associated IMF-supported program. The results across decades and regions are qualitatively and quantitatively similar to the full sample results. The incidence of each broad growth determinant therefor is high, independent of the decade or region.

Table 4. Unconditional Probability of Signals by Decade

Growth Determinants	With IMF-supported programs		Without IMF-supported programs	
	# Signals	Prob.	# Signals	Prob.
Panel A: 1980–89				
External Factors and Endowments	19	0.046	24	0.021
Institutions	25	0.060	27	0.024
Macroeconomic Stability	24	0.058	31	0.028
Structural Reforms	12	0.029	22	0.020
Trade Diversification and Quality	26	0.063	37	0.033
Investments, Labor, and Productivity	13	0.031	20	0.018
Total Candidate Years	415		1127	
Panel B: 1990–99				
External Factors and Endowments	39	0.069	28	0.033
Institutions	62	0.110	46	0.054
Macroeconomic Stability	80	0.142	46	0.054
Structural Reforms	102	0.181	34	0.040
Trade Diversification and Quality	69	0.123	58	0.068
Investments, Labor, and Productivity	67	0.119	39	0.046
Total Candidate Years	563		856	
Panel C: 2000–10				
External Factors and Endowments	129	0.304	68	0.087
Institutions	81	0.191	31	0.040
Macroeconomic Stability	84	0.198	36	0.046
Structural Reforms	89	0.209	32	0.041
Trade Diversification and Quality	69	0.162	33	0.042
Investments, Labor, and Productivity	75	0.176	29	0.037
Total Candidate Years	425		784	

Source: Authors' calculations.

Table 5. Incidence of Growth Determinants

Growth Determinants	With IMF-supported programs		Without IMF-supported programs		Difference (i.e., With minus Without)	
	# GSs	Incidence	# GSs	Incidence	Coefficient	P-value
External Factors and Endowments	74	1.000	56	0.966	0.034	0.109
Institutions	65	0.878	48	0.828	0.051	0.413
Macroeconomic Stability	67	0.905	53	0.914	-0.008	0.869
Structural Reforms	65	0.878	46	0.793	0.085	0.186
Trade Diversification and Quality	69	0.932	49	0.845	0.088	0.106
Investments, Labor, and Productivity	68	0.919	52	0.897	0.022	0.660
Total Growth Surges	74		58		-	

Source: Authors' calculations.
Notes: Numbers of GSs are those preceded by a signal.

29.	Table 6 shows the effectiveness of the growth determinant indexes with and without an associated IMF-supported program, as well as the difference between the two values. The effectiveness of each broad growth determinant also is quite high, exceeding 20 percent, independent of an association with IMF-supported programs. In other words, the probability that

a growth surge followed significant improvements across the spectrum of variables was greater than 20 percent. This probability, however, was increased drastically by the presence of an IMF-supported program. More specifically, the effectiveness of a signal was 10 to 20 percentage points higher (i.e., 35 percent to 45 percent) when associated with an IMF-supported program. Those differences in effectiveness values are statistically significant for all broad growth determinants, including those related to external factors as well as policy factors.

Table 6. Effectiveness of Growth Determinants						
	With IMF-supported programs		Without IMF-supported programs		Difference (i.e., With minus Without)	
Growth Determinants	# Signals	Effectiveness	# Signals	Effectiveness	Coefficient	P-value
External Factors and Endowments	187	0.399	120	0.237	0.162	0.000
Institutions	168	0.352	104	0.249	0.103	0.001
Macroeconomic Stability	188	0.443	113	0.294	0.150	0.000
Structural Reforms	203	0.426	88	0.240	0.186	0.000
Trade Diversification and Quality	164	0.354	128	0.239	0.115	0.000
Investments, Labor, and Productivity	155	0.417	88	0.229	0.188	0.000
Total Growth Surges	74		58		-	

Source: Authors' calculations.
Notes: Numbers of signals are those followed by a growth surge.

30.   Before moving on, it may be helpful to summarize the main findings from our two performance indicators. First, significant improvements across the spectrum of variables preceded nearly all growth surges, independent of an association with IMF-supported programs. Second, significant improvements across the spectrum of variables were more effective at predicting growth surges when associated with an IMF-supported program.

31.   Turning to the individual growth determinant indexes, macroeconomic stability signals were most effective at predicting growth surges, independent of their association with IMF-supported programs and particularly so when associated with an IMF-supported program (see Table 6). This finding is consistent with the view that macroeconomic stability is necessary to sustain growth and, thus, supports the priority on macroeconomic stability envisaged in IMF-supported programs. The second and third most effective signals, focusing on those associated with IMF-supported programs, stemmed from structural reforms and investments, labor, and productivity improvements, respectively. These results are particularly encouraging given the significant weight IMF-supported programs place on these categories. Taken together, these results support the view that IMF-supported programs increase the likelihood of growth surges by helping country authorities implement policies that notably improve macroeconomic stability and enhance structural reforms, among other measures. Positive external factor developments also are helpful, but the results suggest that the benefits are considerably stronger when associated with an IMF-supported program.

32.   There also are important differences about the effectiveness of individual growth determinants and the role of IMF-supported programs across decades and regions. Table 7 displays the effectiveness of the growth determinant indexes by decade, with and without associated IMF-supported programs. Panel A shows that the effectiveness of each broad growth determinant is lowest for the 1980s and that no statistically significant difference exists between signals associated with and without IMF-supported programs. At the other end of the spectrum, Panel C shows that the effectiveness of nearly all broad growth determinants is highest for the 2000s and that the substantial differences between signals associated with and without IMF-supported programs are statistically significant.[25] Hence, IMF-supported programs seemingly have become more effective at establishing conditions for growth surges over time.

Table 7. Effectiveness of Growth Determinants by Decade

Growth Determinants	With IMF-supported programs		Without IMF-supported programs		Difference (i.e., With minus Without)	
	# Signals	Effectiveness	# Signals	Effectiveness	Coefficient	P-value
Panel A: 1980–89						
External Factors and Endowments	19	0.153	24	0.146	0.007	0.872
Institutions	25	0.225	27	0.176	0.049	0.327
Macroeconomic Stability	24	0.216	31	0.248	-0.032	0.566
Structural Reforms	12	0.128	22	0.188	-0.060	0.238
Trade Diversification and Quality	26	0.157	37	0.153	0.004	0.919
Investments, Labor, and Productivity	13	0.151	20	0.153	-0.002	0.976
Total Growth Surges	15		12		-	
Panel B: 1990–99						
External Factors and Endowments	39	0.269	28	0.269	0.000	0.996
Institutions	62	0.262	46	0.275	-0.014	0.758
Macroeconomic Stability	80	0.394	46	0.305	0.089	0.083
Structural Reforms	102	0.421	34	0.219	0.202	0.000
Trade Diversification and Quality	69	0.367	58	0.319	0.048	0.329
Investments, Labor, and Productivity	67	0.396	39	0.247	0.150	0.004
Total Growth Surges	21		19		-	
Panel C: 2000–10						
External Factors and Endowments	129	0.645	68	0.285	0.360	0.000
Institutions	81	0.628	31	0.320	0.308	0.000
Macroeconomic Stability	84	0.764	36	0.330	0.433	0.000
Structural Reforms	89	0.631	32	0.337	0.294	0.000
Trade Diversification and Quality	69	0.633	33	0.295	0.338	0.000
Investments, Labor, and Productivity	75	0.641	29	0.305	0.336	0.000
Total Growth Surges	22		43		-	

Source: Authors' calculations.
Notes: Numbers of signals are those followed by a growth surge.

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[25] The effectiveness of trade diversification and quality without an associated IMF-supported program actually is slightly higher in the 1990s.

33.   Table 8 displays the effectiveness of the growth determinant indexes by region, with and without associated IMF-supported programs. When associated with IMF-supported programs, the effectiveness of each broad growth determinant is highest for the European region and the differences between signals associated with and without IMF-supported programs are highly statistically significant. The effectiveness of most broad growth determinants also is quite high when associated with IMF-supported programs in the Middle East and Central Asia as well as Asia and Pacific regions. In contrast, the effectiveness of most broad growth determinants is lowest in the African and Western Hemisphere regions and the difference between signals associated with and without an IMF-supported program is statistically insignificant in many cases, particularly in the African region.

34.   We also looked at whether the effectiveness of the growth determinant indexes varies by type of IMF-supported program. To assess these potential differences, we undertook similar analyses while splitting the sample between GRA-supported and PRGT-supported programs (see Appendix, Table A7). The results of these subsamples, however, did not considerably differ qualitatively or quantitatively from the effectiveness with all IMF-supported programs or from each other.

