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Transitions between growth episodes: Do institutions matter and do some institutions matter more?

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Abstract

This paper examines the institutional and political determinants of the timing of growth episodes. We extend the earlier literature on the determinants of the onset of growth accelerations and decelerations by providing a more generalised approach to understanding growth episode transitions. We differentiate between six types of growth episodes – from growth collapses (where the episode specific growth rate, g, is -2 per year), to negative growth (g between -2 and 0), stagnation (g between 0 and +2), stable growth (g between +2 and +4), moderate growth (g between +4 and +6), and rapid growth (g over +6). Using multinomial logit models, in the context of a panel dataset of 125 countries from 1984 to 2010, we examine the likelihood of switching from one growth episode to another growth episode. We find that though bureaucracy quality has a positive effect while switching from negative growth episodes to positive growth episodes, it does not matter in most of the cases of switching from stable or moderate positive growth episodes to rapid positive growth episodes. Both contract viability and democratisation can explain the switching from negative growth episodes to positive growth episodes. Contract viability and democracy can also explain the movements from lower positive growth episodes to higher positive growth episodes. However, while contract viability is important for moving from stable or moderate positive growth episodes to rapid growth episodes, democracy is not important in explaining such switches. This suggests that while better economic and political institutions matter in taking a country from growth collapses to stable growth, economic institutions matter more than the political institutions for the transition from stable growth to rapid growth.

Keywords: economic growth, growth episodes, institutions, bureaucracy quality, contract viability, democracy, multinomial logit model, panel data

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1. Introduction

A large literature has examined the role of institutions in explaining economic growth. While the earlier literature has examined the role of institutions in determining long-run per capita income (see Hall and Jones, 1999, Acemoglu *et al.,* 2004, Rodrik *et al.,* 2004 and Acemoglu and Robinson, 2010), a new literature examines the determinants of growth accelerations and deceleration episodes – which are large discrete changes in medium-term growth rates common in developing countries (Pritchett, 2000, Rodrik, 1999, 2003, Hausmann *et al.*, 2006, Jones and Olken, 2008, Aizenman and Spiegel, 2010, Berg *et al.*, 2012, Pritchett *et al.*, 2013 and Kar *et al.*, 2013a). Some of these studies examine the onset of growth accelerations (e.g. Hausmann *et al.*, 2006) while others examine the onset of growth decelerations (e.g. Breuer and McDermott, 2013). However, these studies look at only the timing of the shift in the growth rate (either as an acceleration or a deceleration), and the econometric methodology they use are probit models (where the year of the break is taken as one, with other years as zero) to study the likelihood of a growth break occurring in a given year, for a set of correlates. An important limitation of these studies is that they do not differentiate between the different growth episodes that a country is transitioning from or to. For example, when a country moves from a growth collapse to rapid growth, it is a different growth transition qualitatively than when it moves to an episode with slightly positive but slow growth. Two recent papers use Markov-switching regression models to study the transition probabilities between growth episodes (Jerzmanowski, 2006, Kerekes, 2012). While these papers use a more sophisticated methodology than the simple probit approach of earlier studies to study growth transitions and allow for the possibility that countries may switch between different types of growth episodes, a limitation of the Markov-switching modelling approach is that it can only consider one determinant at a time in understanding growth episode transitions.

This paper extends the previous literature on growth episode transitions in two ways. Firstly, it moves beyond the simple probit approach of Hausmann *et al.* (2006) and Jones and Olken (2008) to estimate multinomial logit models of switches between growth episodes, where we classify growth episodes into six categories, by the episode specific average growth rate – from strongly negative growth episodes to rapid growth episodes. Secondly, by allowing for a more general approach than the Markov-switching regression modelling approach in our multinomial logit modelling, we can incorporate a wide range of determinants of growth episode transitions and can examine the role of economic institutions versus that of political institutions in explaining switches between growth episodes. There is still an inconclusive debate on the role of democracy in bringing about transitions to rapid growth. For example, Acemoglu *et al.* (2014) find a sizeable and robust effect of democracy on economic growth using annual panel data for 175 countries for 1960-2010. Their estimates suggest that a country that switches from non-democracy to democracy achieves an increase in GDP per capita of about 20 per cent in the next 30 years. On the other hand, Pritchett and Summers (2014) show that rapid growth episodes are associated with autocracies.

A similar debate has been occurring on the role of economic institutions. Hausmann *et al.* (2005), Hausmann *et al.* (2006) and Jones and Olken (2008) find that improvements in the quality of economic institutions are not associated with growth accelerations. However, Jerzmanowski (2006) and Kerekes (2012) find that better institutional quality improves the possibility that a country will remain in a stable or miracle growth episode and will be less likely to suffer a growth collapse, though the role of institutions is not as important in separating moderately successful countries from failing countries.[1]

A long-standing literature has looked at the effect of state capacity on long-run economic development. For example, Rauch and Evans (2000) find that state bureaucracies characterised by meritocratic recruitment and predictable, rewarding career ladders are associated with higher growth rates. Dincecco and Katz (2016) show that variation in fiscal capacity (as a result of pre-modern wars) explains long-run productivity levels (GDP per worker), after accounting for endogeneity. This literature, however, does not examine whether state capacity (as measured by bureaucratic quality) can trigger a movement from lower order to higher order growth episodes.

In this paper, we examine whether political institutions (measured as the extent of democracy and the quality of the bureaucracy) and economic institutions (measured as the extent investors have trust in the viability of contracts) play a role in explaining transitions between growth episodes, and if they do, whether their effect differs across the transition paths between different types of growth episodes.

