Inflation, Finance and Growth: A Trilateral Graphical Analysis

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Abstract

A large body of evidence links financial development to economic growth, yet the channels through which inflation affects this relationship are less thoroughly explored. We take a trilateral graphical approach to analyzing these channels, and find that higher levels of financial development, combined with low inflation, are related to higher rates of economic growth, especially in developing countries, but that financial development loses much of its explanatory power in the presence of high inflation. In particular, to maintain steady growth, relatively large increases in financial development must compensate for small increases in the price level when the annual rate of inflation lies between 5 and 14 percent, whereas less compensation in terms of financial development is required at inflation rates that exceed 14 percent. Of course, growth rates are generally much lower in such high inflation, low financial development settings.

JEL Classification: E31, E44, O3

Key Words: Financial development; Economic growth; Inflation; Cross-country analysis.

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1. Introduction

The burgeoning literature on the link between financial development and economic growth has made much progress over the past decade in characterizing statistically relationships described earlier by Gurley and Shaw (1955), Goldsmith (1969), and McKinnon (1973).[1] Much of the newer literature uses panel data to examine differences in growth rates across countries over long periods of time (e.g., King and Levine 1993; Beck at al. 2000). These and many other studies, including time series (e.g., Demetriades and Hussein 1996; Rousseau and Wachtel 1998), affirm that financial deepening and the expanding financial services that accompany it are growth promoting. At the same time, there has been less emphasis on determining whether there are particular economic conditions that affect the strength of the finance-growth link.

The link between inflation and growth has also been widely studied, though the nature of its non-linearity remains imperfectly understood.[2] Several influential studies in the early 1990s (e.g., Fischer 1993; Barro 1996) provide the empirical basis for the widely supported negative relationship, but Bruno and Easterly (1998) show that these results are due largely to high inflation episodes, meaning periods when annual inflation rates exceeded 40 percent. The latter finding is interesting because there are good reasons to believe that even moderate inflation can have negative effects on real activity. For one, financial intermediation becomes more difficult as the flow of information about the real returns to investments that is used by intermediaries in making loans becomes more uncertain and less readily available. Further, inflation can repress financial intermediation by eroding the usefulness of money assets and by leading to policy decisions that distort the financial structure. The channel by which inflation affects growth may

[1] Levine (2005) provides a useful survey of the literature to date.

[2] Temple (2000) discusses various theoretical arguments for why inflation and growth should be related and surveys the empirical literature.

therefore run, at least in part, through the financial sector.

To the extent that high inflation disrupts the smooth operation of a nation's financial markets and institutions, it also discourages their integration with the rest of the world. Since high inflation is often variable inflation as well, there will be considerable uncertainty about future prices, interest rates, and exchange rates, which in turn increases the costs of hedging financial risks among potential trade partners. If inflation also increases a currency's vulnerability to speculative attack, hedging instruments will become even more expensive and difficult to price. All of this will discourage trade and inflows of foreign capital.

A few other studies examine the inflation-finance-growth nexus. Haslag and Koo (1999) and Boyd et al. (2001) show that inflation is associated with financial repression. Rousseau and Wachtel (2002) identify an inflation threshold for the finance-growth relationship, finding that finance affects growth positively only when annual inflation can be held below a threshold that lies between 13 and 25 percent, depending on the measure of financial depth that is chosen. They also find that disinflations are related to strong positive effects of finance on growth.

In this paper we build upon these earlier studies by introducing a three-dimensional graphical approach that characterizes more precisely the trilateral relation between inflation, finance, and growth. This method allows us to identify the finance-inflation pairs that are most advantageous. Specifically, we find that low inflation is associated with higher growth in a cross-country regression framework, but that inflation loses statistical significance when measures of financial depth are also included in the regression. We suspect that a negative correlation between inflation and financial development results in problems of multicollinearity that drive this result. Our graphical approach ameliorates such problems and finds that high levels of finance and relatively low levels of inflation are both instrumental for achieving high

levels of long-run growth, and that inflation hinders the smooth operation of the finance-growth nexus more in developing countries than in developed ones.

We then take a data-driven approach to determining threshold inflation rates where the tradeoffs between inflation and financial development in the growth process appear to shift. Our results suggest that to maintain steady growth, relatively large increases in financial development must compensate for small increases in the price level when the annual rate of inflation lies between 5 and 14 percent, whereas much less compensation in terms of financial development is required when inflation rates exceed 14 percent. Of course, growth itself is generally lower in such higher inflation settings.

In Section 2 we describe the data and present results from a baseline regression analysis. Section 3 introduces the trilateral graphical approach and presents our basic findings, while Section 4 focuses on their robustness to extreme observations. Section 5 compares the nature of the inflation-finance-growth link across developed and developing countries. Section 6 examines inflation thresholds, and we draw together our conclusions in Section 7.

2. Baseline growth regressions

An almost standard empirical framework has emerged since Barro (1991) and Levine and Renelt (1992) introduced the cross-country regression as an empirical representation of the Solow growth model. The baseline equation includes a set of explanatory variables that provide robust and widely accepted proxies for the basic growth determinants. King and Levine (1993) extend this framework to include measures of financial development, and we begin with their baseline. Specifically, we start with the average rate of growth in real per capita output averaged over 5-year periods from 1960-2004 as the dependent variable and then condition on the following explanatory variables:

- The log of initial per capita GDP in constant 1995 U.S. dollars, which is expected to have a negative coefficient due to convergence (i.e., the tendency for countries with lower starting levels of GDP to "catch up" with higher GDP countries).
- The log of the initial secondary school enrollment rate (i.e., percent of the high school aged population actually enrolled), which is expected to have a positive coefficient. School enrollment rates are more widely available than other more precise measures of human capital, and should reflect a country's commitment towards the development of human capital reasonably well.
- Liquid liabilities (i.e., M3) as a percent of GDP. The broad M3 aggregate includes all deposit-type assets and is assumed to relate to the extent and intensity of financial intermediation.
- In addition to these three variables, we include the inflation rate (as an annual percent) explicitly to examine its direct effects on growth, and expect a negative coefficient.

