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From Riches to Rags, and Back? Institutional Change, Financial Development and Economic Growth in Argentina since 1890

NAURO F. CAMPOS[*,**,†], MENELAOS G. KARANASOS[*] & BIN TAN[‡]

*Brunel University, London, UK, **ETH, Zurich, Switzerland, †IZA, Bonn, Germany, ‡Southwestern University of Finance and Economics, Chengdu, China

ABSTRACT *Argentina is the only country in the world that in 1900 was 'developed' and in 2000 was 'developing'. Although economic historians have identified and explored various possible explanations (chiefly institutions, political instability, financial development, inflation, trade openness and international financial integration), no study so far has attempted a comprehensive quantitative assessment of their relative importance. This article tries to fill this gap using the power-ARCH framework and annual data since 1896 to study the effects of these factors in terms of both growth and growth volatility. The results highlight two main factors to understand the remarkable growth trajectory of Argentina over the very long run, financial development and institutions (formal and informal political instability) and stress the importance of differences in their short vis-à-vis long-run behaviour.*

1. Introduction

The general economic trend since the Industrial Revolution has been one of widespread economic betterment. A sustained increase in living standards is evident across the globe. As such, it is surprising that there one country in the world that in 1900 was 'developed' and in 2000 was 'developing': Argentina. Although placed among the highest incomes per capita in the world in 1900, 'Argentina's ratio to OECD income fell to 84 per cent in 1950, 65 per cent in 1973, and a mere 43 per cent in 1987... Argentina is therefore unique' (Della Paolera & Taylor, 2003, p. 5). Unsurprisingly, the 'Argentine puzzle' has received a great deal of attention and scholars have identified several potential reasons, chiefy among them financial development, political institutions, macroeconomic volatility, inflation, trade openness, public deficit, and international financial integration. Surprisingly, however, there are no studies trying to quantify and assess the relative importance of this array of reasons. This article tries to fill this gap.

Within a power-ARCH (PARCH) framework and using annual time series data for Argentina covering the period from 1896 to 2000, the aim of this article is to put forward answers to the following questions. What is the relationship between, on the one hand, financial development (domestic and international), public deficits and inflation, trade openness and political institutions and, on the other, economic growth and volatility? Are the effects of these variables direct (on economic growth) or indirect (by way of the conditional growth volatility)? Does the intensity and sign of these impacts vary over time? Does the intensity of these effects vary with respect to short-versus long-run considerations? Is the intensity of these effects constant across the different eras or

phases of Argentine economic history (in other words, are they independent from the main structural breaks we estimate)?

This article tries to contribute to our understanding of the main causes of economic growth with special emphasis on the role of institutions. Durlauf, Johnson, and Temple (2005) and Acemoglu (2009) provide recent, authoritative surveys that support the view that there seems to be dissatisfaction with the empirical growth literature, while Sen (2013) and Spolaore and Wacziarg (2013) argue that within-country focus and historical quantitative research respectively are important attempt to minimise this dissatisfaction. This article tries to contribute to this line of inquiry by focusing on one the most undisputed and intriguing country outliers (as opposed to follow the common practice of trying to learn something about growth by focusing on the mean or median country). We believe this study can further our understanding about economic growth because: (a) we study only one individual country over a very long period of time with annual frequency data; (b) we extensively use the economic history literature to guide our choice of potential important reasons for the Argentine decline; (c) we pay particular attention to two sets of institutions (namely, political and financial institutions) that have figured prominently in the literature; and (d) we choose an econometric methodology that has been seldom used in the empirical growth literature, despite the fact that it easily allow us to contrast the direct to the indirect (that is, by way of the volatility channel) effects of each of our candidate reasons, sort out the short-from the long-run impacts and distil the consequences of accounting for important structural breaks on the robustness of our key results.

Another important benefit of our choice of econometric framework is that it helps shedding light on the relationship between output growth and its volatility. While Ramey and Ramey (1995) show that growth rates are adversely affected by volatility, Grier and Tullock (1989) argue that larger standard deviations of growth rates are associated with larger mean rates. The majority of ARCH papers examining the growth–volatility link are restricted to these two key variables; that is, they seldom assess whether the effects of the presence of other variables affect the relation and, in the rare occasions that happens, they are usually inflation and its volatility that comes into play. One contribution of this article is to study if and how the growth–volatility relationship changes in light of a much wider set of variables. Note also that the use of annual data allows us to perform a more appropriate test of the hypothesis that predicts a positive effect of output variability and uncertainty on the growth rate of output.

The econometric results below refer to four different types of effects, namely direct (on mean economic growth), indirect (by way of volatility), dynamic (short and long-run) and structural break effects. Regarding the direct effects on economic growth, in the multivariate analysis we find evidence for appositive effect of the development of financial institutions (private and savings banks deposits to GDP) and a negative effect of the instability of informal political institutions (guerrilla warfare and general strikes) as two of the main drivers of growth in Argentina since the 1890s. These results are explored in more detail in Campos, Karanasos, and Tan (2012) using a much broader set of measures for these two key variables than that used in the current article. The relative importance of financial and political institutions in explaining the Argentine puzzle is confirmed. While financial and political institutions in our analysis emerge clearly as first-order explanations, our results also suggest an important role for other two reasons (namely trade openness and international financial integration) and, to a lesser extent, to inflation and public deficits. One reason for such hierarchy is that our analysis tries to identify deep reasons that have been important throughout the very long time window we consider. Consequently, one can maybe argue that international financial integration and trade openness where very important earlier on (and by a similar token that inflation may have been very important later on), but our response is that our results shows these factors although have been important in explaining Argentinean growth, they are not as consistently powerful as political and financial institutions.

How does this set of potential reasons for the relative collapse of per capita GDP in Argentina affect predicted growth volatility? Or, in other words, how do they affect growth indirectly through their impact on growth volatility? Our multivariate results show that the most robust of such indirect effects are negative and are those from formal political instability (constitutional changes) and trade openness. We find the large number of constitutional changes and the radical changes we see in terms of trade policy stances have significantly contributed to dampen (the expected part of) growth volatility, and this, by its turn, has a further negative effect on economic growth. There is also evidence for a positive effect of international financial integration (here proxied by UK interest rates) and public deficits, but this set of results is not entirely robust (it weakens, for instance, when one accounts for structural breaks.)

In terms of the dynamic effects, our results show that changes in informal political institutions and international financial integration have affected Argentine growth negatively in the last hundred years or so, both in the short and the long run. Interestingly, we find that the effects of political instability are larger in the short than in the long run, while those for financial development are negative in the short run but positive in the long run. Notice that these latter effects are somewhat weak in that they do not always hold for the full set of proxies we use for financial development (they are particularly strong when we use savings deposits as a proxy). Last, but not least, we should note that we find a negative short-run effect of trade openness, but this effect is not robust as it weakens in the long-run.

The fourth and last type of effect we estimate is with regard to the presence of structural breaks. This is a crucial exercise given the very long-term nature of our data. We find that the main results just described remain once we take structural breaks into account, the notable exception being that the direct effects of UK interest rates disappears.