35.   Our results, so far, suggest that IMF-supported programs have played a significant role in helping countries initiate growth surges, particularly through restoring macroeconomic stability and enhancing structural reforms. More specifically, IMF-supported programs have helped to improve the growth determinants themselves (see Table 3) and also have raised the effectiveness of the growth determinants in contributing to growth surges. These results suggest that the IMF is learning from experience and paying greater attention to addressing growth related constraints. Nevertheless, these results suggest there may be room for further improvement, for example in helping countries in the African and Western Hemisphere regions, where the effectiveness of growth determinants in contributing to growth surges is lower than in other regions.

VI. EMPIRICAL ANALYSIS

36.   Thus far, our analysis considered the relationship between growth surges and individual broad growth determinants. The extremely high incidence of each growth determinant, however, suggests that significant improvements in these indexes often occur simultaneously and may be inter-related. Thus, for example, improved external conditions may help a country to sustain macroeconomic policy adjustments and economic reforms. A more comprehensive, empirical analysis therefore can help assess the relative effectiveness of these broad growth determinants as well as the role of IMF-supported programs in initiating growth surges.

Table 8. Effectiveness of Growth Determinants by Region						
	With IMF-supported programs		Without IMF-supported programs		Difference (i.e., With minus Without)	
Growth Determinants	# Signals	Effectiveness	# Signals	Effectiveness	Coefficient	P-value
Panel A: AFR						
External Factors and Endowments	36	0.183	13	0.148	0.035	0.471
Institutions	37	0.174	14	0.146	0.028	0.543
Macroeconomic Stability	38	0.229	14	0.177	0.052	0.357
Structural Reforms	48	0.239	12	0.176	0.062	0.288
Trade Diversification and Quality	37	0.184	11	0.112	0.072	0.113
Investments, Labor, and Productivity	40	0.250	14	0.189	0.061	0.307
Total Growth Surges	20		6		-	
Panel B: APD						
External Factors and Endowments	28	0.560	26	0.347	0.213	0.018
Institutions	29	0.558	18	0.321	0.236	0.013
Macroeconomic Stability	23	0.605	21	0.375	0.230	0.028
Structural Reforms	32	0.744	22	0.478	0.266	0.010
Trade Diversification and Quality	26	0.520	31	0.449	0.071	0.450
Investments, Labor, and Productivity	19	0.679	22	0.361	0.318	0.005
Total Growth Surges	12		16		-	
Panel C: EUR						
External Factors and Endowments	62	0.765	41	0.248	0.517	0.000
Institutions	58	0.744	34	0.270	0.474	0.000
Macroeconomic Stability	75	0.815	42	0.362	0.453	0.000
Structural Reforms	80	0.825	33	0.241	0.584	0.000
Trade Diversification and Quality	60	0.732	40	0.252	0.480	0.000
Investments, Labor, and Productivity	60	0.845	26	0.222	0.623	0.000
Total Growth Surges	17		17		-	
Panel D: MCD						
External Factors and Endowments	30	0.750	25	0.298	0.452	0.000
Institutions	17	0.472	30	0.390	0.083	0.411
Macroeconomic Stability	28	0.718	25	0.410	0.308	0.002
Structural Reforms	21	0.656	12	0.316	0.340	0.004
Trade Diversification and Quality	21	0.618	30	0.286	0.332	0.000
Investments, Labor, and Productivity	17	0.607	17	0.258	0.350	0.001
Total Growth Surges	11		11		-	
Panel E: WHD						
External Factors and Endowments	31	0.307	15	0.158	0.149	0.014
Institutions	27	0.276	8	0.129	0.146	0.029
Macroeconomic Stability	24	0.270	11	0.151	0.119	0.068
Structural Reforms	22	0.212	9	0.115	0.096	0.089
Trade Diversification and Quality	20	0.208	16	0.152	0.056	0.304
Investments, Labor, and Productivity	19	0.224	9	0.136	0.087	0.174
Total Growth Surges	14		8		-	

Source: Authors' calculations.
Notes: Numbers of signals are those followed by a growth surge. AFR, APD, EUR, MCD, and WHD are shorthand for departments covering Africa, Asia and the Pacific, Europe, the Middle East and Central Asia, and the Western Hemisphere (i.e., the Americas and Caribbean), respectively.

37.   The dependent variable in our benchmark model is a dummy variable that equals one the year before, during, or after a growth surge begins, and zero otherwise.[26] Since the dependent variable is binary, we employ a logit regression for our benchmark model. The set of explanatory variables includes: (i) a dummy variable that equals one if an IMF-supported program was ongoing or ended within the previous two years, and zero otherwise; (ii) five-year averages of the six broad growth determinant indexes; and (iii) interaction terms between the IMF-supported program dummy and each growth determinant. Finally, we include dummy variables representing the different decades, regions, and levels of development in our sample to ascertain whether previously identified differences are robust to this type of analysis.

38.   Table 9 displays regression results from our benchmark model. More specifically, Table 9 shows the average marginal effects of each independent variable with and without an associated IMF-supported program. The average marginal effect is computed as the average of all the marginal effects calculated for each set of independent variables at their observed values based on the logit estimates.[27] They reflect the average change in the probability of a growth surge for a one-unit increase in a given independent variable. For example, a coefficient of 0.5 implies that a one-unit increase in the independent variable increases the probability of a growth surge by 50 percent.[28]

39.   The results in Table 9 demonstrate that the benchmark model has relatively good predictive power.[29] More importantly, these results reveal notable similarities and differences from our earlier findings regarding the impact of individual variables on the likelihood of growth surges. For example, the association with IMF-supported programs produces a statistically significant, positive relationship between the initiation of growth surges and improvements in several broad growth determinants (i.e., external factors and endowments, macroeconomic stability, structural reforms, and investments, labor, and productivity). While a statistically significant, positive relationship also exists without associated IMF-supported programs between the initiation of growth surges and improvements in external factors and endowments as well as macroeconomic stability, the impact of each is smaller. In contrast, a statistically significant, positive relationship exists between the initiation of growth surges and improvements in institutions as well as trade diversification and quality when there are no associated IMF-supported programs, but not with an IMF-supported program.

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[26] The practice of using a range of years around the estimated starting year of a growth surge is common in the literature (see e.g., Hausmann and others, 2005; Jong-A-Pin and de Haan, 2011; Libman and others, 2019; Atsebi, 2020) and due to uncertainty regarding the precise timing of growth surges.

[27] The average marginal effects are calculated in two independent sub-samples (i.e., with and without associated IMF-supported programs) from a single logit regression. Thus, the results of our single, benchmark regression are reported in two columns and exclude values for the interaction terms.

[28] Values for the five-year averages of the six broad growth determinant indexes range from 0.0 to 0.6 therefore the realized changes in the probability of a growth surge were less than those reflected by the coefficients in Table 8.

[29] More specifically, the classification power is above 90, the AUROC is approximately 0.8, and the Pseudo R^2 is almost 0.2.

Table 9. Benchmark Regression Results: Average Marginal Effect

Independent Variables	With IMF-supported Programs	Without IMF-supported Programs
IMF-supported Program	0.021*	--
	(0.011)	--
External Factors and Endowments	0.673***	0.196*
	(0.123)	(0.103)
Institutions	0.055	0.097*
	(0.054)	(0.056)
Macroeconomic Stability	0.498***	0.408***
	(0.097)	(0.082)
Structural Reforms	0.331***	0.158
	(0.093)	(0.097)
Trade Diversification and Quality	0.065	0.190***
	(0.075)	(0.062)
Investments, Labor, and Productivity	0.234***	0.104
	(0.081)	(0.065)
1980–89 (Base Level)		
1990–99	0.004	0.004
	(0.012)	(0.010)
2000–10	0.087***	0.078***
	(0.017)	(0.015)
AFR (Base Level)		
APD	0.119***	0.107***
	(0.022)	(0.019)
EUR	0.048**	0.041**
	(0.019)	(0.017)
MCD	0.042**	0.036**
	(0.018)	(0.015)
WHD	-0.008	-0.007
	(0.013)	(0.010)
Advanced Economies (Base Level)		
Low-income Developing Economies	0.014	0.012
	(0.019)	(0.016)
Emerging Economies	0.083***	0.074***
	(0.016)	(0.016)
Observations	3763	
# of GSs	132	
# of Countries	169	
Pseudo R^2	0.189	
Classification Power	90.380	
AUROC	0.795	
BIC	2237.996	

Source: Authors' calculations.
Notes: Logit estimations. Robust standard errors in parentheses. *** *p<0.01, ** p<0.05, * p<0.1.*
The table shows the average marginal effect of each independent variable with and without IMF-supported programs. Thus, the average marginal effect of the IMF-supported program variable captures the direct effect of IMF-supported programs, i.e. the effect not transmitted through the six broad categories of growth determinants. AFR, APD, EUR, MCD, and WHD are shorthand for departments covering Africa, Asia and the Pacific, Europe, the Middle East and Central Asia, and the Western Hemisphere (i.e., the Americas and Caribbean), respectively.