Our data are organized as a panel of country observations from the 2005 edition of the World Bank's *World Development Indicators* database and includes as many as 84 countries.[3] Initial values of GDP, the secondary school enrollment rate, financial depth, and inflation are from the first year of each five-year period. We include fixed effects for the five-year periods because global business cycle conditions could involve shocks with common growth effects across countries.

Table 1 presents the results. In the first column, which corresponds to the baseline growth model, the coefficient for initial GDP is negative and thus consistent with a convergence effect,

[3] These are the same 84 countries used by Boyd, Levine and Smith (2001) and Rousseau and Wachtel (2002).

TABLE 1
OLS Growth Regressions, 1960-2004

Variables	Dependent Variable: Growth of Per Capita Income (%)			
Log initial GDP	-0.112 (0.109)	-0.271* (0.113)	-0.149 (0.111)	-0.281* (0.113)
Log initial SEC (%)	1.114** (0.210)	0.962** (0.208)	1.161** (0.211)	0.995** (0.210)
Initial M3 (% GDP)		0.021** (0.004)		0.020** (0.005)
Initial Inflation (%)			-0.016* (0.007)	-0.008 (0.007)
R-bar sqd.	0.18	0.21	0.19	0.21

Notes: Standard errors are in parenthesis. * and ** indicate significance at the 5% and 1% levels, respectively. Growth rates are five-year averages. All equations include fixed effects for time periods that are not shown. The sample size in each equation is 524.

but is not statistically significant, while the coefficient on the initial secondary enrollment rate (SEC) is positive and significant at the one percent level.

We bring financial development and inflation into the analysis in the remaining columns of Table 1. When we add M3 as a percent of GDP to the regression in the second column, it is positively related to growth and significant at the one percent level. The coefficient on the log of the initial secondary school enrollment rate (SEC) is similar in magnitude to that obtained in the first column, while the coefficient on the log of initial income remains negative but is now statistically significant at the five percent level. This specification seems to reflect elements of the Solow model better than the baseline represented in column 1.

The regression in the third column replaces initial financial depth with the initial inflation rate. Inflation enters with the expected negative sign and is significant at the five percent level,

yet the log of initial GDP is once again no longer significant. Finally, when we include both initial financial depth and initial inflation in column 4, the effect of the initial ratio of M3 to GDP is robust to the inclusion of the initial inflation, but that the effect of initial inflation is no longer statistically significant.

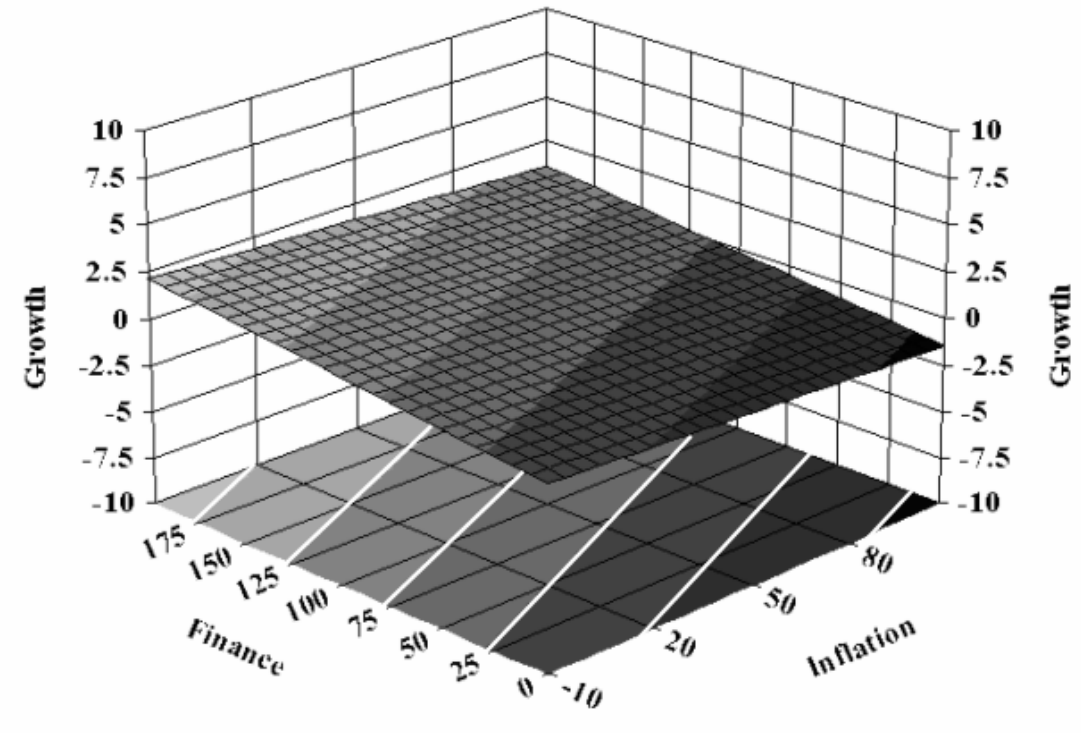
The dampening of the effect of inflation on growth when combined with financial development, as observed in Table 1, calls for explanation. Is the direct effect of inflation on growth as important as the regression in the third column suggests? Or does inflation inhibit growth primarily through its effects on the smooth operation of the financial sector as suggested by the regression in the fourth column? Is there a trade-off between inflation and finance in achieving a given rate of growth? If such a tradeoff exists, linear regression analysis seems unable to show it clearly, especially given the negative and significant correlation between financial depth and inflation of -0.40, yet it is possible to show the tradeoff with a graphical analysis so long as the dimensionality of the system can be held to three. We explore such a trilateral graphical approach in the next section.