In summary, our results indicate that financial and political institutions exhibit the most robust first-order effects on growth and volatility in Argentina since 1890. We argue for the preponderance of these two factors on the basis that their effects are significant either directly or indirectly and in both the short and long runs once we account for structural breaks. The effect of the development of financial institutions is positive and direct on economic growth in Argentina since the 1890s, and it also shows negative short-run effect and a positive and larger long-run effect (this is particularly strong for the case of savings deposits.) According to these results, the debacle is explained instead by institutional collapse, as informal political instability (in particular guerrilla wars and strikes) shows a direct negative effect coupled with negative short- and long-run impacts on growth, while formal political instability(constitutional changes) also has equally significant and negative indirect effects on growth. There are some additional results that are worth mentioning. International financial integration may also have contributed to the debacle because both short- and long-run effects are negative, but it has no robust direct or indirect effect. Trade openness seems to have contributed as well because short-run and indirect effects are negative, yet we find no long-run effects on growth. The results for inflation and public deficits are also important but less consistent.

Which theoretical ideas help understand these results? Or, in other words, how does the experience of this consummate outlier (Argentina) ultimately contribute to our understanding of the process of economic growth? The results suggest that institutional and financial factors have first-order effects in explaining the economic growth performance of Argentina for the last century or so. Economists have made a lot of effort to understand the economic effects of institutions for economic growth (Acemoglu, Johnson, & Robinson, 2005) and development (Lin & Nugent, 1995). The results in this article strongly suggest that the sustained and irreversible collapse of institutions expressing itself as formal and informal political instability can indeed be identified as a fundamental cause of long-run economic growth. Where one finds inadequate and unstable institutions, not only economic prosperity seldom follows, but more importantly economic decline entails. Economic historians highlight the role of both political institutions and financial institutions in explaining economic growth over the long run (Haber, North, & Weingast, 2008).The results in this article illustrate the power of these institutional effects. Indeed, they show that these negative effects are strong enough to cancel out the positive impacts of financial development on economic growth (Levine, 2005). One way of summarising the interplay between these factors is to note that while the short- and long-run

effects of institutions are found to go in the same direction (they are both negative), only the long-run effect of financial development on growth is found to be positive (although the short-run effect was estimated to be smaller, it was also found to be negative). The two most important reasons for the economic decline of Argentina are linked to financial and political institutions, with a smaller role played by international financial integration, trade openness, public deficits and inflation. This relatively smaller role can be better understood in light of the fact that the respective theoretical implications in terms of growth and its volatility tend to be ambiguous; see Bussiere and Fratzscher (2008) for financial integration, Di Giovanni and Levchenko (2009) for trade openness, and Dotsey and Sarte (2000), Aghion and Marinescu (2008) and Panizza and Presbitero (2013) for public deficits and inflation.

The article is organised as follows. Section 2 briefly reviews the vast economic history literature on Argentina discussing the main reasons that have been offered to explain the relative decline. Section 3 describes the data and Section 4 provides details for the econometric methodology. Section 5 has the baseline econometric results. Section 6 concludes and suggests directions for future research.

2. The Argentine Riddle

There is little disagreement among economists that the period from 1875 to the eve of World War I is the Golden Age, or the Belle Époque, of Argentinean economic history (Cortes Conde, 2009; Sanz-Villarroya, 2007; Taylor, 1992). Just to illustrate this, note that for the year 1913, della Paolera and Taylor (2003) estimate income per capita in Argentina to be (in 1992 US dollars) around $3,797. They provide evidence that this figure is higher than the corresponding figures for France and Germany ($3,452 and $3,134 respectively) and is substantially higher than those for Spain or Italy. Massive inflows of foreign capital (physical as well as human) supported the rapid expansion of the exports of primary products (grain, meat, wool and leather), which, coupled with favourable international conditions, ultimately fuelled very rapid rates of economic growth (Cortes Conde, 2009; Rock, 1986). There is also little disagreement that Argentina's uniqueness is because no other country climbed down so dramatically from the selected group of advanced, rich or developed countries (Figure 1).

The major disagreement among economic historians to this day is not whether but actually when (and, of course, why) this unchecked decline started. Some argue that it started with the 1930 crisis (for example, Diaz-Alejandro [1985]), others argue for an earlier turning point (for instance, Taylor (1992) suggests 1913), while Sanz-Villarroya (2005) estimates that the first important structural break for Argentina happens in 1899.[1] Another way of understanding this process is presented by Cortes Conde (2009), who argues that Argentina experienced a Belle Époque until WWI, a deceleration between WWI and WWII, and a decline starting after 1945.

Irrespective of exactly when the decline started, its existence was not undisputed until immediately after World War II. In 1947 Argentina was still ranked the 10th country in the world in terms of per capita income (Alston & Gallo, 2010). della Paolera and Taylor (2003, p. 5) note that:

> by 1900 Argentina's income per capita had risen from about 67 per cent of developed country-levels in 1870, to 90 per cent in 1900, and 100 per cent in 1913 whatever its exact status in 1913, for all practical purposes Argentina was an advance country'.

They also calculate that since then the ratio of Argentina's income to OECD income fell to 84 per cent in 1950, then to 65 per cent in 1973, and then to 43 per cent in 1987.This ratio rebounds in the 1990s, but again reverts with the 2001 crisis.[2] Last but not least, it should not go unnoticed that in a recent book on the great depressions of the twentieth century (Kehoe & Prescott, 2007), Argentina is the only country that has two chapters (out of 16) entirely and solely dedicated to its economy.

It is not surprising, therefore, that there is a vast literature on the Argentine puzzle, providing alternative explanations for its long-run relative economic decline. One argument is that increased direct competition in international markets during and after WWI (especially from the other areas of new settlement; that is, Australia and Canada) has an important role to play, as does the sharp decline in immigration and foreign capital inflows.

Finance has also received a great deal of attention in terms of its potential role in explaining the Argentinean decline (della Paolera & Taylor, 1998). For example, Prados de la Escosura and Sanz-Villarroya (2009) argue that contract-intensive money is actually the key factor in explaining the Argentinean puzzle. Taylor (2003) associates the Argentine decline to extremely low savings rates (the high population dependency rate linked to the immigration policy). This argument combines with Solberg's (1987) view and highlights the issue of (restricted) access to finance as a way of perpetuating high inequality levels. Moreover, the role of the financial sector does not need to be limited to domestic or national aspects. Many believe that there may have been excessive dependence on foreign capital in the Belle Époque (British foreign capital to be precise) and the associated radical changes around WWI as an important cause of the Argentinean decline (Taylor, 1992).