We estimate multinomial logit models for 125 countries using panel data from 1984 to 2010. Our dependent variables are growth episodes, ordered from one to six, and categorised by their episode specific average growth rates of GDP per capita. These six episodes are: growth collapses (where the episode specific growth rate, g, is -2 per year), negative growth (g between -2 and 0), stagnation (g between 0 and +2), stable growth (g between +2 and +4), moderate growth (g between +4 and +6), and rapid growth (g over +6). To identify growth breaks in the GDP per capita series of the 125 countries, we follow the method of Kar *et al.* (2013b), which avoids the limitation of purely statistical methods and filter-based approaches to identifying structural breaks in growth rates.

We find that though bureaucracy quality has a positive effect while switching from negative growth episodes to positive growth episodes, it doesn't matter in most of the cases while switching from lower order growth episodes to higher order growth

[1] For example, according to the findings of the paper, a country such as South Korea, with a high quality of institutions, has a 74 per cent probability of remaining in a stable or miracle growth episode, and the ability to recover from a crisis to miracle growth is high at 43 per cent probability. On the other hand, for a country with a low quality of institutions such as Nigeria, while the probability of being in stagnation or crisis is high at 82 per cent, there is still a 14 per cent chance that Nigeria can move out of a growth crisis to miracle growth.

episodes. Both contract viability and democratisation can explain the switch from negative growth episodes to positive growth episodes. Contract viability and democracy can also explain the movements from lower positive growth episodes to higher positive growth episodes. However, while contract viability is important for moving from moderate positive growth episodes to rapid growth episodes, democracy is not important in explaining this switch. This suggests that while better economic and political institutions matter in taking a country from growth collapses to stable growth, economic institutions matter more than political institutions for the switch from stable growth to rapid growth.

The rest of the paper is in 4 sections. The next section describes the method we use to identify growth breaks. Section 3 presents the data and empirical strategy. Section 4 presents the results. Section 5 concludes.

2. Identifying Growth Episodes

Growth episodes have been identified in different studies in different ways. Pritchett (2000) identified distinct patterns in growth rates in developing countries: some countries had steady growth, others had rapid growth followed by stagnation, and others had rapid growth followed by decline or even catastrophic falls, while still others experienced continuous stagnation or even steady decline. Rodrik (1999) focused on the difference in rates of economic growth experienced between 1960-75 and 1975-89. Rodrik (2003) listed 64 cases of growth transitions where growth acceleration was defined as an increase in an economy's per capita GDP growth of 2.5 percentage points or more (relative to the previous 5 years) that was sustained over at least 10 years.

Hausmann *et al*. (2006) used a filter to identify growth accelerations. According to this filter, 'Growth is rapid', if the growth rate $g_{t,t+n}$ at time t over horizon n, which is the least squares growth rate of GDP per capita from t to t+n, is greater than or equal to 3.5 percent per annum. In addition, "Growth accelerates", if the change in growth rate at time t, which is the change in the growth rate over horizon n across the period, is greater than or equal to 2 percent per annum. The relevant time horizon was considered in that study to be eight years.

Jones and Olken (2008), using the Bai and Perron (1998) method, detected a total of 73 structural breaks in 48 of the 125 countries that had at least 20 years of Penn World Table data and classified those breaks as either "up-breaks" or "down-breaks" depending on whether the average growth rate in the episode after the break is above or below the average growth rate before.

Aizenman and Spiegel (2010) identified factors associated with takeoff - a sustained period of high growth following a period of stagnation - and examined a panel of 241 "stagnation episodes" from 146 countries, 54 percent of those episodes were followed by takeoffs. Countries that experienced takeoffs averaged 2.3 percent

annual growth following their stagnation episodes, while those that did not averaged 0 percent growth; 46 percent of the takeoffs were "sustained," i.e. lasting 8 years or longer.

Berg *et al.* (2012) identified structural breaks in economic growth in 140 countries and used those to define “growth spells”: periods of high growth preceded by an upbreak and ending either with a downbreak or with the end of the sample. The paper applied a variant of a procedure proposed by Bai-Perron (1998, 2003) for testing for multiple structural breaks in time series when both the total number and the location of breaks was unknown.

While the use of the Bai-Perron method in recent studies to identify growth breaks is an improvement over filter-based approaches such as used by Hausmann *et al.* (2006), it has a significant shortcoming that is well known in the literature. The problem is the low power of the Bai-Perron test which leads to false rejections of many 'true' breaks. To overcome this shortcoming, Kar *et al.* (2013b) use a two-stage procedure for identifying structural breaks in economic growth, where the first stage is identical to the first part of the Bai-Perron procedure that involves maximising the F-statistic to identify *candidate* years for structural breaks in growth, and the second stage imposes thresholds on the magnitude of the shift in candidate breaks in order to determine the *actual* breaks. Thus, this procedure involves the best fit of the Bai-Perron method to the data in the first stage, and the application of a filter to the breaks identified from the first stage in the second stage. It may be noted that by using filters in the second stage instead of statistical inference (which really leads to the low power in the Bai-Perron tests), our methodology is able to identify many more 'true' breaks compared with the pure statistical approach.

The threshold rules are that the absolute value of the change in the growth rate after a potential break had to be (a) 2 percentage points if it was the first break, (b) 3 percentage points if the potential break was of the opposite sign to the previous break (an acceleration that followed a deceleration or a deceleration that followed an acceleration) and (c) 1 percentage point if the potential break was of the same sign as the previous break (an acceleration that directly followed an acceleration or a deceleration that followed a previous deceleration). Thus, the magnitude filters used in our methodology are also able to take into account the previous history of breaks in any country.