3. Trilateral graphic approach

Obtaining a trilateral graph requires reducing the dimensionality of the regression in the final column of Table 1. We do this by plotting the residuals from the first column of Table 1 against initial inflation and the initial M3 (as a percent of GDP), along with the corresponding regression plane. This allows us to analyze trade-offs between inflation and financial depth in explaining the Solow residuals.[4] Not including the financial variable in the baseline regression

[4] Alternatively, we could obtain residuals from the projections of growth, initial financial depth and initial inflation on initial GDP, initial SEC, and the time effects, and then regress the growth residuals on those for financial depth and inflation. This would recover the coefficients in the final column of Table 1 exactly. Plotting these residuals in a three-dimensional graph would

Figure 1a – Trilateral Relation between Inflation, Finance and Growth (Including All Observations)



$$GR = -0.448 - 0.008 * INF + 0.013 * FIN$$

may influence the coefficient on the log of initial GDP in the first column of Table 1, thereby dampening the effects of initial finance in our three-dimensional analysis, but these distortions are likely to be minimal.[5]

We begin the graphical presentation with Figure 1a, which uses data for all 84 countries over nine five-year periods. The darkness of the fitted planar surface in the three-dimensional space decreases as the unexplained growth (i.e., Solow) residuals become larger. That is to say,

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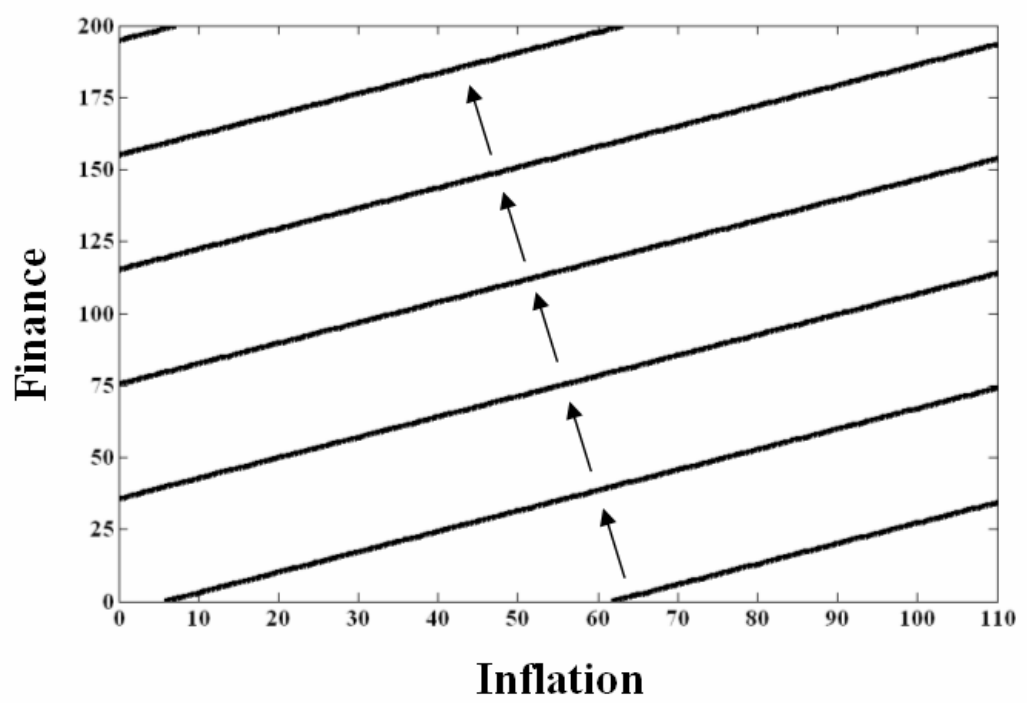
offer little information beyond the original regression, however, and suffer from the same problems of multicollinearity.

[5] From this point, we will use the terms 'growth' and 'Solow residual' interchangeably.

Figure 1b – Projection of the Surface in Figure 1a

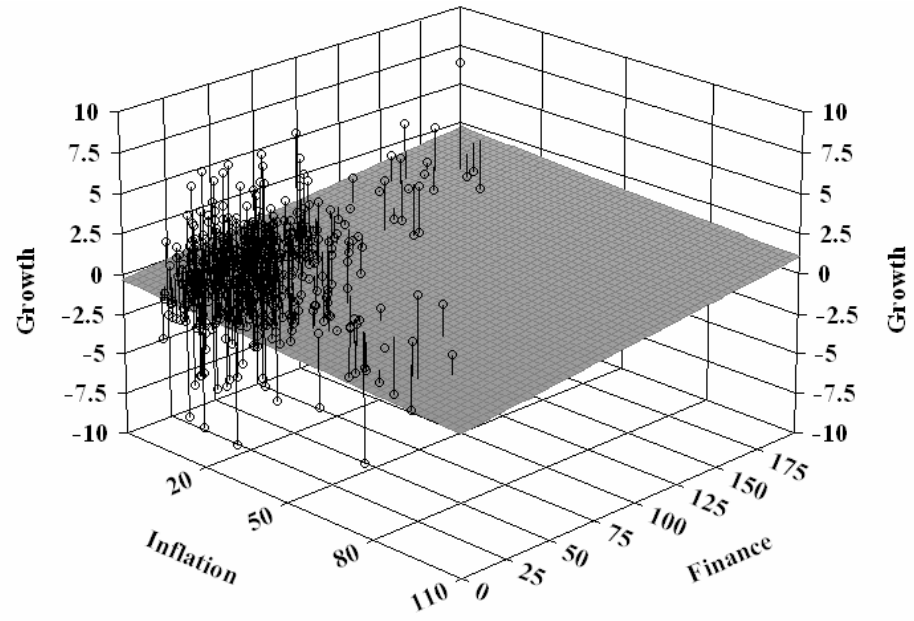


the brightest part of the surface represents the highest level of growth.[6] The equation that we used to create the regression plane is shown at the bottom, where *GR* denotes the growth residuals, *INF* is the initial inflation rate, and *FIN* is initial M3 as a percent of GDP. The base of Figure 1a is a two-dimensional projection of the fitted surface. Here, the brightest area once again represents the highest level of growth associated with given levels of finance and inflation. The white lines on this projection are central to our analysis, and show the combinations of inflation and finance that can achieve given levels of growth. In this sense, the white lines are similar to indifference curves, each representing a different growth rate.