Such radical shifts in market conditions extended from the financial to the goods markets, the emphasis here being on international trade. Until 1914, Argentina was an aggressive exporter exhibiting extremely high levels of openness to international trade (measured as the ratio of exports plus imports to GDP.) The data we use in this paper (details below) show that this ratio exceeds 50 per cent in the years immediately before WWI, with a clearly declining trend in the inter-wars years (the ratio goes down from about 45 per cent to 20 per cent in these 20 years), and it never exceeds 25 per cent from 1945 to almost 2000. If one believes that exports alone are a major driving force of economic growth, then these numbers surely provide fuel to placing openness as a major reason for the Argentine decline (Diaz-Alejandro, 1985). One important caveat that should be mentioned in this context is that it is unclear (and still much-debated) what were the reasons for such a reversal. In particular, the debate is whether this was mainly the disruption and closing up of international markets first with WWI and then with the Great Depression, or was it mainly the adoption of excessively protectionist policies by successive Argentinean governments. Note that these policies inspired and were later reinforced by the import substitution model advocated by the leading Latin American economist of the time, Raul Prebish (from Argentina).
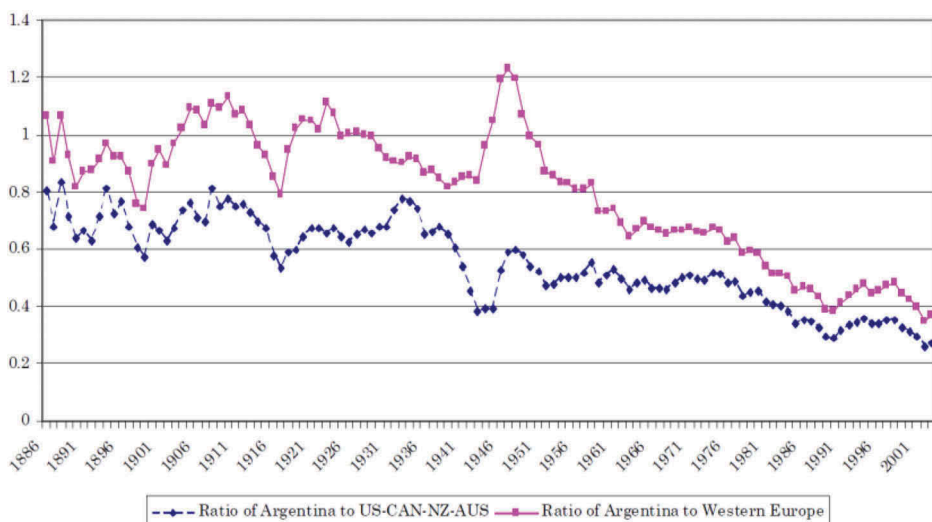
Figure 1. Ratio of Argentina's GDP per capita to developed countries' GDP per captia, 1885–2003.

In addition to trade policies, many scholars believe that standard macroeconomic policies in general, and their inconsistency and the resulting macroeconomic instability in particular, are also to blame. For instance, della Paolera and Taylor (2003) show how public deficits throughout Argentinean history also seem to play an important role in explaining the decline. As mentioned above, we agree that these are important factors, yet we here try to identify factors that are consistently important throughout the period of analysis, and there seems to be consensus that these factors matter particularly in the years after 1973.

Although there is a large literature associating the long-run relative decline of the Argentinean economy with political and institutional factors,[3] we are unaware of studies that try to quantitatively evaluate this association. For instance, Acemoglu and Robinson (2006, p. 7) observe that: 'The political history of Argentina reveals an extraordinary pattern where democracy was created in 1912, undermined in 1930, re-created in 1946, undermined in 1955, fully re-created in 1973, undermined in 1976, and finally re-established in 1983'. In a recent paper, Alston and Gallo (2010) identify the onset of widespread electoral fraud in the 1930s as a turning point for the erosion of the rule of law and one main reason for the Argentinean decline.

In what follows, we take these considerations on board in trying to provide a comprehensive quantitative account of the relative importance of the main reasons often identified with the Argentinean debacle, namely political instability, domestic financial development, trade openness, macroeconomic volatility(inflation and public deficits) and integration in the international financial system.

3. Data

The data set we put together for this article reflects the main factors identified by economic historians discussed above. The factors often associated with the relative economic decline of Argentina are the following: financial development; political instability (or institutions); macroeconomic volatility; inflation; trade openness; public deficit; and international financial integration.

Our basic data source is the Cross National Time Series Data set (Banks, 2005) which contains historical series on income per capita and various dimensions of instability.[4] This is a commercial database that has been extensively used in the scholarship on growth and political instability (Durlauf et al., 2005). Data are available yearly for Argentina from 1896 until 2000, for various instability series, excluding the two World War periods (1914–1918 and 1939–1945).

Our two main measures of financial development try to capture the efficiency of the financial sector, not its relative size. The source for both is Mitchell (2003). The first is the bank deposits by the private sector over GDP (private deposits/GDP), which we believe is a good proxy for the share of credit to the private sector over GDP. Although the latter is a measure widely used in the literature, one must note that it is not available for Argentina for more than half of our sample (it is available consistently only after 1960.) Our second measure from Mitchell (2003) is the total deposits in savings banks. Given its more restrictive nature and the fact that the exact definition of savings bank deposits contains an unobservable legal element, we use this variable mostly for robustness check thereby attaching greater weight to private deposits (Figure 2).[5]

We also explore the hypothesis that different types of political instability have different effects on economic growth.[6] This is done by further developing the distinction between formal and informal political instability introduced in Campos and Karanasos (2008). The distinction is based on whether or not different forms of instability originate from within the political system: guerrilla warfare is thus informal political instability, while constitutional reforms are classified as formal instability. In addition to the obvious policy implications this taxonomy generates (in a literature in which policy implications are scarce), this distinction allows us to investigate questions that naturally have not been investigated so far, such as whether or not the effects of some forms of informal instability are more severe in the short-run than in the long-run, and whether or not the main effect of formal instability occurs through growth volatility. One of our hypotheses is that the answer to these questions is the same ('yes'), and below we provide further justification as well as full econometric support.

Private deposits over GDP   Savings banks deposits over GDP
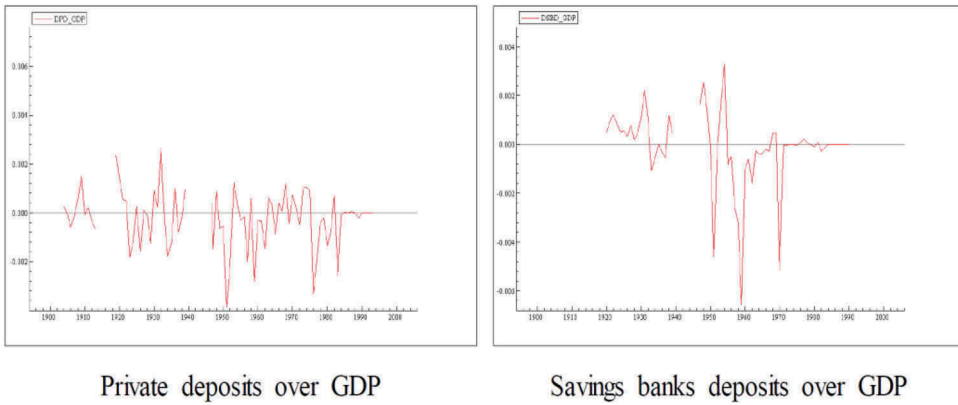
Figure 2. Measures of financial development.