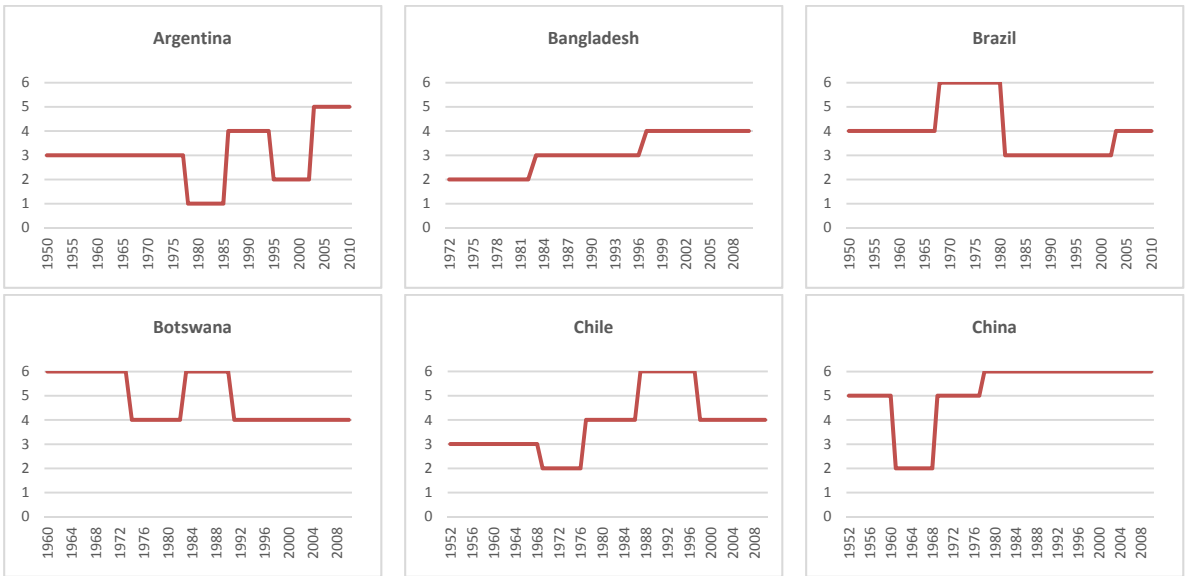
To estimate potential breaks, we assumed that a “growth episode” lasts a minimum of 8 years (as in Berg *et al.,* 2012). The use of shorter periods (e.g. 3 or 5 years) risk conflation with “business cycle fluctuations” or truly “short run” shocks (e.g. droughts). Longer periods (e.g. 10 or 12 years) reduce the number of potential breaks. Application of this procedure to the Penn World Tables (PWT) 7.1 data for 125 countries (eliminating all countries with very small populations and those that did not have long enough data series) for the period 1950-2010 identified 314 structural

breaks in growth, with some countries having no breaks (e.g. USA, France, Australia) and others having four breaks (e.g. Argentina, Zambia).[2]

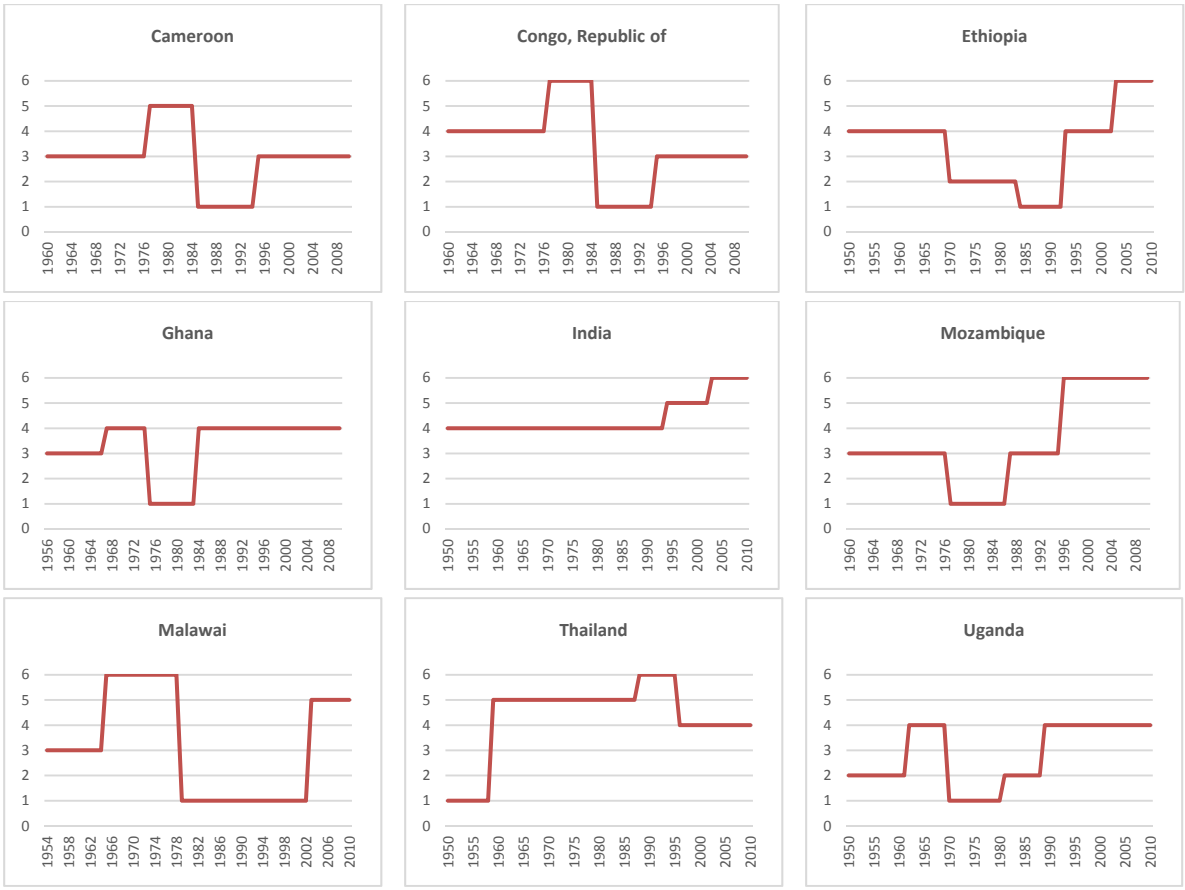
Our paper constructs a growth episode variable using the country-specific episode GDP per capita growth rates before and after the structural breaks in economic growth identified by Kar *et al*. (2013a). This variable ranges from 1 to 6 depending on the following growth categories before and after the year of break:

1 = if growth rate is below -2% (episode of growth collapse);
2 = if growth rate is between -2% (inclusive) and less than 0% (episode of negative growth);
3 = if growth rate is between 0% (inclusive) and less than 2% (episode of stagnation);
4 = if growth rate is between 2% (inclusive) and less than 4% (episode of stable growth);
5 = if growth rate is between 4% (inclusive) and less than 6% (episode of moderate growth);
6 = If growth rate is more than 6% (episode of rapid growth).

Figure 1: Growth episodes of selected countries



[2] The length of the output data series that is available in the Penn World Tables vary from country to country. This implies that we need to specify a maximum number of candidate breaks for each country depending on the length of the data series available. We postulate that a country with: i) Forty years of data (only since 1970), can have a maximum of two breaks; ii) More than forty years and up to fifty-five years (data since 1955), can have a maximum of three breaks; iii) More than fifty-five years (before 1955), can have a maximum of four breaks.



Source: Authors' illustration using data from PWT 7.1

Figure 1 presents such growth episodes of some selected countries. Argentina, for example, experienced large fluctuations in growth episodes, as it had a growth episode of 3 between 1950 and 1977, an episode of 1 between 1978 and 1985, an episode of 4 between 1986 and 1994, an episode of 2 between 1995 and 2002, and an episode of 5 between 2003 and 2010. Large fluctuations in growth episodes are also observed for Chile, Cameroon, Congo, Ethiopia, Malawi and Uganda. In contrast, Bangladesh and India gradually moved from lower order growth episodes to higher order growth episodes. Countries such as China, India, Ethiopia and Mozambique showed rapid growth (episode 6) in later years.

3. Data and Empirical Strategy

3.1. Data

We have used panel data for 125 countries. Since the International Country Risk Guide (ICRG) data are available from 1984, the panel data has a time dimension between 1984 and 2010 (with country-years as units of analysis). We use three different variables as alternative aspects of institutional quality. For economic institution variables we use 'bureaucracy quality' and 'contract viability', and for the political institution variable we use a measure of democracy, 'Polity 2'.

The *bureaucracy quality* (burqua) variable shows that institutional strength and the quality of the bureaucracy is a shock absorber that tends to minimise revisions of policy when governments change. High points are given to countries where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services. The value of this variable ranges from 0 to 4. This data is taken from the ICRG database.[3]

Contract Viability (contviab) is the risk of unilateral contract modification or cancellation and, at worst, outright expropriation of foreign-owned assets. It is a combination of two variables taken from the ICRG data base - repudiation of contracts and expropriation risk.[4] The risk of repudiation of contracts addresses the possibility that foreign businesses, contractors and consultants face the risk of a modification in a contract taking the form of repudiation, postponement or scaling down due to an income drop, budget cutbacks, indigenisation pressure, a change in government, or a change in government economic and social priorities. Lower scores signify a greater likelihood that a country will modify or repudiate a contract with a foreign business. Risk of expropriation evaluates the risk of outright confiscation and forced nationalisation of property. Lower ratings are given to countries where expropriation of private foreign investment is a likely event.[5] Contract viability or its components – risk of repudiation of contract and risk of expropriation – have been widely used in the growth empirics literature to measure the quality of economic institutions (Hall and Jones, 1999, Acemoglu *et al.*, 2001).

The Polity 2 variable is the commonly used measure of democracy (see Alesina and Tabellini, 2009 and Burke and Leigh, 2010) and is computed by subtracting the institutionalised autocracy score from the institutionalised democracy score; the resulting unified polity scale ranges from +10 (strongly democratic) to -10 (strongly autocratic). The measure of democracy is based on an evaluation of the country's elections for competitiveness and openness, the nature of political participation in general, and the extent of checks on executive authority. We have transformed this variable by adding 10 to each value to convert it to a range of 0 (strongly autocratic) to 20 (strongly democratic). This data is taken from the Polity IV database.[6]

Between 1984 and 2010 there are 232 growth episodes in the 125 countries. The summary statistics of the growth episodes are presented in Table 1. It appears that the largest frequency of growth episode is the 4th growth episode (growth rate is

[3] See https://www.prsgroup.com/about-us/our-two-methodologies/icrg (accessed November 11, 2014).
[4] See Hansson (2006)
[5] ICRG reports contract viability data only from 2001, and does not provide disaggregated data on risk of repudiation of contracts and risk of expropriation from this year onwards. For 1984-2000, we use the data on risk of repudiation of contracts and risk of expropriation, which are available from the IRIS-3 Dataset (see Knack and Keefer, 1995) and use different weights to construct the contract viability variable. The weights we use on risk of repudiation of contracts and risk of expropriation for the construction of contract viability in the empirics are 0.50 and 0.50, respectively. However, we find that there is no difference in results when we use different weights for risk of repudiation of contracts and risk of expropriation.
[6] See http://www.systemicpeace.org/polity/polity4.htm (accessed November 11, 2014).

between 2% inclusive and less than 4%) and the lowest frequency of growth episode is the 6th growth episode (growth rate is more than 6%). Table 2 presents the summary statistics of the explanatory variables.