To get a better idea about the projection of the surface and the white lines superimposed upon it, we present the projection alone in Figure 1b. In this depiction, finance increases along

[6] We use the TableCurve 3D, Version 4.0 software. Note that the plane-fitting algorithm produces a continuous gradient in shades of gray, but that we discretize the gradient in our graphs to aid in the exposition.

Figure 1c – An Alternate View of Figure 1a with Sample Points



the vertical axis and inflation increases along the horizontal axis. The arrows show the path through which the linearized indifference curves for growth take higher values. In particular, these lines suggest that a higher level of financial depth is needed to maintain a steady growth rate in higher inflation environments, or equivalently, that steady growth after a lowering of inflation can be achieved with less financial depth. More formally, using the equation at the bottom of Figure 1a, the absolute value of the marginal rate of substitution between inflation and financial depth is constant and equal to the slope of our indifference lines. Since this slope is 0.71, a country with an inflation rate one percent higher than a second country must have a level of financial depth that it is 0.71 percentage points higher to achieve the same growth rate as the second country. We can also say that higher levels of growth are most readily achieved at higher levels of finance when inflation is relatively low.

Figure 1c presents an alternate view of the same results depicted in Figure 1a, along with the sample points. What stands out is that there are no instances of countries or time periods

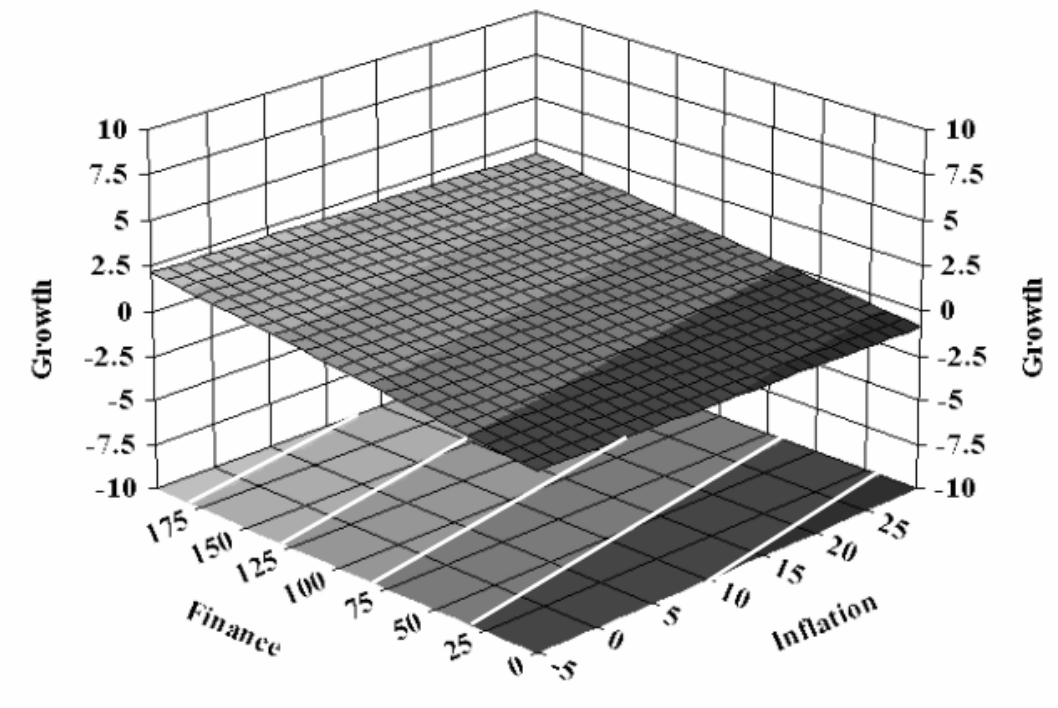
where high levels of inflation and financial development co-exist to deliver the relatively high levels of growth suggested by the right corner of the fitted surface. The surface also indicates that high levels of inflation are more tolerable when there is adequate financial depth for investors to hedge at least partially against price level uncertainties. Put differently, strong growth appears difficult to achieve under any inflation circumstances in the absence of a well-developed financial sector.

4. Sensitivity to potential outliers

In this section we explore the sensitivity of our main results to the presence of high inflation observations in the sample, given that earlier evidence suggests that inflation's negative effects on growth are due primarily to leverage points, and in particular to observations of inflation rates that exceed 40 percent per annum. To do this, we repeat the graphical analysis using only those initial inflation observations that that lie below 30 percent. Figure 2a presents the resulting trilateral graph.

Perhaps surprisingly, the white lines in Figure 2a indicate that there is now an even sharper tradeoff between inflation and financial development in achieving high rates of growth. According to the equation given at the bottom of the figure, the absolute value of the marginal rate of substitution between inflation and finance is about 0.99. That is to say, if inflation is one percent higher, the level of financial depth now needs to be nearly an entire percentage point higher to keep growth constant. This suggests that countries with inflation rates above some threshold level may already suffer from an impaired ability to form contracts, and that even higher inflation rates among the high inflation group would not hamper the ability of finance to promote growth much more severely. On the other hand, in lower inflation ranges, a bit more inflation can have marked effects on the ability to form long term contracts. Figure 2b offers an

Figure 2a - Trilateral Relation between Inflation, Finance and Growth (Including Inflation Observations Less Than 30 Percent)