Our informal political instability variables[7] are strikes (this is a count variable reflecting general strikes of 1,000 or more workers involving more multiple employers and aimed at government policies) and guerrilla warfare (which is coded as a dummy variable for the occurrence in a given year of armed activity, sabotage or bombings by independent bands of citizens and aimed at regime overthrow). The source for these is Banks (2005), which is perhaps one of the most widely used data sources in the relevant political science literature. These series are available since 1919 (Figure 3).

Our formal political instability variable is shown in Figure 4 and is as follows: the number of constitutional changes. This is coded as a dummy variable reflecting the occurrence of the respective events. The data source is Banks (2005).[8]

Our measures of inflation, trade openness and public deficit are from Alston and Gallo (2010). Inflation is measured as yearly changes in the consumer price index (CPI). Public deficit is proxied as the ratio of the federal deficit to GDP, but it does exclude state-owned enterprises.[9] Trade openness is measured in standard fashion as the ratio of imports plus exports to GDP. Alston and Gallo (2010) have carried out various necessary adjustments to underlying data from Véganzonès and Winograd (1997), from the Ministry of Economy of Argentina and from the IMF's International Financial Statistics (Figure 5).

Finally, international financial sector developments have also been repeatedly blamed for Argentina's poor economic performance. There are two aspects of this issue that are often said to play a role: the first being the credit crunch associated with the onset of WWI and with the Great Crisis of 1929; and the second being the change in global financial leadership which went from London to New York during this period. We must say that we proceed as if the second aspect is less important, but also that we were

Guerilla Warfare   Strikes
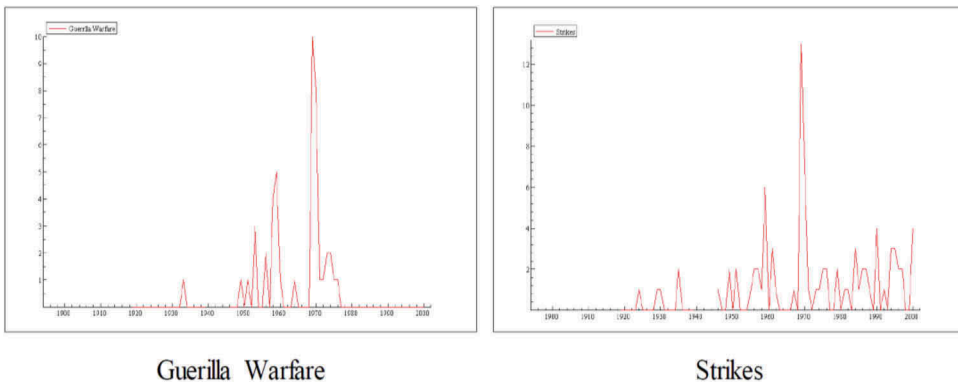
Figure 3. Measures of informal political instability.
Note: Based on data in Banks (2005).

Constitutional changes

Legislative elections
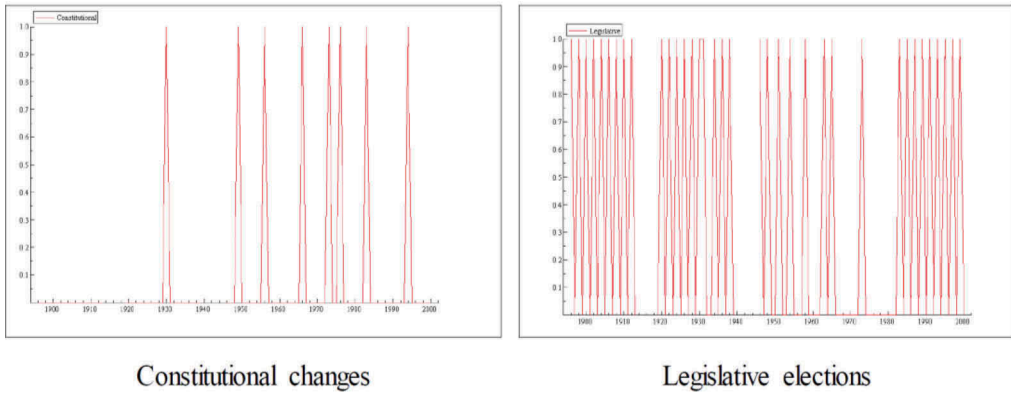
Figure 4. Measures of formal political instability.
Note: Based on data in Banks (2005).

Inflation

Trade Openess

Public Deficit
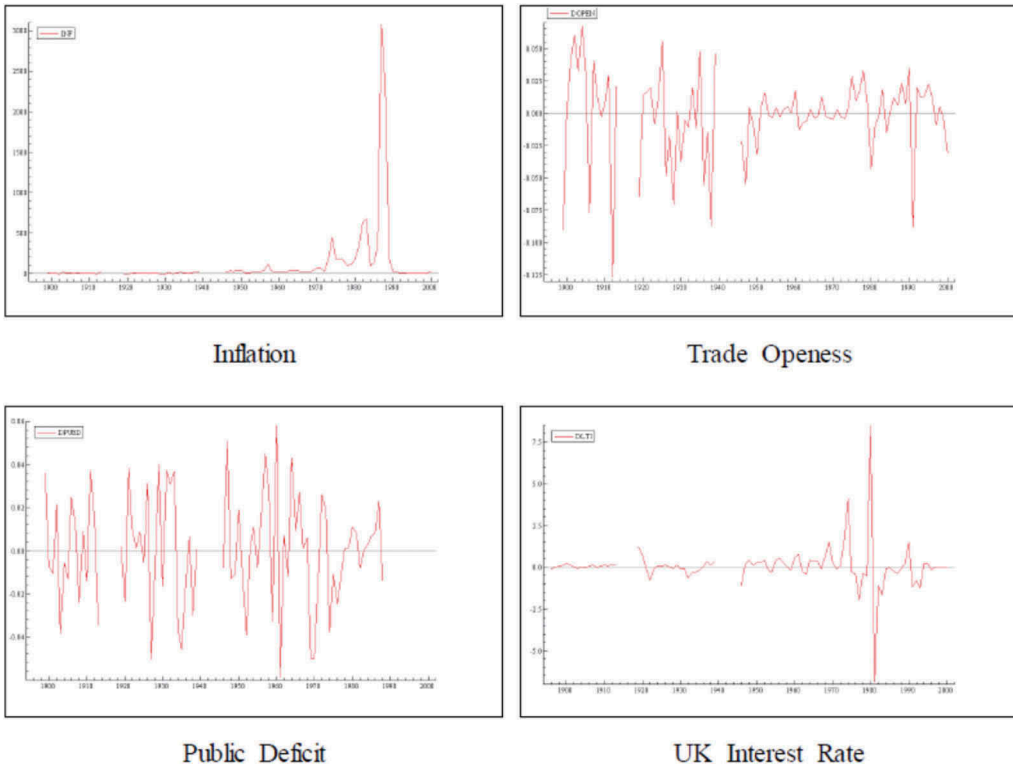
UK Interest Rate

Figure 5. Other variables.

absolutely sure it is much more difficult to measure than the first. Thus, in standard fashion in this type of study, we use the level of interest rates in the United Kingdom as our proxy for the overall conditions in international financial markets (the source of these data is Bordo, Eichengreen, Klingebiel, & Martinez-Peria [2001]). Because the transition to the US financial leadership is often said to be even less beneficial to Argentina (mainly because American investors often refrained to take managerial control of Argentine firms), our estimates for this effect should be conservative, and if at all biased will show a smaller than actual effect of the international financial market in the Argentinean decline.