Table 1: Summary statistics of growth episodes

Growth Episode	Frequency	% of Total
1	45	19.40
2	27	11.64
3	49	21.12
4	54	23.28
5	32	13.79
6	25	10.77
Total	232	100.00

Source: Authors', using data from PWT 7.1

Table 2: Summary statistics of explanatory variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Log value of general government final consumption expenditure as % of GDP (lngov_con)	3105	2.619	0.472	-0.837	3.998
Log value of net ODA received as % of GNI (lnoda_rec)	2382	0.878	1.972	-7.055	5.199
Log value of annual inflation rate (lninfla_cpi)	2744	1.896	1.382	-4.092	10.076
Log value of trade as % of GDP (lntrade_gdp)	3138	4.164	0.569	2.382	6.132
Log value of net barter terms of trade index (2000=100) (lntot)	2531	4.652	0.265	3.058	5.755
Hausmann Hidalgo measure of economic complexity (hh_eci)	2235	0.003	1.070	-2.585	2.719
Bureaucracy Quality (burqua)	2938	2.135	1.222	0.00	4.00
Contract Viability (contviab)	3063	7.196	2.154	0.5	10
Revised combined polity score (polity2)	3187	12.928	6.790	0.00	20.00

Source: Authors

3.2 Empirical Strategy

In order to explore the likelihood of switching from one growth episode to another the best technique is to apply a multinomial logit model. The multinomial logit model predicts the probabilities of the different possible outcomes of a categorically-distributed dependent variable, given a set of independent variables.

If we let i be the country and g be the growth episode at time t, then we can estimate the following equation:

$$g_{it} = \beta_0 + \beta_1 inst_{it} + \gamma_j Z_{it} + u_{it} \qquad \text{Equation (1)}$$

Where, g_{it} is the growth episode of country i at time t, $inst_{it}$ is the institution variable (either bureaucracy quality or contract viability or Polity 2), $\gamma_j Z_{it}$ is the set of control variables and u_{it} is the error term. The variable g can take values from 1 to 6 for country i at time t, depending on the growth episode which the country is experiencing in that year.

We have run the multinomial logit regression considering six growth episodes as six bases. This helps us understand the dynamics of the impacts of different explanatory variables while switching from one growth episode to another growth episode. The multinomial logit regressions produce log-odds for all other categories relative to the base, where log-odds is a linear function of the predictors.

We have used a range of control variables that are standard in the growth empiric literature. These are general government final consumption expenditure as % of GDP, net ODA received as % of GNI, annual inflation rate, trade as % of GDP, the terms of trade index, the Hausmann-Hidalgo measure of economic complexity (Hausmann *et al.*, 2011), and continent dummies. A higher value of government final consumption expenditure and a higher inflation rate can negatively affect the growth rate of per capita income (Mankiw *et al.*, 1992, Andrés and Hernando, 1997). Trade openness may have a positive effect on economic growth (Frankel and Romer, 1999). The effect of aid on growth may go either way – higher availability of resources for investment should have positive impact on economic growth (Dollar and Kraay, 2002), but aid inflows can lead to a Dutch Disease effect, and lead to a contraction of the tradable sector, and hence, negatively impact on growth (Rajan and Subramanian, 2008). Positive terms of trade movements may lead to higher growth (Burke and Leigh, 2010). Greater economic complexity can also have a positive effect on economic growth (Hausmann and Hidalgo, 2011). The source of data for most of the control variables is the World Bank's World Development Indicators except the measure of economic complexity, which is obtained from the Atlas of Economic Complexity.

We do not consider including country fixed effects, since growth accelerations or decelerations are more pronounced in some countries (e.g in Sub-Saharan Africa and Latin America) than others; and since this is a feature we want to explain, we don't want these to be washed out with fixed effects. Also, as our dependent variable is episode of growth, rather than growth rate itself, in a multinomial logistic framework, we do not expect any endogeneity issue, and therefore, we do not consider any instrumental variable method.

4. Results

There are 18 sets of regression results considering three institutional variables and six growth episodes as six bases. Complete sets of results for the regressions, considering the 1st growth episode as the base, for three institutional variables, are presented in Tables 3, 4 and 5. The summary of results for three institutional variables from the 18 set of regressions is presented in Table 6.

In Table 3 and the first part of Table 6 the results for regression involving bureaucracy quality, considering the 1st growth episode as the base, are presented. Government consumption expenditure as % of GDP has a negative and significant effect when switching from an episode of growth collapse (growth episode 1) to higher order growth episodes. However, it has a larger negative effect when switching to high growth episodes (episodes 5 and 6). Official development assistance received as % of GNI has a negative and significant effect while switching to an episode of negative growth (episode 2) and no significant effect while switching to other higher order growth episodes. Inflation rate has a negative and significant effect while switching to any higher order growth episode. Trade as % of GDP has a positive and significant effect while switching from an episode of growth collapse (episode 1) to a negative growth episode (episode 2). However, it has either no effect while switching to episodes 3 and 5 or some negative and significant effects while switching to a stable growth episode (episode 4) and a rapid growth episode (episode 6). Terms of trade index doesn't have any significant effects for any switches. The Hausmann and Hidalgo economic complexity index has positive and significant effects in all five switches and larger effects are observed in the switches to greater positive growth episodes (switching to episodes 5 and 6). Our variable of interest is bureaucracy quality. Bureaucracy quality appears to have a statistically significant positive effect while switching from an episode of growth collapse (episode 1) to episodes 2, 3 and 4, but no significant effect while switching to growth episodes 5 and 6.