$$GR = -0.4789 - 0.0126 * INF + 0.0127 * FIN$$

Figure 2b – An Alternate View of Figure 2a with Sample Points

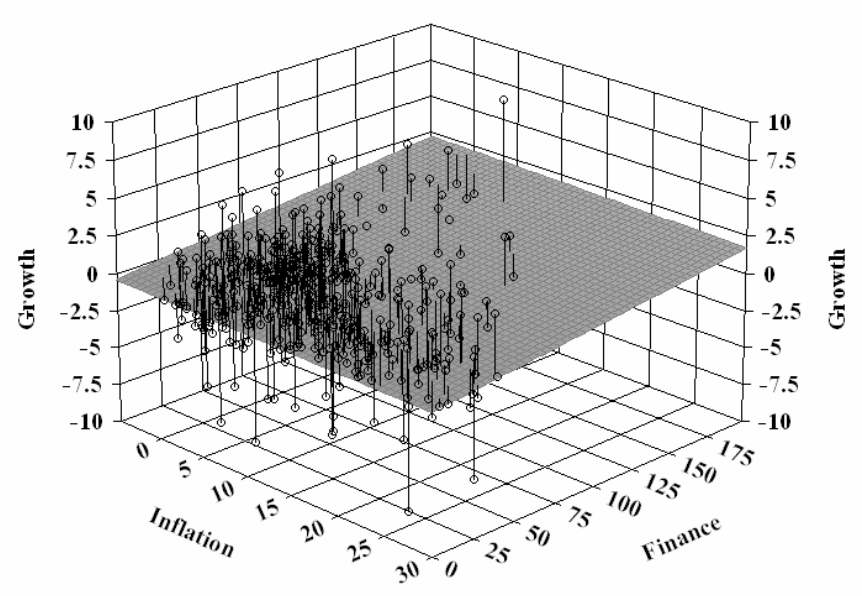
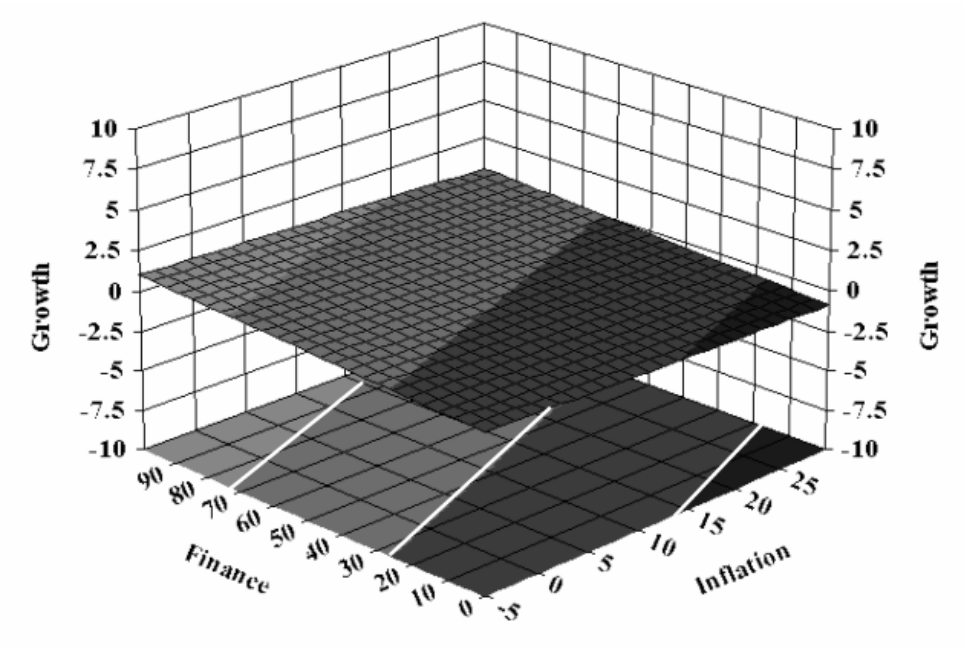
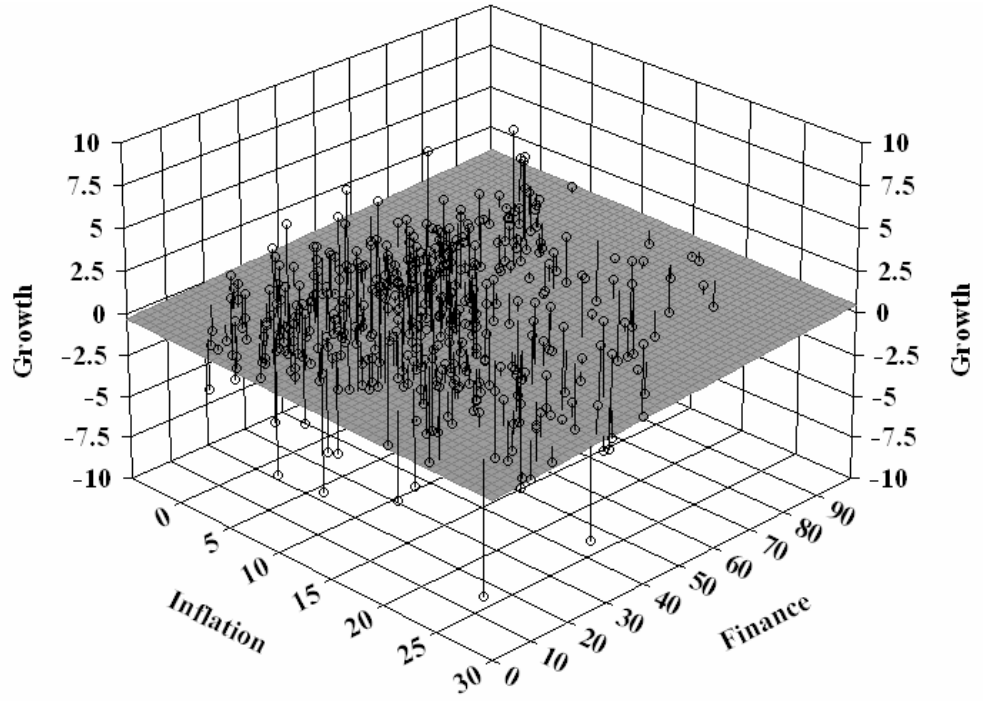


Figure 3a - Trilateral Relation between Inflation, Finance and Growth (including observations with inflation under 30% and financial depth under 100%)



$$GR = -0.4147 - 0.0147 * INF + 0.0133 * FIN$$

Figure 3b – An Alternate View of Figure 3a with Sample Points



alternate view of Figure 2a with the sample points included. These points also suggest that financial repression is more likely when inflation rates exceed about 15 percent.

