

**Discussion of: Inflation and Financial Performance: What Have We Learned in the
Last Ten Years? (John Boyd and Bruce Champ)**

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Boyd and Champ have put together a very useful survey of the literature on inflation and the real economy and produced some empirical updates and refinements. The basic lesson, sensible, is that inflation is bad. Theory offers good intuitions as to why that should be the case. Mainly, inflation can have a direct impact on the optimization strategies of economic agents. For instance, banks may alter their incentives to lend as the opportunity cost of money changes with inflation. Similarly, firms may also modify their choice between using internally generated funds or external sources to finance new capital investments. That, in turn, may have an additional impact on banks' decision making, as they perceive a modification in the quality distribution of prospective entrepreneurs.

I offer a main point of discussion. This should not be read as a criticism to Boyd and Champ but rather as observations on possible directions to improve the current literature. Boyd and Champ state that their main objective was to increase mutual awareness between theorists and applied economists. The underlying text of their comment is that perhaps theory and empirical analysis of inflation have proceeded in an independent fashion, and this may have limited the scope of the results attained so far. I

agree fully with this characterization and I dare to add that perhaps theorists have been ahead of the game in this particular line of research.

Reading through Boyd and Champ survey of the literature, we learn that all the empirical evidence on inflation and its links with other economic variables is obtained from studies based on aggregate, cross-country data set. The endemic problem with this approach is that it lends itself - too easily - to objections related to omitted variable biases, common factor determination, endogeneity, reverse causality, etc. This was indeed a common refrain in commenting the results of what by now can be defined as “traditional” studies on the link between financial development and economic growth: the seminal empirical work of King and Levine (1993 a, b) was instrumental in confirming the original Schumpeterian intuition of the existing causal link going from financial markets development to growth. This intuition was well grounded and hard to dispute, and by now there is widespread consensus that the link does indeed exist. And yet, such consensus was not really reached until more recent times, as scholars started to depart from the traditional approach and, thanks also to richer data sets becoming available, began direct testing of specific theoretical predictions related to the finance-growth nexus, making use of more and more disaggregated information on industries and firms.¹

The empirical analysis of the impact of inflation on the real economy suffers from the same type of criticism. However, the problem is even more serious: in establishing the causal link between finance and growth, scholars were relatively comfortable in performing the thought experiment of comparing two otherwise identical economies, differing for, say, the number of banks in operation or the size of the stock market. Which one is likely to display more growth? More in general, we are fairly at ease in applying

¹ As examples of such works, see Rajan and Zingales (1998) or Demirguc-Kunt and Maksimovic (1998).

the “natural experiments” methodology while testing the impact of structural variables that can be related to the functioning and depth of the financial sector.

I am, however, a little uncomfortable in extending this methodological approach to the analysis of inflation, or more precisely, to empirical studies based on comparisons of economies in a *persistent* state of low- or high-inflation. Taken at face value, the results of the cross-sectional studies surveyed by Boyd and Champ imply that going from a high-inflation to a low-inflation environment, growth will improve, banks will thrive, and capital markets will do too. I have no doubt that it is better to be in a low-inflation environment but I do not know how to really interpret such findings. States of persistently high or low inflation are, in fact, achieved as the result of fundamentally different conditions. Undisciplined, excessive money growth, most of the time needed to satisfy unsustainable fiscal spending, in an environment with poor institutions and regulations is what typically leads to persistent high inflation. Inflation thus changes as an economy goes through deep, pervasive transformations of its fundamentals. Indeed, inflation will change as *a result* of such transformations.

Take the example of most Latin American countries in the last twenty five years. Average inflation in the region was about 180 percent per year in 1980, peaking at 235 percent in the first half of the 1990s. Inflation is currently at one-digit levels in Chile, Brazil, Colombia, Peru, Mexico (Bernanke, 2005). The remarkable success for these countries in shifting to a low-inflation environment was precisely achieved, as Bernanke (2005) points out, through aggressive fiscal discipline, the development of better institutions, the modernization of the banking system and commitment to improved independence of central banking institutions. Consequently, in a very fundamental way,

these countries today are not the same countries as they were twenty years ago. Hence, my main point is that being in a high- or low-inflation environment is the end result of major structural differences that make the *ceteris paribus* principle behind the natural experiment approach very difficult to be applied in this case.

This comment is not just limited to Latin American countries. Table 1 reports mean values and statistical significance on the mean difference for a number of variables describing institutional and regulatory characteristics across 109 countries. I also focus specifically on variables measuring characteristics of the banking industry, as Boyd and Champ devote a special interest to the impact of inflation on banks' pricing strategies and overall profitability. The data sources are Demirguc-Kunt and Levine (2001) and Barth, Caprio and Levine (2004). High inflation countries are defined as those in the top quartile of the distribution and low-inflation ones as those in the bottom quartile.

As the numbers indicate, high-inflation countries score systematically worse along all dimensions. An overall weaker institutional environment is highlighted by an inferior legal structure, more pervasive corruption, heavier bureaucratic burden, poorer contract enforceability, and less protection of property rights.