In Tables 4 and the first part of Table 6 the results for regressions involving contract variability (contviab), considering the 1st growth episode as the base, are presented.[7] Government consumption expenditure as % of GDP has a negative and significant effect while switching to higher order growth episodes. Official development assistance received as % of GNI turns out to have a positive and significant effect while switching to episodes 3 and 6. Inflation rate has a negative and significant effect while switching to any higher order growth episode. Trade as % of GDP has a positive and significant effect while switching to episodes 2 and 5. Terms of trade index has a negative and significant effect while switching to episodes 2, 3 and 4 and doesn't have any significant effects for other switches. The economic complexity index has positive and significant effects in all five switches. Therefore, contract variability appears to have statistically significant positive effects in all five switches, and larger effects are observed in the switches to higher order growth episodes.

[7] The results for two other measures of contract variability, contviab2 and contviab3, are similar to those of contviab1. Therefore, we report only the results for contviab1.

Table 3: Regression results, bureaucracy quality

	Growth episodes				
Base = 1	**2**	**3**	**4**	**5**	**6**
lngov_con	-2.77***	-2.71***	-2.65***	-3.93***	-3.50***
	(0.61)	(0.55)	(0.56)	(0.60)	(0.65)
lnoda_rec	-0.31**	0.18	0.01	-0.10	0.25
	(0.15)	(0.13)	(0.13)	(0.14)	(0.15)
lninfla_cpi	-0.92***	-1.16***	-0.95***	-0.81***	-1.38***
	(0.17)	(0.16)	(0.16)	(0.18)	(0.20)
lntrade_gdp	1.10**	-0.46	-1.01**	0.15	-1.13**
	(0.52)	(0.47)	(0.47)	(0.49)	(0.51)
lntot	-0.32	-0.90	-0.53	0.02	1.14
	(0.63)	(0.55)	(0.60)	(0.70)	(0.85)
hh_eci	0.66*	1.20***	0.98***	1.44***	3.04***
	(0.36)	(0.31)	(0.33)	(0.37)	(0.44)
burqua	0.42**	0.39**	0.62***	0.12	0.32
	(0.21)	(0.18)	(0.19)	(0.21)	(0.25)
_cons	6.53*	16.13***	14.57***	11.36**	9.59*
	(3.85)	(3.46)	(3.65)	(4.15)	(4.90)
No. of obs = 1059, LR chi2(175)= 838.06, Prob > chi2 = 0.0000, Pseudo R2 = 0.24, Log likelihood = -1303.52					

Note: ***, ** and * denote significance at the 1%, 5% and 10% level respectively. Standard errors are in parenthesis.

Source: Multinomial logit regression of equation 1

Table 4: Regression results, contract viability

	Growth episodes				
Base = 1	**2**	**3**	**4**	**5**	**6**
lngov_con	-2.75***	-2.88***	-2.79***	-4.41***	-3.79***
	(0.58)	(0.53)	(0.54)	(0.59)	(0.63)
lnoda_rec	-0.21	0.33**	0.16	0.16	0.49***
	(0.14)	(0.13)	(0.13)	(0.14)	(0.15)
lninfla_cpi	-0.67***	-0.90***	-0.66***	-0.48***	-1.09***
	(0.15)	(0.14)	(0.15)	(0.17)	(0.18)
lntrade_gdp	1.75***	0.24	-0.35	0.72*	-0.47
	(0.45)	(0.40)	(0.40)	(0.42)	(0.44)
lntot	-1.23**	-1.97***	-1.51**	-0.73	0.68
	(0.55)	(0.49)	(0.55)	(0.61)	(0.78)
hh_eci	0.70**	1.31***	1.11***	1.33***	3.12***
	(0.32)	(0.29)	(0.30)	(0.34)	(0.41)
contviab	0.60***	0.77***	0.90***	1.13***	1.07***
	(0.16)	(0.15)	(0.15)	(0.17)	(0.18)
_cons	5.33	14.81***	12.44***	7.96**	5.59
	(3.35)	(3.04)	(3.28)	(3.60)	(4.38)
No. of obs = 1133, LR chi2(185) = 966.07, Prob > chi2 = 0.0000, Pseudo R2 = 0.26, Log likelihood = -1382.18					

Note: ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. Standard errors are in parenthesis.

Source: Multinomial logit regression of equation 1

In Table 5 and the first part of Table 6 the results for regressions involving polity2, considering the 1st growth episode as the base, are presented. Government consumption expenditure as % of GDP has a negative and significant effect while switching to higher order growth episodes. Official development assistance received as % of GNI has a negative and significant effect while switching to episodes 2, 4 and 5. Inflation rate has a negative and significant effect while switching to any higher order growth episode. Trade as % of GDP has a positive and significant effect while switching to episodes 2 and 5. Terms of trade index has a negative and significant effect while switching to episodes 2, 3 and 4. The economic complexity index has positive and significant effects in all five switches. Democracy (the political institution variable, polity 2) has a positive and significant effect on switching from an episode of growth collapse (episode 1) to all higher order growth episodes, with the largest effect when switching to an episode of stable growth (episode 4).