To determine the effects of influential observations in the M3/GDP dimension, we next consider only those financial depth observations that are less than 100 percent and those inflation observations less than 30 percent. Figure 3a is the resulting trilateral graph, and Figure 3b shows an alternate view with the sample points included. The white indifference lines in Figure 3a indicate that the absolute value of the marginal rate of substitution between inflation and finance is now about 1.1. That is to say, if inflation increases by 1 percent, the level of financial depth has to increase by more than one percentage point to maintain a constant growth rate. This sensitivity of the tradeoff between inflation and financial depth is even stronger than that obtained with either the full sample or with only the high inflation observations removed, and suggests that potentially harmful effects of inflation on the smooth operation of the finance-growth relationship have their largest effects in environments with both moderate levels of inflation and financial depth.

5. Developed vs. developing countries

We now investigate how the trivariate relationship between inflation, finance and growth might differ across developed and less developed countries. To classify countries, we use the World Bank's 2005 definition of a developing economy as one in which per capita income is less than 3,225 USD; developed countries are the complement.[7]

[7] The 46 less developed countries in our sample are Algeria, Bangladesh, Bolivia, Brazil, Cameroon, Central African Republic, Colombia, Cote d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Fiji, Gambia, Ghana, Guatemala, Guyana, Haiti, Honduras, India, Indonesia, Iran, Jamaica, Jordan, Kenya, Lesotho, Malawi, Morocco, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Papua New Guinea, Paraguay, Peru, Philippines, Rwanda, Senegal, Sierra Leone, Sri Lanka, Sudan, Syrian Arab Republic, Thailand, Togo, and Zimbabwe. The 38 developed

TABLE 2
Growth Equations (%) for Developed and Developing Countries, 1960-2004

Variables	Developed Countries			Developing Countries		
Log initial GDP	-1.108** (0.201)	-1.04** (0.214)	-1.145** (0.207)	-0.342 (0.246)	-0.315 (0.246)	-0.352 (0.245)
Log initial SEC (%)	2.081** (0.414)	2.189** (0.431)	2.096** (0.415)	0.624* (0.274)	0.919** (0.260)	0.705* (0.276)
Initial M3 (% GDP)	0.019** (0.004)		0.019** (0.004)	0.027** (0.010)		0.023* (0.011)
Initial Inflation (%)		-0.016† (0.008)	-0.006 (0.008)		-0.028* (0.012)	-0.022† (0.012)
R-bar sqd.	0.32	0.27	0.32	0.12	0.11	0.13

Notes: †, * and ** indicate significance at the 10%, 5% and 1% levels, respectively. Standard errors are in parenthesis. Estimation is by OLS. Five year average data of all countries is used in all equations. All equations include fixed effects for time periods that are not shown. The sample size of the equation for developed countries is 240, while the sample size of the equation for developing countries is 284.

Table 2 presents results from the baseline growth regressions. The log of initial secondary education enters positively as expected and is statistically significant in all specifications for both the developed and less developed countries, while the coefficient on the log of initial GDP is negative throughout, but statistically significant only for the developed countries. More importantly, the coefficient for initial M3 as a percent of GDP is positive as expected and statistically significant in all equations. In the equations that exclude financial depth, the

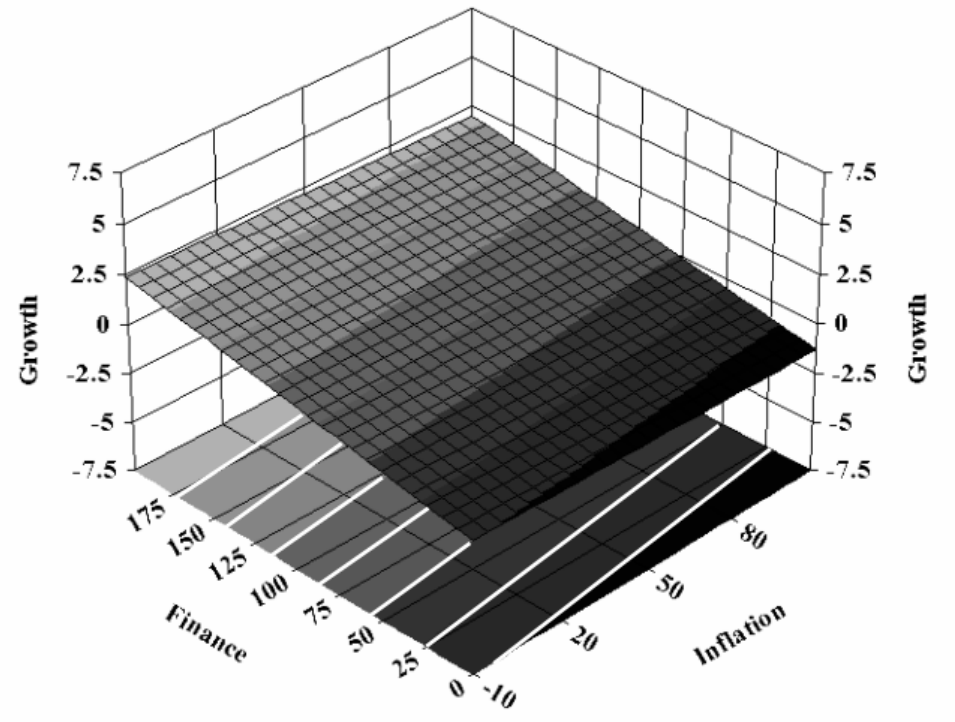
countries in our sample are Argentina, Australia, Austria, Barbados, Belgium, Canada, Chile, Costa Rica, Denmark, Finland, France, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea Rep., Luxembourg, Malaysia, Malta, Mauritius, Mexico, Netherlands, New Zealand, Norway, Panama, Portugal, South Africa, Spain, Sweden, Switzerland, Trinidad and Tobago, Turkey, United Kingdom, United States, Uruguay, and Venezuela.

coefficients on initial inflation have the expected negative signs, with the coefficient significant at ten percent level for the developed countries and at the five percent level for the developing ones. As before, it appears that both initial M3/GDP and initial inflation are important factors in determining long-run growth rates.