40.   These initial results lend themselves to several possible explanations. However, our preferred interpretation is as follows. First, the two most important variables for increasing the likelihood of a growth surge, irrespective of whether there is an IMF-supported program, are macroeconomic stability and external factors and endowments, in that order. Since there is relatively little a country can do to affect its external factors and endowments, these results suggest that improving macroeconomic stability should be a priority. The impact of external factors and endowments, nevertheless, is much greater when associated with an IMF-supported program. This difference may capture confidence effects from an IMF-supported program that enhance a country's ability to capitalize on positive, external shocks. Second, the two variables that increase the likelihood of a growth surge only when associated with an IMF-supported program are structural reforms and investments, labor, and productivity. These results lend support to the view that IMF-supported programs play a role in initiating growth surges through their reforms as well as macro-stabilization impacts.

41.   While the benchmark regression includes standalone dummy variables for decades and regions, we also are interested in how the relationship between growth determinants and growth surges has changed across time and place. Tables 10 and 11 display benchmark regression results including the interaction between growth determinants and dummy variables for decades and regions, respectively, with and without associated IMF-supported programs.[30] The results by decade largely confirm our earlier findings, namely that the effectiveness of nearly all broad growth determinants is highest for the 2000s, particularly when associated with an IMF-supported program. The results by region, on the other hand, do not depict any particular pattern across regions in terms of the impact growth determinants have on initiating a growth surge.

42.   We also looked at whether different types of IMF-supported programs vary in their methods and effectiveness in initiating growth surges. To assess these potential differences, we undertook similar analyses while splitting the sample between GRA-supported and PRGT-supported programs. Once again, the results of these subsamples did not considerably differ qualitatively or quantitatively from our main findings or from each other. The impact of improvements in macroeconomic stability and structural reforms on the initiation of growth surges is higher when associated with PRGT-supported programs than GRA-supported programs. The differences in impact, however, may be attributable to differences in the underlying characteristics of countries that qualify and apply for each type of program. Advanced economies, for example, only qualify for GRA-supported programs and are less likely to experience a growth surge. Thus, it is difficult to conclude that PRGT-supported programs are more effective at initiating growth surges based on our evidence.

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[30] Once again, the average marginal effects are calculated in independent sub-samples (i.e., with and without associated IMF-supported programs by decade and region, respectively) from a single logit regression. Thus, the results of our single, benchmark regression are reported in two columns, with several panels, and exclude values for the interaction terms.

Table 10. Benchmark Regression Results: Average Marginal Effect by Decade

Independent Variables	With IMF-supported Programs	Without IMF-supported Programs
Panel A: 1980–89		
IMF-supported Program	0.021**	--
	(0.010)	--
External Factors and Endowments	0.406**	0.133
	(0.204)	(0.149)
Institutions	0.131*	0.116*
	(0.074)	(0.063)
Macroeconomic Stability	0.659***	0.418***
	(0.163)	(0.128)
Structural Reforms	-0.048	-0.190
	(0.171)	(0.137)
Trade Diversification and Quality	-0.126	0.002
	(0.100)	(0.067)
Investments, Labor, and Productivity	0.085	0.004
	(0.112)	(0.086)
# of GSs	12	15
Panel B: 1990–99		
IMF-supported Program	0.012	--
	(0.010)	--
External Factors and Endowments	-0.189	-0.366***
	(0.160)	(0.137)
Institutions	-0.112	-0.086
	(0.069)	(0.058)
Macroeconomic Stability	0.451***	0.269***
	(0.106)	(0.087)
Structural Reforms	0.231**	0.042
	(0.093)	(0.100)
Trade Diversification and Quality	0.126	0.217***
	(0.084)	(0.074)
Investments, Labor, and Productivity	0.117	0.034
	(0.089)	(0.074)
# of GSs	19	21
Panel C: 2000–10		
IMF-supported Program	0.036**	--
	(0.016)	--
External Factors and Endowments	1.217***	0.768***
	(0.164)	(0.151)
Institutions	0.336***	0.328***
	(0.102)	(0.111)
Macroeconomic Stability	0.622***	0.365***
	(0.155)	(0.131)
Structural Reforms	0.775***	0.441***
	(0.174)	(0.162)
Trade Diversification and Quality	0.132	0.309**
	(0.136)	(0.135)
Investments, Labor, and Productivity	0.337**	0.195*
	(0.132)	(0.112)

Table 10. Benchmark Regression Results: Average Marginal Effect by Decade (concluded)

Independent Variables	With IMF-supported Programs	Without IMF-supported Programs
# of GSs	43	22
Observations	3763	
# of Countries	169	
Pseudo R2	0.220	
Classification Power	90.539	
AUROC	0.820	
BIC	2259.240	

Source: Authors' calculations.
Notes: Logit estimations. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The table shows the average marginal effect of each independent variable with and without IMF-supported programs. Thus, the average marginal effect of the IMF-supported program variable captures the direct effect of IMF-supported programs, i.e. the effect not transmitted through the six broad categories of growth determinants. AFR, APD, EUR, MCD, and WHD are shorthand for departments covering Africa, Asia and the Pacific, Europe, the Middle East and Central Asia, and the Western Hemisphere (i.e., the Americas and Caribbean), respectively.

Table 11. Benchmark Regression Results: Average Marginal Effect by Region

Independent Variables	With IMF-supported Programs	Without IMF-supported Programs
Panel A: AFR		
IMF-supported Program	0.020**	--
	(0.009)	--
External Factors and Endowments	0.656***	0.316**
	(0.149)	(0.129)
Institutions	0.006	0.011
	(0.061)	(0.062)
Macroeconomic Stability	0.410***	0.293***
	(0.101)	(0.098)
Structural Reforms	0.330**	0.208
	(0.129)	(0.130)
Trade Diversification and Quality	-0.029	0.008
	(0.083)	(0.080)
Investments, Labor, and Productivity	0.271***	0.183**
	(0.091)	(0.079)
# of GSs	20	6
Panel B: APD		
IMF-supported Program	0.020	--
	(0.021)	--
External Factors and Endowments	0.297	-0.343
	(0.330)	(0.319)
Institutions	0.044	0.056
	(0.156)	(0.157)
Macroeconomic Stability	0.343	0.194
	(0.308)	(0.283)
Structural Reforms	1.053***	0.829***
	(0.305)	(0.297)

Table 11. Benchmark Regression Results: Average Marginal Effect by Region (continued)

Independent Variables	With IMF-supported Programs	Without IMF-supported Programs
Trade Diversification and Quality	0.196	0.277
	(0.205)	(0.170)
Investments, Labor, and Productivity	0.308	0.178
	(0.238)	(0.197)
# of GSs	12	16
Panel C: EUR		
IMF-supported Program	0.021	--
	(0.013)	--
External Factors and Endowments	0.587***	0.146
	(0.203)	(0.178)
Institutions	0.075	0.077
	(0.118)	(0.110)
Macroeconomic Stability	0.997***	0.831***
	(0.209)	(0.193)
Structural Reforms	0.253*	0.118
	(0.154)	(0.149)
Trade Diversification and Quality	0.161	0.203
	(0.166)	(0.142)
Investments, Labor, and Productivity	0.163	0.076
	(0.149)	(0.125)
# of GSs	17	17
Panel D: MCD		
IMF-supported Program	0.018	--
	(0.013)	--
External Factors and Endowments	0.562**	0.122
	(0.226)	(0.188)
Institutions	0.253*	0.241*
	(0.136)	(0.126)
Macroeconomic Stability	0.681***	0.540***
	(0.203)	(0.168)
Structural Reforms	0.355	0.211
	(0.243)	(0.217)
Trade Diversification and Quality	0.313**	0.342***
	(0.151)	(0.120)
Investments, Labor, and Productivity	0.050	-0.028
	(0.183)	(0.149)
# of GSs	11	11
Panel E: WHD		
IMF-supported Program	0.017**	--
	(0.008)	--
External Factors and Endowments	0.818***	0.452***
	(0.190)	(0.156)
Institutions	0.114*	0.100*
	(0.064)	(0.057)
Macroeconomic Stability	0.222**	0.135
	(0.106)	(0.083)
Structural Reforms	-0.079	-0.131
	(0.135)	(0.122)

Table 11. Benchmark Regression Results: Average Marginal Effect by Region (concluded)		
Independent Variables	With IMF-supported Programs	Without IMF-supported Programs
Trade Diversification and Quality	-0.016 (0.089)	0.018 (0.076)
Investments, Labor, and Productivity	0.101 (0.097)	0.041 (0.089)
# of GSs	14	8
Observations	3763	
# of Countries	169	
Pseudo R2	0.211	
Classification Power	90.114	
AUROC	0.81	
BIC	2379.062	

Source: Authors' calculations.
Notes: Logit estimations. Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. The table shows the average marginal effect of each independent variable with and without IMF-supported programs. Thus, the average marginal effect of the IMF-supported program variable captures the direct effect of IMF-supported programs, i.e. the effect not transmitted through the six broad categories of growth determinants. AFR, APD, EUR, MCD, and WHD are shorthand for departments covering Africa, Asia and the Pacific, Europe, the Middle East and Central Asia, and the Western Hemisphere (i.e., the Americas and Caribbean), respectively.