4. Econometric Framework

The PARCH model was introduced by Ding, Granger, and Engle (1993) and quickly gained currency in the finance literature.[10] Let growth (y_t) follow a white noise process augmented by a risk premium defined in terms of volatility:

$$y_t = c + k h_t + \lambda x_{it} + \varepsilon_t \tag{1}$$

with

$$\varepsilon_t = e_t h_t^{\frac{1}{2}} \tag{2}$$

where x_{it} is either the political instability or the financial development variable or one of the other explanatory variables.[11]

In addition, $\{e_t\}$ are independently and identically distributed (*i.i.d*) random variables with $E(e_t) = E(e_t^2 \text{-} 1) = 0$; while h_t is positive with probability one and is a measurable function of the sigma-algebra $\Sigma_{t\text{-}1}$, which is generated by $\{y_{t\text{-}1}, y_{t\text{-}2}, \ldots\}$ In other words, h_t denotes the conditional variance of growth. In particular, h_t is specified as an asymmetric PARCH(1,1) process with lagged growth included in the variance equation:

$$h_t^{\frac{\delta}{2}} = \omega + \alpha h_{t-1}^{\frac{\delta}{2}} f(e_{t-1}) + \beta h_{t-1}^{\frac{\delta}{2}} + \phi x_{it} + \gamma y_{t-1} \tag{3}$$

with

$$f(e_{t-1}) = [|e_{t-1}| - \varsigma e_{t-1}]^{\delta} \tag{4}$$

where δ (with $\delta > 0$) is the heteroscedasticity parameter, α and β are the ARCH and GARCH coefficients respectively, ς with $|\varsigma| < 1$ is the leverage term and γ is the level term for the *l*th lag of growth. In order to distinguish the general PARCH model from a version in which δ is fixed (but not necessarily equal to 2) we refer to the latter as (P)ARCH.

We present our main reasons in three interdependent blocs: the direct; indirect; and dynamic (shorthand long-run) effects. We proceed with the estimation of the PARCH(1,1) model in Equations (1) and (3) in order to take into account the serial correlation observed in the levels and power transformations of our time series data. The tables report the estimated parameters of interest for the period 1896–2000. These were obtained by quasi-maximum likelihood estimation (QMLE) as implemented in EVIEWS. The best-fitting specification is chosen according to the likelihood ratio (LR) results and the minimum value of the information criteria (IC) (not reported). Once heteroscedasticity has been accounted for, our specifications appear to capture the serial correlation in the power transformed growth series.[12]

Our set of variables tries to reflect the different explanations for the Argentinean puzzle previously put forward by economic historians. This set comprises domestic and international financial developments, informal and formal political instability, inflation and public deficit, and the degree of openness to international trade. In order to study the direct effects of our set of explanatory variables, we specify model 1 with $\mathfrak{J} = \gamma = 0$ in Equation (3), while model 2 with $\lambda = 0$ in Equation (1) allows us to investigate their indirect impacts on growth.

5. Econometric Results

The discussions of the econometric results below are structured according to different types of effects and follow this order: (1) direct effects (on mean economic growth); (2) indirect effects (by way of volatility); (3) dynamic effects (short and long-run); and (4) structural break effects.

5.1. Direct Growth Effects

Table 1 presents the full multivariate results, with informal political instability, domestic and international financial development, and trade openness.[13] Both guerrilla warfare and strikes show the expected negative and statistically significant direct impact (see the λ_1 column). As for the effect of financial efficiency, it is positive and statistically significant (see the λ_2 column). It is worth noting that the influences of the UK interest rate and the trade openness on growth change qualitatively with the presence of informal political instability and financial efficiency. More specifically, the negative impact of interest rate on growth remains when we include in the model the impact of savings bank deposits on growth, but it disappears when we include private deposits. Similarly, trade openness affects growth negatively only in two out of the four cases (see the λ_3 and λ_4 columns in Table 1).[14] We find a positive contemporaneous effect (in the univariate analysis) of inflation on the volatility of growth which is in line with the theory by Dotsey and Sarte (2000), yet in the multivariate analysis discussed below there is a significant lagged effect (results are available upon request).

As for the in-mean parameter (k), notice that in all cases the estimates are statistically significant and positive, which is in line with the theoretical argument of Black (cited in Fountas & Karanasos [2007] therein). Also the power term coefficients δ are rather stable, with the Akaike IC (AIC) criteria choosing a (P)ARCH specification with power term ranging from 0.8 (private deposits) to 1.10 (savings bank deposits.)[15] We have also regressed the volatility of economic growth on the measures of financial development and find no significant effects. We estimate the direct and short-run effects with lagged inflation and public deficits as regressors, and we find a significant negative influence from both variables.

In summary, we find that the main explanatory factors, solely in terms of their direct effects on economic growth in Argentina, turn out to be domestic (financial efficiency) financial development and informal political instability (guerrilla warfare and strikes.) Less robust are the negative direct effects of international financial integration and trade openness. We now turn to the investigation of the indirect effects.

Table 1. Direct effect of guerrilla warfare/strikes, private deposits/savings bank deposits, UK interest rate, and trade openness on economic growth. (P)ARCH estimates.

	k	λ_1	λ_2	λ_3	λ_4	α	β	δ
Guerrilla warfare								
Private Deposits/GDP	0.81	−0.001	0.328	−0.001	−0.011	0.81	0.51	1.00
	(2.06)	(3.32)	(1.98)	(1.40)	(1.18)	(4.42)	(4.31)	−
Savings bank deposits/GDP	0.75	−0.001	0.147	−0.004	−0.014	0.96	0.52	1.10
	(1.54)	(2.63)	(2.16)	(7.18)	(2.50)	(5.07)	(7.46)	−
Strikes								
Private deposits/GDP	0.74	−0.002	0.263	−0.001	−0.046	0.89	0.43	0.80
	(2.15)	(2.14)	(1.69)	(1.50)	(6.89)	(4.60)	(2.86)	−
Savings bank deposits/GDP	0.73	−0.001	0.308	−0.004	−0.127	1.00	0.51	1.10
	(1.62)	(2.01)	(1.79)	(5.17)	(1.46)	(3.87)	(5.05)	−

Notes: This table reports parameter estimates for the following model:

$$y_t = c + kh_t + \lambda_1 x_{i,t}^{(pi)} + \lambda_2 x_{i,t}^{(fd)} + \lambda_3 x_{uk,t} + \lambda_4 x_{to,t} + \varepsilon_t, \ h_t^{\frac{\delta}{2}} = \omega + \alpha h_{t-1}^{\frac{\delta}{2}} |\varepsilon_{t-1}|^{\delta} + \beta h_{t-1}^{\frac{\delta}{2}}$$

where $x_{i,t}^{(pi)}$ is either guerrilla warfare or strikes, $x_{i,t}^{(fd)}$ is either private deposits/GDP or savings bank deposits/GDP, $x_{uk,t}$ is UK interest rate, and $x_{to,t}$ is trade openness.
The numbers in parentheses are absolute t statistics

5.2. Indirect Effects (by way of Growth Volatility)

One of the main advantages of the (P)ARCH framework is that it allow us to study not only the direct growth effects from the full set of explanatory variables described above, but also their indirect effects on economic growth through the predicted component of growth volatility (conditional on its past values). As we can see from Table 1 and Table 2, the effect of conditional or predicted volatility on growth is in all (but two) cases positive ($k > 0$) and statistically significant at conventional levels. In this subsection, we present our results for such indirect effects for the complete set (that is, including all the main explanatory variables).