In the third column of Table 3, however, we again find that the coefficient on inflation is not significant for the developed countries when we include financial depth in the model, though finance remains highly significant. As before, we believe that this reflects a negative effect of initial inflation on growth that is channeled through financial depth. We suspect this because the Pearson correlation between the initial inflation and the initial M3/GDP in the sample of developed countries is –0.59. Notably, the coefficient on inflation remains significant at the ten percent level for the developing countries in the final column of Table 2, even when finance and inflation enter the specification simultaneously. It thus appears that inflation has some direct effect on growth in the developing countries that is not channeled through the financial sector.

In sum, the effect of the initial inflation on the Solow residuals of the developed countries differs from that for the developing countries. To examine this graphically, we apply the three-dimensional approach to each group separately. Figure 4 is the resulting plot for the developed countries. Based on the equation beneath it, the absolute value of the marginal rate of substitution between high levels of finance and low levels of inflation is around 0.18. That is, if inflation is one percent higher, the level of financial depth has to increase by 0.18 percentage points to maintain constant growth. This rate of substitution is much smaller than what we found in our earlier figures, suggesting that the sensitivity of growth to relatively small changes in the inflation rate in low inflation environments, which were quite sharp in the combined sample (see Figure 3), are far less severe in developed economies.

Figure 4 – Trilateral Graph for Developed Countries



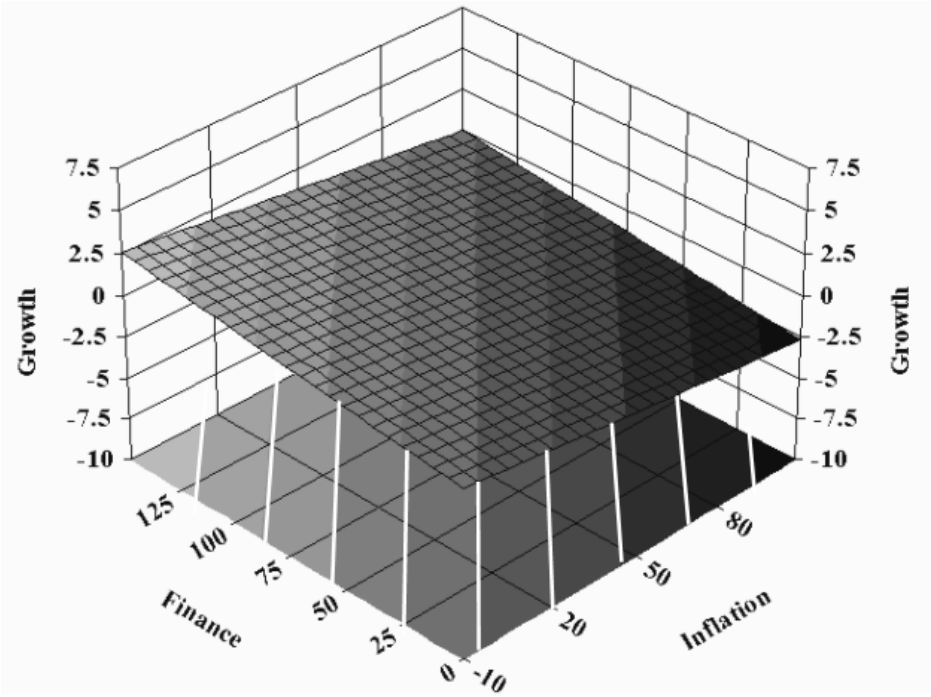
$$GR = -0.9428 - 0.0029 * INF + 0.0163 * FIN$$

Figure 5 is the trilateral graph for the developing countries. Though we generate the fitted plane using all of the observations for the developing countries, we truncate the figure at 100 percent inflation to improve the exposition. The white indifference lines indicate that the absolute value of the marginal rate of substitution between inflation and finance is 1.25, or that if inflation increases by 1 percent, the level of financial depth must increase by 1.25 percent to maintain steady growth. The inflation-finance tradeoff is thus much sharper for the developing countries than for the developed ones. This is consistent with the regression results in Table 2.

6. Inflation Thresholds in the Finance-Growth Relationship

The trilateral graphs presented above, especially Figures 2a and 2b, suggest that the effects of inflation on the operation of the finance-growth link may differ across particular ranges of inflation rates. In this section we take a two-step, data-driven approach to determining

Figure 5 – Trilateral Graph for Developing Countries



$$GR = -0.2637 - 0.0218 * INF + 0.0174 * FIN$$

such thresholds. In the first step, we impose the existence of two thresholds and then determine the specific inflation rates associated with them. In the second step, we use the calculated thresholds in the graphical analysis.

To implement the first step, we order our pooled five-year observations from those with the lowest inflation rates to those with the highest, divide the sample into three ranges of inflation rates, and then run the regression in the second column of Table 1 (i.e., excluding inflation) with initial M3/GDP interacted with a dummy variable for each inflation range. After repeating this regression for every possible pair of break points along the inflation dimension, we choose the model that generates the smallest residual sum of squares. In other words, we assume a stable relationship between growth, initial GDP, initial SEC, and time across the inflation

TABLE 3
Growth Equation with Inflation Thresholds, 1960-2004

Variables	Dependent Variable: Growth of Per Capita Income
Log initial GDP	-0.298* (0.114)
Log initial SEC (%)	1.014* (0.211)
Initial M3 (% GDP) for Low Inflation (up to 5.38%)	0.021* (0.004)
Initial M3 (% GDP) for Medium Inflation (between 5.40% and 13.86%)	0.026* (0.006)
Initial M3 (% GDP) for High Inflation Rates (higher than or equal to 14.21%)	0.010 (0.007)
R-bar sqd.	0.45