43.   Throughout the analysis above, we made judgments about how to define growth surges, the amount of time it takes for IMF-supported programs to affect growth determinants, the amount of time it takes for significant improvements in growth determinants to initiate a growth surge, and the appropriate estimation technique. Such ad hoc decisions are inevitable in this type of analysis and, in fact, common in economic research. To check the sensitivity of these results to our judgments, we therefore experimented with various alternatives. More specifically, we defined growth surges using different criteria and adjusting the minimum duration from 8 years to 6 and 10 years.[31] Separately, we adjusted the amount of time after an IMF-supported program ends that it remains associated with significant improvements in growth determinants from 2 years to 0 and 4 years. We also adjusted the amount of time after significant improvements in growth determinants that they remain associated with the initiation of growth surges from 5 years to 3 and 7 years. Finally, we changed our estimation technique from a logit model to a pooled probit model and a tobit model. Overall, the results from these numerous modifications do not considerably differ qualitatively or quantitatively from our main findings.

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[31] We tried redefining the criteria for growth surges several different ways. First, we applied the same criteria used in Hausmann, Pritchett, and Rodrik (2005). Second, we changed the criteria for rapid growth from 3.5 percent per year to 2.5 percent and 4.5 percent per year. Third, we changed the criteria for accelerating growth from 2 percent higher to 1 percent and 3 percent higher.

VII. CONCLUSION

44.   IMF-supported programs have long been criticized for an excessive tightening bias that produces lackluster growth in the member countries it aims to help. The IMF, to its credit, has been paying increasing attention to growth within IMF-supported programs for almost as long. More recently, the 2002 Guidelines on Conditionality explicitly specified "fostering sustainable economic growth" as a program goal. Greater emphasis on growth outcomes, in turn, has implied increasing attention to growth friendly policies such as growth-enhancing structural reforms and protection of public investment.

45.   Despite these long-standing critiques and shifting Fund priorities, little attention has been paid to the potential role of IMF-supported programs in helping countries institute policies that lead to sustained growth accelerations, i.e., growth surges. This background paper, as part of a broader evaluation of growth and adjustment in IMF-supported programs, therefore sought to determine whether IMF-supported programs help initiate growth surges and, if so, through which channels. Our initial analysis shows that significant improvements across the broad spectrum of relevant growth determinants preceded nearly all growth surges. Moreover, these improvements were more likely to trigger growth surges when associated with IMF-supported programs. These results largely were confirmed using a signal-extraction model. Our benchmark regression results, more specifically, show a statistically significant, positive relationship between the initiation of growth surges and improvements in several broad growth determinants (i.e., macroeconomic stability, structural reforms, and investments, labor, and productivity) that is strongest in the 2000s.

46.   Our results suggest that IMF-supported programs increase the likelihood of a growth surge by helping countries: (i) to implement policies to restore macroeconomic stability and enhance structural reforms and (ii) to increase the effectiveness of these policies in generating a growth surge. Furthermore, our results imply IMF-supported programs have become increasingly effective at initiating growth surges over time, which indicates that the IMF's increasing attention to growth has borne fruit. Nevertheless, our results indicate that external factors and endowments are critical to initiating growth surges. Therefore, the IMF and countries must rely, in part, on good luck, but the presence of an IMF-supported program can contribute to a country being able to build on better external conditions to achieve a growth surge.

47.   Looking ahead, our analysis highlights the importance of prioritizing macroeconomic stability and achieving structural reforms to have a long-lasting impact on growth. IMF-supported programs therefore need to consider country ownership, focus, and technical support to foster adequate implementation, follow-through, and impact. Ultimately, the IMF should continue to learn from its experiences and apply those lessons to maximize the likelihood that its member countries experience growth surges.

APPENDIX TABLES

Table A1. List of Growth Surges						
Country	Start Year	End Year	Duration	Avg. Growth	RGDP Per Capita (Start)	RGDP Per Capita (End)	IMF-Supported Program
Albania	1997	2013	17	5.78	3751	9745	1
Argentina	1984	1999	16	6.88	4539	13165	1
Armenia	2001	2011	11	9.05	3300	8561	1
Antigua and Barbuda	1980	1992	13	6.09	5525	11923	0
Antigua and Barbuda	1999	2009	11	3.44	13606	19736	0
Austria	1984	1995	12	3.96	18865	30071	0
Azerbaijan	2002	2013	12	15.72	2886	16638	1
Benin	1998	2006	9	3.66	1296	1790	1
Bangladesh	2005	2016	12	6.87	1461	3245	1
Bulgaria	2001	2011	11	5.77	8595	15924	1
Bahrain	1994	2008	15	6.86	16158	43683	0
Belarus	2001	2013	13	5.63	8563	17451	0
Bolivia	1992	2013	22	4.47	2318	6065	1
Brazil	1988	2000	13	2.53	6229	8617	1
Brazil	2006	2015	10	4.27	9515	14450	1
Bhutan	1980	1988	9	3.78	1589	2219	0
Bhutan	1994	2002	9	5.81	2859	4752	0
Chile	1989	1998	10	4.09	7581	11317	1
Chile	2005	2013	9	5.81	13403	22292	0
China	1981	1989	9	3.78	1827	2551	1
China	1992	2012	21	6.51	2821	10596	0
Cote d'Ivoire	2010	2017	9	3.71	2597	3606	1
Democratic Republic of Congo	2008	2016	9	3.21	594	789	1
Congo	2001	2015	15	3.76	2151	3743	1
Colombia	2005	2014	10	5.12	7616	12551	1
Cape Verde	1993	2005	13	4.85	2195	4065	0
Czech Republic	2002	2010	9	3.28	21374	28586	0
Germany	1987	1995	9	3.58	21827	29965	0
Djibouti	2009	2017	9	3.87	2518	3545	1
Denmark	1993	2001	9	3.24	26015	34668	0
Dominican Republic	1994	2003	10	3.36	5510	7666	1
Ecuador	2003	2012	10	5.42	5996	10168	1
Egypt	1990	2000	11	7.99	2013	4690	1
Egypt	2002	2014	13	5.53	4870	9800	0
Spain	1988	1996	9	3.66	15183	20986	0
Estonia	1999	2009	11	6.48	10772	21484	1
Ethiopia	2005	2016	12	7.65	630	1526	1
Gabon	1997	2009	13	2.83	7927	11392	1
United Kingdom	1991	1999	9	3.72	22395	31110	0
Georgia	2002	2013	12	8.96	3304	9254	1
Ghana	2001	2015	15	3.86	2764	4875	1
Equatorial Guinea	1998	2006	9	17.77	4414	19245	1
Grenada	1986	1995	10	5.66	3276	5679	1
Croatia	1998	2007	10	6.00	11329	20286	1
Hungary	1997	2005	9	3.56	13907	19052	1
Indonesia	1988	1997	10	5.66	2702	4683	0
Indonesia	2006	2015	10	7.94	4655	9995	0
India	1989	1997	9	3.91	1232	1741	0
India	2000	2013	14	6.77	1988	4976	0
Ireland	1985	2002	18	6.05	13596	39118	0
Iran (Islamic Republic of)	1992	2008	17	8.97	3780	16273	0
Iraq	2007	2017	11	9.98	5857	16683	1