Table 5: Regression results, democracy (polity2)

	Growth episodes				
Base = 1	**2**	**3**	**4**	**5**	**6**
lngov_con	-1.76***	-3.24***	-3.36***	-4.37***	-4.54***
	(0.59)	(0.53)	(0.55)	(0.58)	(0.62)
lnoda_rec	-0.34**	-0.06	-0.35***	-0.38***	0.09
	(0.12)	(0.11)	(0.11)	(0.12)	(0.13)
lninfla_cpi	-0.78***	-1.16***	-1.00***	-0.86***	-1.34***
	(0.16)	(0.15)	(0.15)	(0.16)	(0.19)
lntrade_gdp	1.95***	0.62	0.36	1.18***	0.52
	(0.44)	(0.39)	(0.39)	(0.41)	(0.43)
lntot	-2.35***	-1.75***	-1.48***	-0.86	0.13
	(0.55)	(0.46)	(0.50)	(0.53)	(0.70)
hh_eci	0.96***	1.46***	1.30***	1.26***	3.09***
	(0.32)	(0.28)	(0.29)	(0.31)	(0.39)
polity2	0.12***	0.12***	0.22***	0.16***	0.14***
	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)
_cons	10.92***	19.16***	18.39***	14.61***	14.20***
	(3.44)	(3.05)	(3.21)	(3.37)	(4.20)
No. of obs = 1208, LR chi2(195) = 963.11, Prob > chi2 = 0.0000, Pseudo R2 = 0.24, Log likelihood = -1488.6299					

Note: ***, ** and * denote significance at the 1%, 5% and 10% level, respectively. Standard errors are in parenthesis.
Source: Multinomial logit regression of equation 1

Table 6 presents the results for all regressions considering all six growth episodes as bases. However, here we provide coefficients and significance levels for only the institutional variables. While considering negative growth episode (episode 2) as the base, bureaucracy quality doesn't appear to have any significant effect on the higher order growth switches. Contract viability has a positive and significant effect on all higher order growth switches. Democracy has a positive and statistically significant effect while switching from negative growth episode (episode 2) to stable growth

episode (episode 4) but doesn't have any statistically significant effect while switching to any other higher order growth episodes.

In the case of an episode of growth stagnation (episode 3) as the base, bureaucracy quality has a positive and statistically significant effect while switching to a stable growth episode (episode 4) and a negative effect while switching to a moderate growth episode (episode 5) and doesn't have any statistically significant effect on switching to episode 6. Contract viability has a positive and statistically significant effect while switching to all higher order growth episodes. Democracy does have positive effects while switching from stagnation (episode 3) to stable growth (episode 4) and moderate growth (episode 5), but doesn't have any statistically significant effect for other higher order growth switches.

If we consider stable growth (episode 4) as the base, bureaucracy quality has a statistically significant negative impact while switching to episode 5, but no significant effect while switching to episode 6; contract viability has positive and significant effects while switching to episodes 5 and 6; and democracy has negative effects on switching to both moderate growth (episode 5) and rapid growth (episode 6).

While considering moderate growth (episode 5) as the base, bureaucracy quality, contract viability and democracy do not have any statistically significant effect on switching to the rapid growth (episode 6). Finally, the results of the regression considering episode 6 as the base show the symmetric reverse effects of the results discussed above.

In sum, the results of the multinomial panel regression models suggest that bureaucracy quality has a positive effect while switching from growth collapse to all higher order growth episodes, but doesn't appear to be statistically significant in almost all other regressions, and in some cases it comes with statistically significant negative signs suggesting that improvement in the bureaucracy quality doesn't matter while switching from lower order growth episodes to higher order growth episodes. However, while switching from an episode of growth collapse to any positive growth episode, contract viability and democracy (polity2) variables appear to be statistically significant with positive signs in most of the switches. In the case of movements from stagnation to stable or moderate growth, both contract viability and democracy are statistically significant with positive signs. However, in the case of switching from stable growth to moderate growth, though contract viability has a positive effect, democracy has a negative effect. Democracy also has a negative effect while moving from stable growth to rapid growth, and in such cases, contract viability doesn't have any impact. These results suggest that while contract viability has positive effects in most of the switches, democracy matters while switching form growth collapse to higher order growth episodes or from stagnation to higher order

positive growth episodes, but doesn't matter much while switching from stable growth to higher order positive growth episodes.[8]

Table 6: Summary of the results of 18 set of regressions for all institutional variables