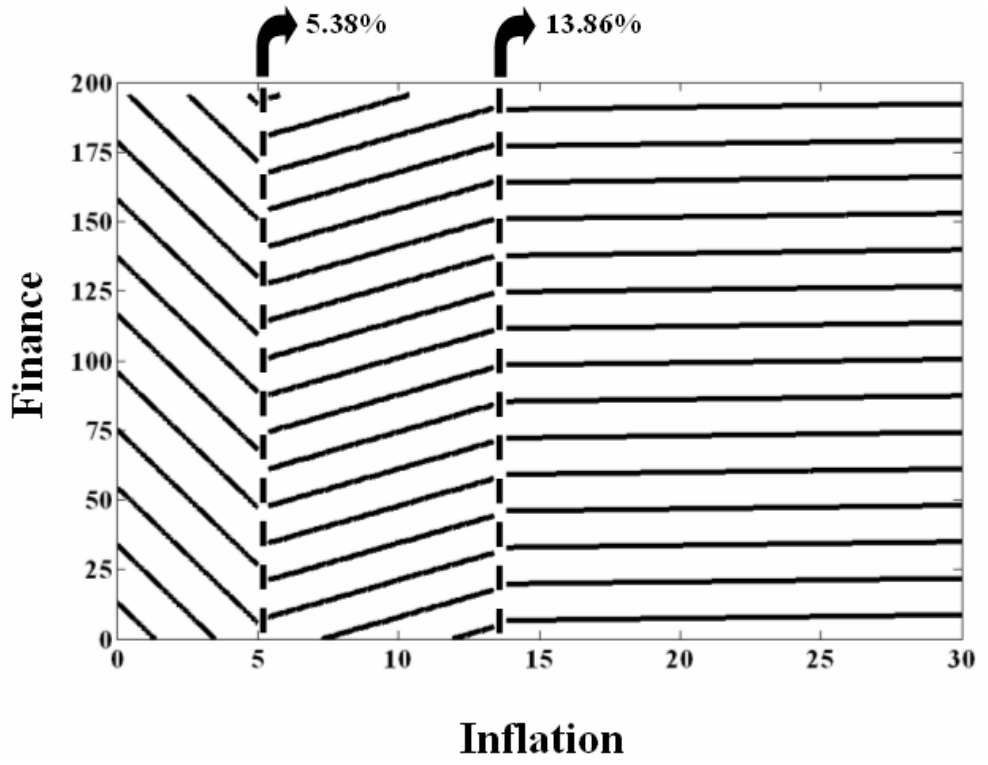
Notes: * indicates significance at the 1% level. Standard errors are in parenthesis. Estimation is by OLS. Five year average data of all countries is used in all equations. All equations include fixed effects for time periods that are not shown. Dummy variables have been used to obtain the relevant finance coefficients related to different rates of inflation. The sample size is 524.

groups, and allow the coefficients of the initial M3 to GDP ratio to differ within these intervals.

Table 3 presents estimates from the regression that uses the inflation thresholds of 5.4 and 13.9 percent determined by the procedure described above. All of the estimates have the expected signs and are statistically significant except for the interaction between financial depth and the dummy variable for high inflation. The adjusted R^2 indicates a considerably better fit for the threshold model than for any of the specifications reported in Table 1.

In the second step, we use the inflation thresholds (i.e., 5.4 percent and 13.9 percent) to show the tradeoffs between inflation and finance that correspond to given growth rates. Note that the two thresholds imply three such tradeoffs. Figure 6 shows the projection of the resulting tri-

Figure 6 – Projection of the Trade-offs Between Finance and Inflation with Inflation Thresholds



planar surface, which can be seen as an extended version of Figure 1b that allows for two break points. We truncate the graph at an inflation rate of 30 percent to improve the exposition. As in Figure 1b, each of the solid lines in Figure 6 represents an indifference relationship between finance and inflation along which a constant rate of growth obtains, with the growth rates increasing as we move northward in the graph. Since each inflation range generates its own plane in three dimensional space, the growth rates associated with the solid lines differ across each threshold.

Interestingly, for low inflation (i.e., up to 5.4 percent per year), a given rate of growth can be achieved with lower financial depth so long as inflation is high enough! This implies some substitutability between high finance and high inflation in promoting growth in low inflation

environments. The result derives from the presence of observation with negative and small positive inflation rates in the sample. Since deflation brings its own negative effects on real activity, and the literature on inflation targeting (e.g., Fischer 1995) suggests that inflation goals in the range of 2-3 percent per year are optimal in that they control growth in the price level while minimizing the possibility of deflation, we might expect economies with higher inflation rates to perform better than those with very low or negative rates when inflation is held beneath our lower threshold. The average growth rate for the 182 observations in this segment of the sample is a robust 2.2 percent per year

A different picture emerges, however, when the inflation rate lies between 5.4 and 13.9 percent. For these cases, where the average annual rate of growth for the 181 observations in the range is 2 percent, the tradeoff reverses sharply, requiring financial depth to compensate dearly for a given rise in the inflation rate. The slope of the indifference lines for this middle inflation range is about 2.9, implying that financial depth must rise by nearly three percentage points to maintain steady growth in the face of a one percent rise in the inflation rate. This tradeoff is even higher than that found for developing countries generally (without thresholds) in Figure 5.

When inflation exceeds the upper threshold of 13.9 percent, the negative tradeoff between inflation and financial depth remains, but is nearly flat (the slope of the indifference lines is only 0.13 for this region), meaning that at any given high rate of inflation, growth remains almost uniformly low regardless of the level of financial development. As might be expected, the average growth rate of less than one percent among the 161 observations in this segment of the sample is much lower than those for the lower inflation ranges.

7. Conclusion

We take a trilateral graphical approach to analyzing the relation between finance,

inflation and growth, and find that high levels of financial depth are important for achieving long-run growth and that higher inflation rates hinder the smooth operation of this linkage. High inflation disrupts the finance-growth nexus most seriously, but the effects of inflation are not that sensitive to its level once a country is in the high-inflation range. At middle-range inflation rates, the finance-growth link across countries seems quite sensitive to small differences in inflation rate, and these effects are stronger for developing countries than for developed ones.

Our findings underscore the importance of avoiding excessive inflation in formulating monetary policy, and imply that even moderate inflations (i.e., between 6 and 14 percent per annum) can have serious macroeconomic consequences. Developing institutional arrangements for controlling and fighting inflation, including the implementation of credible and low inflation targets, would therefore seem to have potentially large benefits.

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