Country	Start Year	End Year	Duration	Avg. Growth	RGDP Per Capita (Start)	RGDP Per Capita (End)	IMF-Supported Program
Israel	1989	1997	9	4.34	19921	29205	0
Jordan	1998	2013	16	5.89	3478	8694	1
Japan	1987	1996	10	5.00	20731	33783	0
Kazakhstan	2002	2012	11	10.92	7025	21974	1
Kenya	2008	2016	9	3.81	2110	2955	1
Kyrgyzstan	2005	2015	11	5.32	2079	3677	1
Cambodia	1996	2010	15	5.46	1106	2455	1
Saint Kitts and Nevis	2003	2011	9	4.63	14277	21457	0
Kuwait	2004	2012	9	5.12	50362	78921	0
Laos	1999	2013	15	7.83	1669	5168	1
Lebanon	1997	2008	12	8.16	5610	14385	0
Sri Lanka	1991	1999	9	4.64	2927	4401	1
Sri Lanka	2003	2016	14	6.52	4929	11938	1
Lesotho	2009	2017	9	3.40	2219	2999	0
Lithuania	1999	2009	11	5.66	10373	19003	1
Luxembourg	1987	1995	9	4.61	33788	50687	0
Latvia	2000	2009	10	5.64	10150	17565	1
Morocco	1983	1992	10	3.91	2939	4312	1
Morocco	2007	2016	10	4.77	4891	7794	0
Republic of Moldova	2005	2013	9	6.72	2613	4692	1
Maldives	1999	2009	11	4.85	7079	11916	0
Macedonia	2002	2010	9	5.01	7204	11187	1
Mali	2004	2012	9	4.92	1280	1972	1
Malta	2009	2017	9	5.08	26792	41847	0
Myanmar	1996	2013	18	9.18	972	4724	0
Montenegro	1999	2013	15	5.00	6594	13709	0
Mongolia	2001	2012	12	10.40	3000	9837	1
Mozambique	1998	2006	9	4.62	637	957	1
Mauritania	2004	2012	9	3.46	2160	2934	1
Mauritius	1985	1994	10	6.22	6517	11913	1
Mauritius	2008	2017	10	4.18	15047	22657	0
Malaysia	1991	1999	9	4.50	8635	12832	0
Malaysia	2001	2012	12	4.61	12989	22310	0
Namibia	1999	2013	15	4.57	5211	10187	0
Nigeria	2000	2010	11	19.08	764	5220	1
Nicaragua	2009	2017	10	3.38	3843	5360	1
Netherlands	1993	2001	9	4.33	27501	40264	0
Norway	1992	2002	11	3.95	26847	41098	0
Nepal	2007	2016	10	5.12	1385	2282	1
Oman	1997	2009	13	9.54	11784	38538	0
Pakistan	2001	2013	13	3.93	2692	4444	1
Panama	2004	2015	12	5.60	10706	20581	1
Peru	2003	2013	11	6.57	5474	11018	1
Philippines	1989	1997	9	3.55	3341	4575	1
Philippines	2008	2017	10	4.77	4786	7629	0
Poland	2003	2014	12	4.63	14221	24487	0
Portugal	1987	1995	9	5.07	11484	17915	1
Paraguay	2003	2013	11	4.76	4837	8069	1
Qatar	1998	2006	9	17.12	27384	113522	0
Romania	1997	2013	17	5.80	7432	19387	1
Russian Federation	2001	2012	12	8.06	10110	25620	1
Rwanda	2003	2011	9	5.69	869	1430	1
Saudi Arabia	2001	2012	12	9.27	18371	53258	0
Sudan	2001	2012	12	6.72	1772	3867	0
Singapore	1989	2006	18	6.68	18518	59335	0
El Salvador	1989	2001	13	4.37	2574	4486	0
Serbia	2001	2009	9	7.22	6463	12108	1

Country	Start Year	End Year	Duration	Avg. Growth	RGDP Per Capita (Start)	RGDP Per Capita (End)	IMF-Supported Program
Suriname	1999	2013	15	6.17	6214	15265	0
Slovakia	1999	2012	14	4.65	14190	26830	0
Swaziland	1984	1992	9	4.81	4008	6118	0
Seychelles	2008	2016	9	4.52	18686	27810	1
Syrian Arab Republic	1999	2009	11	13.75	1263	5210	0
Thailand	1985	1997	13	6.11	3725	8054	1
Thailand	2004	2012	9	5.21	9062	14314	0
Tajikistan	2005	2013	9	5.75	1743	2883	1
Turkmenistan	2001	2016	16	7.12	7393	22206	0
Trinidad and Tobago	2000	2009	10	6.31	13134	24215	0
Tunisia	1988	1999	12	4.06	4989	8042	1
Turkey	2005	2013	9	6.08	12794	21770	1
Tanzania	1999	2008	10	4.67	1072	1692	1
Uganda	2003	2012	10	3.86	1181	1726	1
Ukraine	2003	2011	9	6.16	5569	9534	1
Uruguay	2008	2016	9	4.76	13373	20315	1
Uzbekistan	2002	2016	15	5.43	4151	9176	0
St. Vincent and the Grenadines	2001	2009	9	3.16	7202	9527	0
Viet Nam	1989	1998	10	4.73	1207	1916	0
Viet Nam	2003	2012	10	7.36	2417	4917	1
Yemen	1997	2011	15	10.60	837	3793	1
Zambia	2001	2013	13	8.62	1223	3585	1
Zimbabwe	1982	1990	9	3.62	3207	4418	1

Source: Authors' calculations.

Table A2. List of Variables

Variable	Source
Real GDP per capita in 2010 PPP terms	Penn World Tables 9.1
IMF-supported programs dummy	IMF Strategy and Policy Review department
External Factors and Endowments	*Authors' calculations based on following sources*
Trading partners' growth (in percent)	Global Economic Environment, IMF
Terms of trade (export price / import price)	Penn World Tables 9.1
Nominal US FED interest rate (in percent)	Bank of International Settlements
Volatility of S&P 500 index returns	Standard and Poor's
Total natural resources rents (in percent of GDP)	World Development Indicators, World Bank
Institutions	*Authors' calculations based on following sources*
Accountability index	Varieties of Democracy (V-Dem) project
Civil liberties index	Varieties of Democracy (V-Dem) project
Political corruption index	Varieties of Democracy (V-Dem) project
Rule of law index	Varieties of Democracy (V-Dem) project
Macroeconomic Stability	*Authors' calculations based on following sources*
Financial crises at end	Authors' calculations based on Frankel and Rose (1996), Reinhart and Rogoff (2009), Laeven and Valencia (2018), and Medas and others (2018)
Normal recession at end	Authors' calculations based on Bry and Boschan (1971)
Public debt (in percent of GDP)	Global Debt Database, IMF, Mbaye and others (2018)
Current Account (in percent of GDP)	World Economic Outlook, IMF
Inflation (in percent)	World Economic Outlook, IMF
Change of REER (in percent)	Authors' calculations based on International Financial Statistics
Structural Reforms	*Authors' calculations based on following sources*
Agriculture reform	Authors' calculations based on Giuliano and others (2013), Alesina and others (2020), and IMF Research department
Product market reform	Authors' calculations based on Giuliano and others (2013), Alesina and others (2020), and IMF Research department
Labor market reform	Authors' calculations based on Giuliano and others (2013), Alesina and others (2020), and IMF Research department
Financial reform	Authors' calculations based on Giuliano and others (2013), Alesina and others (2020), and IMF Research department
Trade-Tariff reform	Authors' calculations based on Giuliano and others (2013), Alesina and others (2020), and IMF Research department
Current account reform	Authors' calculations based on Giuliano and others (2013), Alesina and others (2020), and IMF Research department
Capital account reform	Chinn and Ito (2008)
Trade Diversification and Quality	*Authors' calculations based on following sources*
Export Quality Index	Export Diversification and Quality database, IMF
Average Quality Index of Importers	Export Diversification and Quality database, IMF
Product diversification index	Export Diversification and Quality database, IMF
Partner diversification index	Export Diversification and Quality database, IMF
Investments, Labor, and Productivity	*Authors' calculations based on following sources*
Domestic investment (in percent of GDP)	Investment and Capital Stock dataset 1960-2015, IMF
Foreign Direct Investment (in percent of GDP)	World Economic Outlook, IMF
Welfare-relevant TFP index (USA=1)	Penn World Tables 9.1
Human Capital index	Penn World Tables 9.1

Source: IEO.