			Growth Episodes			
Base = 1	**1**	**2**	**3**	**4**	**5**	**6**
burqua		0.42*	0.39**	0.62***	0.12	0.32
		(0.21)	(0.18)	(0.19)	(0.21)	(0.25)
contviab		0.59***	0.77***	0.90***	1.13***	1.07***
		(0.16)	(0.15)	(0.15)	(0.17)	(0.18)
polity2		0.12***	0.12***	0.22***	0.16***	0.14***
		(0.04)	(0.03)	(0.03)	(0.04)	(0.04)
Base = 2	**1**	**2**	**3**	**4**	**5**	**6**
burqua	-0.42*		-0.03	0.19	-0.30	-0.10
	(0.21)		(0.16)	(0.17)	(0.11)	(0.23)
contviab	-0.59***		0.18*	0.30***	0.53***	0.47***
	(0.16)		(0.09)	(0.10)	(0.12)	(0.14)
polity2	-0.12***		0.01	0.10***	0.04	0.02
	(0.04)		(0.02)	(0.02)	(0.03)	(0.03)
Base = 3	**1**	**2**	**3**	**4**	**5**	**6**
burqua	-0.39**	0.03		0.23*	-0.27*	-0.07
	(0.18)	(0.16)		(0.12)	(0.16)	(0.19)
contviab	-0.77***	-0.18*		0.13*	0.36***	0.29**
	(0.15)	(0.09)		(0.07)	(0.10)	(0.12)
polity2	-0.12***	-0.01		0.09***	0.04*	0.01
	(0.03)	(0.02)		(0.02)	(0.02)	(0.02)
Base = 4	**1**	**2**	**3**	**4**	**5**	**6**
burqua	-0.62***	-0.19	-0.23*		-0.50***	-0.30
	(0.19)	(0.17)	(0.12)		(0.16)	(0.19)
contviab	-0.90***	-0.30***	-0.13*		0.23**	0.17*
	(0.15)	(0.10)	(0.07)		(0.09)	(0.08)
polity2	-0.22***	-0.10***	-0.09***		-0.06***	-0.08***
	(0.33)	(0.02)	(0.02)		(0.02)	(0.02)
Base = 5	**1**	**2**	**3**	**4**	**5**	**6**
burqua	-0.12	0.30	0.27*	0.50***		0.19
	(0.21)	(0.190	(0.16)	(0.16)		(0.22)
contviab	-1.13***	-0.53***	-0.36***	-0.23**		-0.06
	(0.17)	(0.12)	(0.10)	(0.09)		(0.13)
polity2	-0.16***	-0.04	-0.04*	0.06***		-0.02
	(0.04)	(0.03)	(0.02)	(0.02)		(0.03)
Base = 6	**1**	**2**	**3**	**4**	**5**	**6**
burqua	-0.32	0.10	0.07	0.30	-0.19	
	(0.25)	(0.23)	(0.19)	(0.19)	(0.22)	
contviab	-1.07***	-0.47***	-0.29***	-0.17*	0.06	
	(0.18)	(0.14)	(0.12)	(0.08)	(0.13)	
polity2	-0.14***	-0.02	-0.01	0.08***	0.02	
	(0.04)	(0.03)	(0.02)	(0.02)	(0.03)	

Note: ***, ** and * denote significance at the 1%, 5% and 10% level, respectively.
Standard errors are in parenthesis. Source: Multinomial logit regression of equation 1

[8] As a robustness test, we have collapsed the six growth episodes to four growth episodes, merging moderate growth with rapid growth (episodes 5 and 6), and growth collapses with negative growth (episodes 1 and 2). When we did this, we found no change in our key findings on the role of economic and political institutions.

5. Conclusions

In this paper, we investigate the role of economic and political institutions in determining the likelihood of a country transitioning from one growth episode to another. In contrast to the previous literature on the determinants of growth accelerations and decelerations, which does not differentiate between the different growth episodes that a country is transitioning from or to, in this paper, we provide a richer characterisation of the growth process where a country may move between six different types of growth episode, ranging from growth collapses to rapid growth. By doing so, we are better able to capture the episodic nature of growth and that many countries tend to switch frequently between growth collapses to slow growth to rapid growth (Kar *et al.*, 2013a). We estimate multinomial logit models for 125 countries for the period 1984-2010 to examine the role of contract viability (as a measure of the quality of economic institutions) and the role of democracy and bureaucratic quality (as measures of political institutions) in explaining the switches that countries experience between different types of growth episodes.

We find that though bureaucracy quality has a positive effect while switching from negative growth to positive growth, it doesn't matter in most of the cases while switching from lower order growth episodes to higher order growth episodes. Both contract viability and democratisation can explain the switching from negative growth episodes to positive growth episodes. Contract viability and democracy can also explain the movements from lower positive growth episodes to higher positive growth episodes. However, while contract viability is important for moving from stable growth to rapid growth episodes, democracy is not important in explaining this switch. This suggests that while better economic and political institutions matter in taking a country from growth collapses to stable growth, economic institutions matter more than political institutions for the switch from stable growth to rapid growth.

Our results suggest that in contrast to the findings of Acemoglu *et al.* (2014), democratic episodes do not necessarily witness transitions to rapid growth episodes from moderately positive growth episodes. However, democratic episodes do witness a transition from negative to positive growth episodes, indicating that democratisation does prevent the worst type of growth episode that a country can experience. We also find that improving state capacity in the form of the quality of the bureaucracy can help in taking a country out of negative growth episodes but that higher state capacity does not increase the likelihood of rapid growth episodes. This finding suggests that previous research that has found a positive role of bureaucratic quality in fostering economic growth (such as Evans and Rauch, 1999) need to differentiate between phases of growth, and that the relationship between bureaucratic quality and economic growth may not be monotonic.

We find that the most important institutional determinant of switching to higher order growth episodes from lower ones, and in particular, to rapid growth episodes, is the nature of property rights institutions – that is, the extent to which investors trust the viability of contracts. In contrast to the previous literature on the determinants of

growth accelerations (e.g. Hausmann *et al.,* 2005), we find that not only does institutional quality matter in bringing about a growth acceleration, but that the greater the quality of property rights institutions, the higher is the likelihood of a transition to a rapid growth phase.

Our findings have clear policy implications. For a country in a growth decline or collapse, it is important to stress improvements in both political and economic institutions, such as bureaucratic quality, viability of contracts and democratisation to move into an episode of positive growth. However, once the country is in a stable or moderate positive growth episode, further movements into rapid growth episodes need further emphasis on improving the quality of property rights institutions rather than greater democratisation or state capacity. Economic institutions trump political institutions in bringing about rapid growth episodes, though they both matter in reversing growth collapses.

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