Table 2 shows that adding to the baseline model the complete set of explanatory variables, the indirect negative effect of formal political instability is statistically significant.[16] Focusing attention first on the $\Im_1$ and k parameters, note that formal instability (in this case, the occurrence of changes in the constitution) is found to affect conditional volatility negatively ($\Im_1 < 0$). Economic agents have severe difficulties in anticipating the consequences of changes in the rules of the game (constitutions). Such changes increase the share of unanticipated uncertainty and this accordingly reduces growth. Since $k > 0$, constitutional changes affect growth negatively as well. Of course, these results reinforce the notion that the type of political instability matters vis-à-vis economic growth: while informal (guerrilla warfare and strike) may have direct effect, the impact of formal instability (constitutional changes) operates indirectly, by way of growth volatility.

There are a number of other noteworthy results from Table 2. In particular, the impacts of UK interstate and public deficit on volatility are positive ($\Im_2, \Im_4 > 0$) and statistically significant. On the other hand, we find evidence that increases in trade openness are associated with decreases in conditional volatility ($\Im_3 < 0$) of per capita growth in Argentina.

The fact that exogenous increases in trade openness have a negative and significant impact on growth (recall that the direct effect is also negative) reflects one of the costs many economic historians associate with volatility: in the short run, changes in the share of trade in GDP decrease the conditional or expected share of growth volatility (or, equivalently, increase the amount of growth volatility that economic agents are not able to anticipate.) Therefore such a decrease in conditional volatility driven by trade openness translate into lower rates of economic growth (because $k > 0$). Although many scholars have given this explanation a great deal of weight and importance, the overall context of our results recommends a more limited role as the direct effects of trade openness are not as robust as those for financial and political institutions.

Last, and also of interest, is that we could not detect any significant indirect effects from domestic financial development (proxies by private deposits) or informal political instability (proxied by the occurrence of guerrilla warfare). There is no evidence that such factors affect growth in Argentina indirectly, through the conditional volatility of growth. Recall, however, that we do find that the direct effects of both domestic financial development and guerrilla warfare are substantial (see Table 1).

Table 2. Indirect effect of constitutional changes, UK interest rate, trade openness, and public deficit on economic growth. (P)ARCH estimates.

	k	α	β	ϕ_1	ϕ_2	ϕ_3	ς_2	γ	δ
Constitutional changes	1.52	0.46	0.69	−0.02	0.01	−0.17	0.08	0.04	1.00
	(3.09)	(4.04)	(7.03)	(6.19)	(2.99)	(5.91)	(2.96)	(0.74)	–
								$l = 7$	

Notes: This table reports parameter estimates for the following model:

$$y_t = c + kh_t + \varepsilon_t, \ h_t^{\frac{\delta}{2}} = \omega + \alpha h_{t-1}^{\frac{\delta}{2}} |\varepsilon_{t-1}|^\delta + \beta h_{t-1}^{\frac{\delta}{2}} + \phi_1 x_{i,t}^{(pi)} + + \phi_2 x_{uk,t} + \phi_3 x_{to,t} + \phi_4 x_{pd,t} + \gamma y_{t-l}$$

where $x_{i,t}^{(pi)}$ indicates constitutional changes, $x_{uk,t}$ is UK interest rate, $x_{to,t}$ is trade openness, and $\phi_4 x_{pd,t}$ is public deficit.

The numbers in parentheses are absolute t statistics.

In summary, we find strong evidence that both informal political instability (constitutional changes) and trade openness have a negative indirect (by way of volatility) impact on growth, whereas UK interest rate and public deficit affect it positively. No other variables in our set of explanatory variables seem to exhibit equally robust estimates of their indirect effects.

5.3. Dynamic Aspects

This section investigates how short- and long-run considerations help refine the baseline results above. Another potential benefit from this exercise is that the required use of lags may help ameliorate lingering concerns about endogeneity. This is because in order to estimate short- and long- run relationships, we use the following error correction (P)ARCH form:

$$\Delta y_t = \mu + \theta \Delta x_{i,t-l} + \varphi(y_{t-1} - c - \zeta x_{i,t-1}) + \varepsilon_t, \tag{5}$$

where θ and ς capture the short- and long-run effects respectively, and φ is the speed of adjustment to the long-run relationship.[17] This is accomplished by embedding a long-run growth regression into an ARDL model (see Pesaran, 1997; Pesaran & Shin, 1998) In other words, the term in parenthesis contains the long-run growth regression, which acts as the forcing equilibrium condition:

$$y_t = c + \zeta x_{it} + u_t \tag{6}$$

where u_t is I(0). The short-run effect is captured by the lag of the first difference of informal political instability or financial efficiency variable or one of the explanatory variables ($\Delta x_{i,t-l}$). The condition for the existence of a long-run relationship (dynamic stability) requires that the coefficient on the error-correction term be negative and not lower than -2 (that is, $-2 < \varphi < 0$). PARCH effects are incorporated by specifying the error term u_t as follows:

$$\varepsilon_t = e_t h_t^{\frac{1}{2}} \tag{7}$$

where

$$h_t^{\frac{\delta}{2}} = \omega + \alpha h_{t-1}^{\frac{\delta}{2}} |e_{t-1}|^{\delta} + \beta h_{t-1}^{\frac{\delta}{2}}. \tag{8}$$

Table 3 presents the full multivariate results, for informal political instability (guerrilla warfare and strikes), domestic and international financial development, and trade openness. Again because of space considerations, the additional Appendix (which is available upon request) reports results for the intermediate steps; that is, those between the results for one by one variables (which are provided in the Online Appendix; see Table A3) and for all variables together.[18]

The estimated coefficient on the error correction term φ lie within the dynamically stable range from -0.68 to -0.36. Regarding the short- and long-run estimates, θ and ς, we focus first on those obtained from the informal political instability variables. All four estimates of the short-run coefficients (see the θ_1 column) are highly significant and negative and their absolute values are higher than the corresponding values for the long-run coefficients (see the ς_1 column). This provides supporting evidence for the notion that the duration of the political instability effect does indeed matter and, for guerrilla warfare and general strikes, such effects tend to be considerably stronger in the short run than in the long run as previously noted by Campos and Nugent (2002) and Murdoch and Sandler (2004). As with the univariate analysis (see the Online Appendix) both the short- and long-run effects of the UK interest rate are negative (see the θ_3 and ς_3 columns). This is intuitive as it suggests that lower interest rates abroad, *ceteris paribus*, has helped Argentina to attract foreign capital (in search of higher returns), which is normally thought of as using more advanced technology and hence more productive, which by its turn has a positive effect on economic growth.