Table A3. Summary Statistics for All Variables

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
All Growth Surges					
Income per capita at start of GS (USD PPP)	132	7884.7	7969.6	593.8	50362.3
Income per capita at end of GS (USD PPP)	132	15074.6	15804.0	789.2	114000.0
Duration of GSs (years)	132	11.4	2.7	9.0	22.0
Avg. growth of income per capita 7 years before GSs	132	1.9	1.5	-1.2	12.0
Avg. growth of income per capita 7 years after GSs	132	6.3	3.4	3.5	24.7
Avg. growth of income per capita during GSs	132	5.9	2.8	2.5	19.1
Percent of years with an IMF-supported program in effect during GSs	132	43.8	40.8	0.0	100.0
Growth Surges with IMF (during IMF-supported programs or 2 years after conclusion)					
Income per capita at start of GS (USD PPP)	74	4849.8	3848.6	593.8	18685.9
Income per capita at end of GS (USD PPP)	74	9330.9	6904.3	789.2	27809.9
Duration of GSs (years)	74	11.1	2.5	9.0	22.0
Avg. growth of income per capita 7 years before GSs	74	2.0	1.8	-1.2	12.0
Avg. growth of income per capita 7 years after GSs	74	6.7	3.8	3.5	24.7
Avg. growth of income per capita during GSs	74	6.1	3.0	2.5	19.1
Percent of years with an IMF-supported program in effect during GSs	74	71.5	29.8	8.3	100.0
Growth Surges without IMF-Supported Programs					
Income per capita at start of GS (USD PPP)	58	11756.9	9989.4	972.3	50362.3
Income per capita at end of GS (USD PPP)	58	22402.8	20383.8	1740.7	114000.0
Duration of GSs (years)	58	11.6	3.0	9.0	21.0
Avg. growth of income per capita 7 years before GSs	58	1.8	1.1	-0.6	4.7
Avg. growth of income per capita 7 years after GSs	58	5.8	2.9	3.6	18.6
Avg. growth of income per capita during GSs	58	5.7	2.5	3.2	17.1
Percent of years with an IMF-supported program in effect during GSs	58	8.4	20.4	0.0	92.3
All Variables					
GSs dummy, 1 at starting year and 0 otherwise	3763	0.035	0.184	0.000	1.000
Growth Determinant Indexes					
Aggregate index of all GSs' predictors	3763	0.230	0.198	0.000	1.000
External factors and endowments index	3763	0.186	0.180	0.000	0.793
Institutions index	3763	0.199	0.275	0.000	1.000
Macroeconomic stability index	3763	0.204	0.189	0.000	0.937
Economic reforms index	3763	0.097	0.144	0.000	0.890
Trade diversification and quality index	3763	0.232	0.257	0.000	1.000
Investments, labor, and productivity index	3763	0.179	0.228	0.000	1.000
Growth Determinant Index Averages					
External factors and endowments index, average over [T-5, T]	3763	0.103	0.059	0.000	0.347
Institutions index, average over [T-5, T]	3763	0.142	0.127	0.000	0.640
Macroeconomic stability index, average over [T-5, T]	3763	0.096	0.078	0.000	0.450
Economic reforms index, average over [T-5, T]	3763	0.067	0.069	0.000	0.374
Trade diversification and quality index, average over [T-5, T]	3763	0.155	0.101	0.000	0.566
Investments, labor, and productivity index [T-5, T]	3763	0.105	0.091	0.000	0.526
External Factors and Endowments					
Trading partners' growth (in percent)	3763	3.689	2.072	-12.685	18.077
Terms of trade (export price / import price)	3763	1.008	0.118	0.327	1.715
Nominal US FED interest rate (in percent)	3763	5.999	4.394	0.125	22.000
Volatility of S&P 500 index returns	3763	42.839	36.425	5.335	171.639
Total natural resources rents (in percent of GDP)	3596	7.021	10.383	0.000	86.453

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Institutions					
Accountability index	3531	0.463	0.982	-1.647	2.063
Civil liberties index	3531	0.625	0.274	0.023	0.968
Political corruption index	3515	-0.501	0.309	-0.971	-0.005
Rule of law index	3531	0.540	0.314	0.034	0.998
Macroeconomic Stability					
Financial crises at end	3763	0.144	0.351	0.000	1.000
Normal recession at end	3763	0.052	0.221	0.000	1.000
Public debt (in percent of GDP)	3504	65.433	66.104	0.0E+00	2092.920
Current Account (in percent of GDP)	3644	-3.302	11.687	-242.188	106.836
Inflation (in percent)	3663	49.280	6.6E+02	-4.5E+01	2.4E+04
Change of REER (in percent)	3447	-140.971	9.5E+04	-4.2E+06	3.7E+06
Structural Reforms					
Agriculture reform	3763	0.224	0.359	0.000	1.000
Product market reform	3763	0.291	0.531	0.000	2.000
Labor market reform	3763	0.365	0.381	0.000	1.000
Financial reform	3763	0.282	0.349	0.000	1.000
Trade-Tariff reform	3763	0.556	0.389	-0.040	1.002
Current account reform	3763	0.343	0.395	0.000	1.000
Capital account reform	3763	0.411	0.366	0.000	1.000
Trade Diversification and Quality					
Export Quality Index	3554	0.809	0.162	0.232	1.152
Average Quality Index of Importers	3554	0.919	0.086	0.562	1.155
Product diversification index	3572	3.492	1.257	1.138	6.401
Partner diversification index	3565	2.882	0.643	1.651	5.437
Investments, Labor, and Productivity					
Domestic investment (in percent of GDP)	3684	18.202	9.762	0.792	98.115
Foreign Direct Investment (in percent of GDP)	3487	3.097	13.350	-55.234	502.761
Welfare-relevant TFP index (USA=1)	2549	0.684	0.277	0.108	1.934
Human Capital index	3175	2.142	0.710	1.014	3.703

Source: Authors' calculations.

Table A4. Optimal Thresholds for Sub-Indicator Variables

Variable	Direction	Threshold	Effectiveness	Incidence	Type I Error	Type II Error	TME	# of Signals
External Factors and Endowments								
Trading partners' growth (in percent)	+	75	0.258	0.942	0.154	0.058	0.212	920
Terms of trade (export price / import price)	+	74	0.217	0.964	0.207	0.036	0.243	1173
Nominal US FED interest rate (in percent)	-	88	0.246	0.935	0.081	0.065	0.146	476
Volatility of S&P 500 index returns	-	79	0.268	0.978	0.162	0.022	0.183	979
Total natural resources rents (in percent of GDP)	+	71	0.263	0.914	0.189	0.086	0.275	1134
Institutions								
Accountability index	+	70	0.230	0.856	0.232	0.144	0.376	1336
Civil liberties index	+	72	0.239	0.856	0.184	0.144	0.328	1074
Political corruption index	+	71	0.277	0.568	0.092	0.432	0.524	566
Rule of law index	+	70	0.268	0.791	0.158	0.209	0.367	956
Macroeconomic Stability								
Financial crises at end	+	70	0.277	0.669	0.104	0.331	0.435	639
Normal recession at end	+	70	0.227	0.266	0.040	0.734	0.774	229
Public debt (in percent of GDP)	-	71	0.282	0.935	0.190	0.065	0.255	1174
Current Account (in percent of GDP)	+	72	0.244	0.935	0.213	0.065	0.278	1248
Inflation (in percent)	-	71	0.243	0.863	0.220	0.137	0.356	1286
Change of REER (in percent) (+ means depreciation)	+	71	0.224	0.892	0.209	0.108	0.316	1191
Structural Reforms								
Agriculture reform	+	70	0.310	0.072	0.007	0.928	0.935	42
Product market reform	+	88	0.309	0.345	0.030	0.655	0.684	191
Labor market reform	+	90	0.312	0.187	0.012	0.813	0.825	77
Financial reform	+	77	0.301	0.475	0.084	0.525	0.609	529
Trade-Tariff reform	+	73	0.267	0.712	0.167	0.288	0.455	1012
Current account reform	+	74	0.265	0.374	0.058	0.626	0.684	351
Capital account reform	+	85	0.251	0.453	0.067	0.547	0.614	399
Trade Diversification and Quality								
Export Quality Index	+	71	0.212	0.871	0.214	0.129	0.343	1203
Average Quality Index of Importers	+	71	0.228	0.885	0.216	0.115	0.331	1241
Product diversification index	+	73	0.224	0.827	0.212	0.173	0.385	1210
Partner diversification index	+	70	0.222	0.842	0.232	0.158	0.391	1322
Investments, Labor, and Productivity								
Domestic investment (in percent of GDP)	+	74	0.234	0.899	0.197	0.101	0.297	1137
Foreign Direct Investment (in percent of GDP)	+	76	0.277	0.871	0.162	0.129	0.291	990
Welfare-relevant TFP index (USA=1)	+	74	0.205	0.640	0.137	0.360	0.497	764
Human Capital index	+	75	0.229	0.446	0.170	0.554	0.724	979

Source: Authors' calculations.