Table 3. The short- and long-run growth effects of guerrilla warfare/strikes, private deposits/ savings bank deposits, UK interest rate and trade openness.

	θ_1	θ_2	θ_3	θ_4	φ	ς_1	ς_2	ς_3	ς_4	δ
Guerrilla warfare										
Private	−0.0084	−0.1114	−0.0020	−0.0237	−0.6814	−0.0012	0.2348	−0.0034	−0.0084	0.80
deposits/GDP	(2.24)	(1.69)	(4.44)	(5.22)	(5.69)	(3.65)	(1.51)	(3.05)	(1.40)	
	$l = 2$	$l = 3$	$l = 0$	$l = 0$						
Savings bank	−0.0018	−0.3117	−0.0053	−0.0058	−0.4593	−0.0009	0.1708	−0.0039	−0.0108	0.80
deposits/GDP	(3.28)	(4.27)	(25.48)	(3.91)	(4.31)	(2.84)	(2.21)	(5.54)	(1.43)	
	$l = 3$	$l = 3$	$l = 0$	$l = 1$						
Strikes										
Private	−0.0023	−0.0949	−0.0056	−0.0112	−0.4516	−0.0010	0.3205	−0.0039	−0.0059	0.80
deposits/GDP	(7.70)	(2.48)	(19.57)	(8.41)	(9.60)	(2.23)	(1.57)	(4.95)	(0.67)	
	$l = 3$	$l = 1$	$l = 0$	$l = 3$						
Savings bank	−0.0015	−0.2052	−0.0025	−0.0194	−0.3582	−0.0006	0.3779	−0.0038	−0.0092	0.80
deposits/GDP	(3.54)	(2.02)	(5.21)	(3.79)	(7.13)	(1.95)	(3.47)	(5.08)	(1.19)	
	$l = 3$	$l = 1$	$l = 0$	$l = 0$						

Notes: This table reports parameter (mean) estimates for the following model:

$$\Delta y_t = \mu + \theta_1 \Delta x_{i,t-l}^{(pi)} + \theta_2 \Delta x_{i,t-l}^{(fd)} + \theta_3 \Delta x_{uk,t-l} + \theta_4 \Delta x_{to,t-l}$$
$$+ \varphi \left(y_{t-1} - c - \varsigma_1 x_{i,t-1}^{(pi)} - \varsigma_2 x_{i,t-1}^{(fd)} - \varsigma_3 x_{uk,t-1} - \varsigma_4 x_{to,t-1} \right) + \varepsilon_t,$$

$h_t^{\frac{\delta}{2}} = \omega + \alpha h_{t-1}^{\frac{\delta}{2}} |\varepsilon_{t-1}|^{\delta} + \beta h_{t-1}^{\frac{\delta}{2}}$, The four θ' s (l is the order of the lag) and ς' s capture the short- and long-run effects respectively. φ indicates the speed of adjustment to the long-run relationship. $x_{i,t-l}^{(pi)}$ denotes an informal political instability (either guerrilla warfare or strikes) variable. $x_{i,t-l}^{(fd)}$ denotes a financial development (either private deposits/GDP or savings bank deposits/GDP) variable, $x_{uk,t-l}$ is UK interest rate, $x_{to,t-l}$ is trade openness. The numbers in parentheses are absolute t statistics.

What about the results regarding the financial efficiency dimensions? In the long run, we find that financial efficiency affects growth positively (see the ς_2 column). Note that this effect is particularly strong when savings deposits are used as a proxy. This result is very much in line with the large empirical literature reviewed by Levine (2005), and it is interesting we can reproduce it with our rather different methodology. Maybe more interestingly, the short-run coefficients tell a very differently story: we find that the short-run impact of financial efficiency on growth is negative and significant (see the θ_2 column). Thus, our results square well with recent findings by Loayza and Rancière (2006), among others, in that the sign of the relationship between economic growth and financial development depends on whether these movements are temporary or permanent (the effect being negative in the former and positive in the latter.) It is also important to mention that in the long run the impact of trade openness is no longer statistically significant.[19]

In summary, our dynamic estimates show that in the short run mainly four variables have negative effects on growth; however, this set is much reduced considering long-run effects. In the long run political institutions (informal political instability such as guerrilla warfare and general strikes) as well as the UK interest rate affect growth negatively while the impact of financial institutions is shown to be positive in the long term (and larger than the short-run, negative, effect). It is also worth stressing that the effect of trade openness disappears in the long term.

5.4. Structural Breaks

One final important robustness test regards the role of structural breaks. We use the methodology developed by Bai and Perron (2003) to examine whether there are any structural breaks in growth, its

volatility, the various political instability series and the first differences of the four financial development variables.

For example, our Bai-Perron results support that general strikes have one structural break, which is dated for the year 1955. This is a result of great interest: 1955 is the year of the military coup in which President Juan Domingo Perón was overthrown by the military, thus concluding a defining chapter in Argentine history (for details of the other break dates see the Online Appendix) .

In summary, we find our results to be quite robust to the inclusion of the structural break dummies. That is, (i) informal political instability (either guerrilla warfare or strikes) has a direct negative effect on growth (see the λ_1 column in Table A4 in the Online Appendix), while formal political instability (constitutional changes) have an indirect (through volatility) negative impact on growth (see the $\mathfrak{I}_1$ column in Table A5 in the Online Appendix) (ii) trade openness affects growth negatively both directly and indirectly (see Tables A5 and A6 in the Online Appendix), (iii) financial development affects growth positively in the long run but negatively in the short run (see the θ_2 and ς_2 columns in Table A6 in the Online Appendix), (iv) both the short- and long-run impact of the UK interest rate is negative, while trade openness does not affect growth in the long-run (see the θ_3, ς_3 and ς_4 columns in Table A6 in the Online Appendix). It is also noteworthy that the causal negative effect of strikes reflects the period 1955–2000, which is not surprising given the intricate relationship between the Peron government and organised labour. Finally, the most important difference from the previous results is that the direct (indirect) effect of the UK interest rate (public deficit) disappears when we take into account structural breaks.

6. Conclusions and Future Research

What is the relationship between, on the one hand, financial institutions, political institutions, inflation, public deficit and trade openness and, on the other hand, economic growth and (predicted) growth volatility? Are these effects fundamentally and systematically different? Does the intensity and the direction (the sign) of these effects vary over time in general and, in particular, do they vary with respect to short- versus long-run considerations? Using a PARCH framework and data for Argentina from approximately 1890 to 2000 this article tries to answer these questions. Let us briefly summarise the main results. We call a 'first-order effect' from a given variable when it has significant (a) direct or (b) indirect impact and short- and long-run effects. Consequently, we call a 'second-order effect' one when we identify some evidence of a robust finding for one or more effects but not for at least three of them. On this basis, we argue that two factors have first-order effects to understand economic growth over the very long run in Argentina, namely financial and political institutions. By the same token, there are also a various noteworthy second-order effects, namely international financial integration seems to have clear negative short- and long-run effects, whereas trade openness only have significant negative indirect and short-run effects. More specifically, we find that the main explanatory factors, solely in terms of their direct effects on economic growth in Argentina, turn out to be financial efficiency, informal political instability (either guerrilla warfare or strikes) and trade openness. Further, we find robust evidence that both formal political instability (constitutional changes) and trade openness affect growth negatively, indirectly by way of its volatility. From investigating whether dynamic considerations affect our conclusions, we find important differences in terms of short- and long-run behaviour of the key variables, more specifically, while the effects of political instability and of the UK interest rate (negative) are similar in the long and short run, that of financial development is negative in the short run and positive in the long run. The negative short-run effect of trade openness disappears in the long run. Public deficits and inflation are important variables, but our results suggest that their effects occur either at the beginning (say from 1890 to 1930) or later on (say since the 1970s.)