Table A5. Incidence of Growth Determinants by Decade

Growth Determinants	With IMF-supported programs		Without IMF-supported programs		Difference (i.e., With minus Without)	
	# GSs	Incidence	# GSs	Incidence	Coefficient	P-value
Panel A: 1980–89						
External Factors and Endowments	12	1.000	15	1.000	0.000	0.000
Institutions	10	0.833	11	0.733	0.100	0.553
Macroeconomic Stability	11	0.917	15	1.000	-0.083	0.272
Structural Reforms	11	0.917	15	1.000	-0.083	0.272
Trade Diversification and Quality	12	1.000	12	0.800	0.200	0.108
Investments, Labor, and Productivity	11	0.917	14	0.933	-0.017	0.876
Total Growth Surges	15		12		-	
Panel B: 1990–99						
External Factors and Endowments	19	1.000	19	0.905	0.095	0.176
Institutions	16	0.842	20	0.952	-0.110	0.257
Macroeconomic Stability	19	1.000	20	0.952	0.048	0.348
Structural Reforms	18	0.947	16	0.762	0.185	0.106
Trade Diversification and Quality	18	0.947	19	0.905	0.043	0.620
Investments, Labor, and Productivity	18	0.947	19	0.905	0.043	0.620
Total Growth Surges	21		19		-	
Panel C: 2000–10						
External Factors and Endowments	43	1.000	22	1.000	0.000	0.000
Institutions	39	0.907	17	0.773	0.134	0.142
Macroeconomic Stability	37	0.860	18	0.818	0.042	0.661
Structural Reforms	36	0.837	15	0.682	0.155	0.154
Trade Diversification and Quality	39	0.907	18	0.818	0.089	0.310
Investments, Labor, and Productivity	39	0.907	19	0.864	0.043	0.601
Total Growth Surges	22		43		-	

Source: Authors' calculations.
Notes: Numbers of GSs are those preceded by a signal.

Table A6. Incidence of Growth Determinants by Region

Growth Determinants	With IMF-supported programs		Without IMF-supported programs		Difference (i.e., With minus Without)	
	# GSs	Incidence	# GSs	Incidence	Coefficient	P-value
Panel A: AFR						
External Factors and Endowments	20	1.000	6	1.000	0.000	0.000
Institutions	19	0.950	5	0.833	0.117	0.367
Macroeconomic Stability	19	0.950	6	1.000	-0.050	0.594
Structural Reforms	17	0.850	4	0.667	0.183	0.337
Trade Diversification and Quality	19	0.950	4	0.667	0.283	0.060
Investments, Labor, and Productivity	19	0.950	6	1.000	-0.050	0.594
Total Growth Surges	20		6		-	
Panel B: APD						
External Factors and Endowments	12	1.000	16	1.000	0.000	0.018
Institutions	11	0.917	13	0.813	0.104	0.454
Macroeconomic Stability	9	0.750	15	0.938	-0.188	0.173
Structural Reforms	12	1.000	14	0.875	0.125	0.218
Trade Diversification and Quality	10	0.833	12	0.750	0.083	0.611
Investments, Labor, and Productivity	11	0.917	15	0.938	-0.021	0.840
Total Growth Surges	12		16		-	
Panel C: EUR						
External Factors and Endowments	17	1.000	16	0.941	0.059	0.325
Institutions	16	0.941	16	0.941	0.000	1.000
Macroeconomic Stability	17	1.000	17	1.000	0.000	0.000
Structural Reforms	16	0.941	15	0.882	0.059	0.559
Trade Diversification and Quality	16	0.941	15	0.882	0.059	0.559
Investments, Labor, and Productivity	16	0.941	15	0.882	0.059	0.559
Total Growth Surges	17		17		-	
Panel D: MCD						
External Factors and Endowments	11	1.000	10	0.909	0.091	0.329
Institutions	9	0.818	11	1.000	-0.182	0.152
Macroeconomic Stability	11	1.000	10	0.909	0.091	0.329
Structural Reforms	9	0.818	9	0.818	0.000	1.000
Trade Diversification and Quality	10	0.909	11	1.000	-0.091	0.329
Investments, Labor, and Productivity	9	0.818	8	0.727	0.091	0.631
Total Growth Surges	11		11		-	
Panel E: WHD						
External Factors and Endowments	14	1.000	8	1.000	0.000	0.000
Institutions	10	0.714	3	0.375	0.339	0.131
Macroeconomic Stability	11	0.786	5	0.625	0.161	0.440
Structural Reforms	11	0.786	4	0.500	0.286	0.182
Trade Diversification and Quality	14	1.000	7	0.875	0.125	0.193
Investments, Labor, and Productivity	13	0.929	8	1.000	-0.071	0.463
Total Growth Surges	14		8		-	

Source: Authors' calculations.
Notes: Numbers of GSs are those preceded by a signal.

Table A7. Effectiveness of Growth Determinants by Type of IMF-Supported Program

Growth Determinants	With GRA-supported programs		With PRGT-supported programs	
	# Signals	Effectiveness	# Signals	Effectiveness
External Factors and Endowments	111	0.385	86	0.426
Institutions	107	0.366	70	0.311
Macroeconomic Stability	120	0.441	81	0.429
Structural Reforms	129	0.431	91	0.408
Trade Diversification and Quality	102	0.333	77	0.399
Investments, Labor, and Productivity	88	0.415	74	0.418
Total Growth Surges	43		35	

Source: Authors' calculations.
Notes: Numbers of signals are those followed by a growth surge.

REFERENCES

Acemoglu, D., S. Johnson, and J. A. Robinson, 2001, "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review*, 91, 1369–1401.

Ahluwalia, M. S., 2002, "Economic Reforms in India since 1991: Has Gradualism Worked?" *Journal of Economic Perspectives*, 16, 67–88.

Aizenman, J., and M. M. Spiegel, 2010, "Takeoffs," *Review of Development Economics*, 14, 177–196.

Alesina, A., D. Furceri, J. Ostry, C. Papageorgiou, and D. Quinn, 2020, "Structural Re-forms and Elections: Evidence from a World-Wide New Dataset," *NBER Working Paper No. 26720*.

Atoyan, R., and P. Conway, 2006, "Evaluating the Impact of IMF Programs: A Comparison of Matching and Instrumental-Variable Estimators," *Review of International Organizations*, 1, 99–124.

Atsebi, B. J. M., 2020, "Igniting Growth Surges: Lessons from the Past," *Études et Documents Cerdi, 2020*.

Bai, J., and P. Perron, 1998, "Estimating and Testing Linear Models with Multiple Structural Changes," *Econometrica*, 66, 47.

Bal Gündüz, Y., 2016, "The Economic Impact of Short-term IMF Engagement in Low- Income Countries," *World Development*, 87, 30–49.

Barro, R. J., 1991, "Economic Growth in a Cross Section of Countries," *The Quarterly Journal of Economics*, 106, 407.

_____, 2003, "Determinants of Economic Growth in a Panel of Countries," *Annals of Economics and Finance*, 4, 231–274.

Barro, R. J., and J. W. Lee, 2005, "IMF Programs: Who is Chosen and What are the Effects?" *Journal of Monetary Economics*, 52, 1245–1269.

Bas, M. A., and R. W. Stone, 2014, "Adverse Selection and Growth Under IMF Programs," *Review of International Organizations*, 9, 1–28.

Basu, S. S., M. Chamon, and C. Crowe, 2017, "A Model to Assess the Probabilities of Growth, Fiscal, and Financial Crises," *IMF Working Papers*, 17, 282.

Berg, A., J. D. Ostry, and J. Zettelmeyer, 2012, "What Makes Growth Sustained?" *Journal of Development Economics*, 98, 149–166.

Bird, G., and D. Rowlands, 2017, "The Effect of IMF Programmes on Economic Growth in Low Income Countries: An Empirical Analysis," *Journal of Development Studies*, 53, 2179–2196.

Bordo, M. D., and A.J. Schwartz, 2000, "Measuring Real Economic Effects of Bail Outs: Historical Perspectives on How Countries in Financial Distress Have Fared With and Without Bail Outs," *Carnegie-Rochester Conference Series on Public Policy*, 53(1), pp. 81–167.

Bruno, M., and W. Easterly, 1998, "Inflation Crises and Long-Run Growth," *Journal of Monetary Economics*, 41, 3–26.

Bry, G., and C. Boschan, 1971, "Front Matter to" Cyclical Analysis of Time Series: Selected Procedures and Computer Programs"," *Cyclical Analysis of Time Series: Selected Procedures . . .,* I.

Butkiewicz, J. L., and H. Yanikkaya, 2005, "The Effects of IMF and World Bank Lending on Long-Run Economic Growth: An Empirical Analysis," *World Development*, 33, 371–391.

Cadot, O., C. Carrère, and V. Strauss-Kahn, 2013, "Trade Diversification, Income, and Growth: What Do We Know?" *Journal of Economic Surveys*, 27, 790–812.

Chinn, M. D., and H. Ito, 2008, "A New Measure of Financial Openness," *Journal of Comparative Policy Analysis: Research and Practice*, 10, 309–322.

Collier, P., and A. Hoeffler, 2004, "Aid, Policy and Growth in Post-Conflict Societies," *European Economic Review*, 48, 1125–1145.

Darvas, Z., 2012, "Real Effective Exchange Rates for 178 Countries: A New Database," Tech. rep., Bruegel Datasets.

Dicks-Mireaux, L., M. Mecagni, and S. Schadler, 2000, "Evaluating the Effect of IMF Lending to Low-Income Countries," *Journal of Development Economics*, 61, 495–526.