These findings are interest in themselves, but they also matter because they raise a number of new questions that we believe may be useful in motivating future research. Here, we highlight three suggestions. Regarding the role of finance in the process of economic development, our finding

reinforces a large body of previous research in that we also show a strong, positive impact of financial development on growth in the long run. We find that different forms of political instability affect growth through different channels over different time windows, making up for a strong and rather resilient effect that seem really too powerful vis-à-vis the benefits brought to the table by financial development. We cannot forget, however, that Argentina is unique: no other country in the world since the Industrial Revolution went from riches to rags. Put it differently, Argentina is an outlier, and further research could try to replicate our analysis using the historical experience of other countries (ideally in a panel setting); that is, to study the relationship between financial development and economic growth in a panel of developing countries would strengthen what we know. Yet, the data requirements are very heavy indeed, with most developing countries lacking historical data even on key figures, such as per capita GDP, going back to the beginning or middle of the nineteenth century. This, of course, does not make this task less important. A second suggestion for future research is to relax the stark differentiation we impose above between first- and second-order effects by investigating potential interactions among key variables, as well as the testing of more intricate causal chains (in order to assess the possibility that, say, a factor 'only' has a secondary effect because our method is not fully capturing the possibility of other indirect effects, that is, through other variables of interest). The third suggestion refers to a possible methodological improvement, namely the application of the bivariate GARCH model to the problem at hand (albeit the relatively small number of observations). The joint estimation of the political instability–financial development–growth system in panel of countries would clearly represent progress and is something we feel future research should try to address.

Notes

1. Below we present and discuss our Bai-Perron estimates of the date of structural breaks in Argentinean growth. We find (and adjust our estimates accordingly below) evidence for two structural breaks: 1922 and 1964 (for a fuller treatment of this issue, see Campos, Karanasos, and Karoglou [2011]).
2. Growth was negative from 1999 onwards, culminating with around −10 per cent in the year 2002. The 2001 crisis entailed a default on large part of the external debt, devaluation, inflation and the freezing of bank accounts (the *corralito*). Riots, looting and anti-government demonstrations followed. See Kehoe (2003) for a discussion.
3. See also della Paolera and Taylor (2003) and references therein.
4. We have obtained GDP growth and level figures from various other sources (as well as industrial output series) and initial results (not reported) show that these different measures do not affect our results below.
5. For the sake of robustness, we re-estimate our models using two additional measures of financial development, both reflecting depth. The first is the ratio of M3 to GDP, from Alston and Gallo (2010). The main reason for considering this measure is that it has been used extensively in the finance-growth literature (see Levine, 2005). The second is a narrower

version of this variable (M1 over GDP) and the source of these data is Bordo et al. (2001). An Online Appendix (available upon request) contains figures and the relevant results (Table A1).

6. Another puzzle we are interested in relates to the duration of the political instability effects: while the conventional wisdom is that these are severe in the long-run, Campos and Nugent (2002) and Murdoch and Sandler (2004) argue that they are significantly stronger in the shorterrun than in the long run. In Campos and Nugent (2002), the long-run effect vanishes when the African countries are excluded from the estimation and when institutions are taken into account.

7. Our political instability variables enter one–by–one in the econometric framework we use, so our results are not affected by the taxonomy and as such it is used simply to facilitate the interpretation.

8. For the robustness purposes, results were obtained for two additional measures of informal political instability: The annual number of anti-government demonstrations (peaceful public gatherings of at least 100 people) and the number of assassinations (defined as politically motivated murders or attempted murders of a high government official or politician), as well as for three additional measures of formal political instability: the occurrence of legislative elections; the number of cabinet changes; and the size of the cabinet. See the additional Appendix (which is available upon request) for further details.

9. Because the original inflation series contains a number of obvious outliers between the years 1987 and 1991 (reaching almost 5,000 per cent in 1989), we lower the relative weight of these observations for estimation.

10. See Karanasos and Kim (2006) and references therein.

11. Because the original financial development, openness, public deficit and UK interest rate variables are I (1), they enter our models in first differences.

12. For all cases, we find that the leverage term is insignificant, so we re-estimate our models excluding this parameter.

13. The results for the one-by-one variable are presented in the Online Appendix.

14. Interestingly, this is not the case for the trivariate analysis. That is, when either UK interest rate or trade openness are included (but not both), there is the expected negative and significant influence in all cases (see Table A6 in an additional Appendix which is available upon request).

15. Notice that in all our estimations the ARCH and GARCH parameters (α and β) are highly significant in the majority of the cases (see Tables 1 and 2).

16. The results for the one-by-one variable are reported in the Online Appendix. For the sake of space, the results for the intermediate steps (those in between the results for one-by-one variable and for all variables together) are reported in an additional Appendix which is available upon request. When we include in the variance of growth the UK interest rate and/or trade openness, and one of the four alternative measures of formal political instability, the effects of cabinet size and cabinet changes (in all but one cases) disappear (see in the additional Appendix Tables A8–A9 and A12, available on request). Therefore, in what follows we only use constitutional changes. Moreover when we control for formal political instability inflation has no impact on growth volatility (see Tables A11 and A13 in the additional Appendix, available on request). In addition, our bivariate and trivariate analysis show that the effects of the UK interest rate, trade openness and public deficit are not affected by the addition of any of the four measures of formal political instability (see Tables A8–A10 and A12 in the additional Appendix, available on request).

17. As pointed out by Loayza and Rancière (2006), the requirements for the validity of this methodology are that: (i) there exists a long-run relationship between the variables of interest, and (ii) the dynamic specification of the model is sufficiently augmented so that the regressors are strictly exogenous and the resulting residual is serially uncorrelated.

18. In the univariate analysis, for almost all cases, both the short- and long-run effects of either informal political instability or financial development are significant (see Table A14 in the additional Appendix, available on request). Yet, the results from the bivariate analysis suggest that from the four informal political instability variables only guerrilla warfare and strikes affect significantly growth in the long run (see Table A15 in the additional Appendix, available on request). Similarly, M3/GDP has no long-run effect on growth in three out of the four cases. Finally, when we control for informal political instability and financial efficiency the effect of public deficit on growth is no longer statistically significant.

19. The results from the trivariate analysis provide ample support (see in the additional Appendix Table A16, available on request).

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