Dornbusch, R., I. Goldfajn, R. O. Valdes, S. Edwards, and M. Bruno, 1995, "Currency Crises and Collapses," *Brookings Papers on Economic Activity*, 1995, 219.

Dreher, A., 2006, "IMF and Economic Growth: The Effects of Programs, Loans, and Compliance with Conditionality," *World Development*, 34, 769–788.

Easterly, W., 2005, "What Did Structural Adjustment Adjust? The Association of Policies and Growth with Repeated IMF and World Bank Adjustment Loans," *Journal of Development Economics*, 76, 1–22.

Easterly, W., and others, 1993, "Good Policy or Good Luck?" *Journal of Monetary Economics*, 32, 459–483.

Edwards, S., and S. Van Wijnbergen, 1987, "Tariffs, the Real Exchange Rate and the Terms of Trade: On Two Popular Propositions in International Economics," *Oxford Economic Papers*, 39, 458–464.

Eichengreen, B., Gupta, P., and A. Mody, 2008, "Sudden Stops and IMF Supported Programs: Financial Markets Volatility and Performance in Emerging Markets," *University of Chicago Press*, pp. 219–266.

Evrensel, A., 2002, "Effectiveness of IMF-Supported Stabilization Programs in Developing Countries," *Journal of International Money and Finance*, 21(5), pp. 565–587.

Frankel, J. A., and A. K. Rose, 1996, "Currency Crashes in Emerging Markets: An Empirical Treatment," *Journal of International Economics*, 41, 351–366.

Ghosh, J., 2019, "The IMF's Latest Victims," Project Syndicate, August.

Giuliano, P., P. Mishra, and A. Spilimbergo, 2013, "Democracy and Reforms: Evidence from a New Dataset," *American Economic Journal: Macroeconomics*, 5, 179–204.

Gupta, S., C. A. Pattillo, and K. J. Carey, 2005, "Sustaining Growth Accelerations and Pro-Poor Growth in Africa," *IMF Working Papers*, 05, 1.

Hamann, A. J. and A. Prati, 2002, "Why Do Many Disinflations Fail? The Importance of Luck, Timing, and Political Institutions," *IMF Working Papers*, 02, 1.

Hardoy, I., 2003, "Effect of IMF Programs on Growth: A Reappraisal Using the Method of Matching," *Institute for Social Research Paper*, 2003, 040.

Hausmann, R., J. Hwang, and D. Rodrik, 2007, "What You Export Matters," *Journal of Economic Growth*, 12, 1–25.

Hausmann, R., B. Klinger, and R. Wagner, 2008, "Doing Growth Diagnostics in Practice: A 'Mindbook'," *Center for International Development*.

Hausmann, R., L. Pritchett, and D. Rodrik, 2005, "Growth Accelerations," *Journal of Economic Growth*, 10, 303–329.

Hausmann, R., F. R. Rodriguez, and R. Wagner, 2011, "Growth Collapses," *SSRN Electronic Journal*.

Hutchison, M. M., 2004, "Selection Bias and the Output Costs of IMF Programs."

Hutchison, M. M., and I. Noy, 2003, "Macroeconomic Effects of IMF-Sponsored Programs in Latin America: Output Costs, Program Recidivism and the Vicious Cycle of Failed Stabilizations," *Journal of International Money and Finance*, 22, 991–1014.

Independent Evaluation Office and International Monetary Fund (IEO), 2002, *Evaluation of Prolonged Use of IMF Resources* (Washington: International Monetary Fund).

International Monetary Fund, 2002, "IMF's Guidelines on Conditionality," Tech. Rep. 43, (Washington).

_____, 2019, "Chapter 3: Reigniting Growth in Emerging Market and Low-Income Economies: What Role for Structural Reforms?"

Jones, B. F., and B. A. Olken, 2008, "The Anatomy of Start-Stop Growth," *Review of Economics and Statistics*, 90, 582–587.

Jong-A-Pin, R., and J. de Haan, 2011, "Political Regime Change, Economic Liberalization and Growth Accelerations," *Public Choice*, 146, 93–115.

Joshua, J., 2015, *The Contribution of Human Capital towards Economic Growth in China*, Palgrave Macmillan.

Kaminsky, G., 1999, "Currency and Banking Crises: The Early Warnings of Distress," *IMF Working Paper*, 99, 178 (Washington: International Monetary Fund).

Kaminsky, G., S. Lizondo, and C. M. Reinhart, 1998, "Leading Indicators of Currency Crises," *IMF Staff Papers*, 45, 1 (Washington: International Monetary Fund).

Kar, S., and others, 2013a, "Looking for a Break: Identifying Transitions in Growth Regimes," *Journal of Macroeconomics*, 38, 151–166.

_____, 2013b, *The Dynamics of Economic Growth: A Visual Handbook of Growth Rates, Regimes, Transitions and Volatility*.

Kerekes, M., 2007, "Analyzing Patterns of Economic Growth: A Production Frontier Approach," *Diskussionsbeiträge des Fachbereichs Wirtschaftswissenschaft der Freien Universität Berlin*, 15, 1–45.

Laeven, L., and F. Valencia, 2018, "Systemic Banking Crises Revisited," *IMF Working paper No. 18/206*, 18.

Libman, E., J. A. Montecino, and A. Razmi, 2019, "Sustained Investment Surges," *Oxford Economic Papers*, 71, 1071–1095.

Lucas, R. E., 1988, "On the Mechanics of Economic Development," *Journal of Monetary Economics*, 22, 3–42.

Manzano, O. and R. Rigobon, 2001, "Resource Curse or Debt Overhang?" *NBER Working Paper No. 8390*.

Mbaye, S., M. Moreno Badia, and K. Chae, 2018, "Global Debt Database: Methodology and Sources," *IMF Working Papers*, 18, 1 (Washington: International Monetary Fund).

Medas, P., and others, 2018, "Fiscal Crises," J*ournal of International Money and Finance*, 88, 191–207.

Mehlum, H., K. Moene, and R. Torvik, 2006, "Institutions and the Resource Curse," *Economic Journal*, 116, 1–20.

Mideksa, T. K., 2013, "The Economic Impact of Natural Resources," *Journal of Environmental Economics and Management*, 65, 277–289.

Munro, L. T., 2020, "Immiserizing Growth: When Growth Fails the Poor," *Canadian Journal of Development Studies / Revue Canadienne D'études du Développement*, 41, 161–162.

Mussa, M. and M. Savastano, 1999, "The IMF Approach to Economic Stabilization," *NBER Macroeconomics Annual*, 14, 59–122.

Panagariya, A., 2004, "India in the 1980's and 1990's: A Triumph of Reforms," *IMF Working Papers*, 04, 1 (Washington: International Monetary Fund).

Peruzzi, M., and A. Terzi, 2018, "Growth Accelerations Strategies," *CID Research Fellow and Graduate Student Working Paper No. 91*.

Prati, A., M. G. Onorato, and C. Papageorgiou, 2013, "Which Reforms Work and Under What Institutional Environment? Evidence from a New Data Set on Structural Reforms," *Review of Economics and Statistics*, 95, 946–968.

Przeworski, A., and J. R. Vreeland, 2000, "The Effect of IMF Programs on Economic Growth," *Journal of Development Economics*, 62, 385–421.

Reinhart, C. M., and K. S. Rogoff, 2009, *This Time is Different: Eight Centuries of Financial Folly*, Princeton University Press.

Romer, P., 1987, "Growth Based on Increasing Returns Due to Specialization," *American Economic Review*, 77, 56–62.

Romer, P. M., 1986, "Increasing Returns and Long-Run Growth," *Journal of Political Economy*, 94, 1002–1037.

Sala-i Martin, X., G. Doppelhofer, and R. I. Miller, 2004, "Determinants of Long-Term Growth: A Bayesian Averaging of Classical Estimates (BACE) Approach," *American Economic Review*, 94, 813–835.

Shin, H. Y., 2013, "Procyclicality and the Search for Early Warning Indicators," *IMF Working Paper*, 13, 258 (Washington: International Monetary Fund).

Solow, R. M., 1956, "A Contribution to the Theory of Economic Growth," *The Quarterly Journal of Economics*, 70, 65.

Stiglitz, J., 2002, "Globalization and its Discontents," *Norton: New York, 2002*, 500.

Swan, T. W., 1956, "Economic Growth and Capital Accumulation," *Economic Record*, 32, 334–361.

Van Waeyenberge, E., H. Bargawi, and T. McKinley, 2010, *Standing in the Way of Development? A Critical Survey of the IMF's Crisis Response in Low Income Countries*, TWN Global Economy Series No. 32. European Network on Debt and Development (Eurodad) and Third World Network (TWN).

Vreeland, J., 2003, "The IMF and Economic Development," Cambridge: *Cambridge University Press.*