High-inflation countries are also characterized by much larger obstacles encountered while attempting to open a business. Higher regulatory costs of entry overall are then also reflected in worst entry conditions in banking, as indicated by higher rejection rates of entry applications. But the constraints to the banking industry are not only prevalent at entry. Incumbent banks operate in significantly more restricted environments and in conditions of overall worse efficiency. Perhaps complementary to

this is the much higher fraction of banks that are government owned. Finally, banks in high-inflation environments operate in conditions of poorer market discipline.

Hence, the data in the Table is indicative of fundamental differences between high- and low-inflation countries. This argument, however, is not just underscoring a problem of omitted variables. Simply controlling for institutional and regulatory differences, and for firm- or industry-specific characteristics, would not solve the fundamental problem that inflation is not just another structural variable to be added in a reduced form equation, but itself resulting from a number of economic factors. For example, and focusing on banks, Boyd and Champ reviews empirical work and add some of their own showing that banks' pricing and overall performance is significantly affected moving from a low- to a high-inflation environment. But as the casual evidence in Table 1 indicates, the conditions of entry in the industry are different, so are important determinants of a bank's cost function, and the ownership/managerial characteristics of incumbents, as indicated by the significantly different proportion of government owned banks. These are all first-order determinants of the equilibrium dynamics within the industry, hence of the prevailing pricing and performance measures. I am very comfortable with the predictions of the theoretical models on the impact of inflation, but I am just not sure that this is what we are picking up with the current empirical methodology.

A more convincing approach, in my opinion, would be to focus, for instance, on low-inflation economies and look at the impact of recognizable, exogenous inflationary shocks, such as a shift of the aggregate supply. In such better controlled environment it

would then be possible to analyze, say, individual banks' propensity to lend, or banks' lending standards, or firms' demand for external finance, in response to increasing (or decreasing) prices. In sum, more direct testing of the theoretical implications of the models that Boyd and Champ have reviewed, and to be done in a more controlled environment.

In conclusions, Boyd and Champ should be praised for providing such a systematic compilation and analysis of the theory behind inflation and the real economy. In that respect, they have achieved their claimed main objective mentioned in the opening, that of raising mutual awareness between theorists and applied scholars. I suspect the last group is bound to benefit the most from the potential exchange.

References

- Barth, James R., Gerard Caprio Jr., and Ross Levine, 2004, Bank regulation and supervision: what works best? *Journal of Financial Intermediation*, 13, 205–248.
- Bernanke, Ben, 2005, Inflation in Latina America – A new era?, *BIS Review*, 8, 1-7.
- Demirgüç-Kunt, Asli and Vojislav Maksimovic, 1998, Law, finance, and firm growth, *Journal of Finance* 56, 2107–2137.
- Demirgüç-Kunt, Asli and Ross Levine (eds.), 2001, *Financial Structure and Economic Growth*, The MIT Press, Cambridge, MA.
- King, Robert, and Ross Levine, 1993a, Finance and growth: Schumpeter might be right, *Quarterly Journal of Economics* 108, 717–737.
- King, Robert, and Ross Levine, 1993b, Finance, entrepreneurship and growth, *Journal of Monetary Economics*, 32, 513-542.
- Rajan, Raghuram G., and Luigi Zingales, 1998, Financial dependence and growth, *American Economic Review* 88, 559–586.

Table 1

	Low-Inflation countries	High-Inflation countries	
Variable	Mean	Mean	Mean difference statistical significance
Rule of law	5.25	2.66	***
Contract enforceability	3.05	1.95	***
Corruption	4.32	2.87	***
Bureaucracy	4.52	2.67	***
Property rights	4.37	3.07	***
Entry regulation	3.48	2.67	***
Bank entry denied	0.09	0.20	***
Domestic bank entry denied	0.12	0.10	
Foreign bank entry denied	0.03	0.19	***
Bank activity restrictions	8.37	11.00	**
Bank overhead costs	0.02	0.07	***
Non performing loans	0.06	0.07	***
Net interest margins	0.02	0.07	***
Bank government ownership	0.11	0.26	***
Private monitoring	6.68	5.79	**

Rule of law is an indicator measuring the law and order tradition of a country. It ranges from 10, strong law and order tradition, to 1, weak law and order tradition. Contract enforceability measures the relative degree to which contractual agreements are honored and complications presented by language and mentality differences. Scored 0-4, with higher scores for superior quality. Corruption is an indicator that measures the level of corruption with the scale from 0 (high level of corruption) to 10 (low level). Bureaucracy is an indicator from 0 to 6. High scores indicate autonomy from political pressures and strengths and expertise to govern without drastic changes in policy or interruptions in government services; also existence of an established mechanism for recruiting and training. Property rights is an indicator from 1 to 5. The more protection of private property receives the higher the score. Entry regulation rates regulation policies related to opening and keeping open a business. The scale is from 0 to 5, with higher scores meaning that regulations are straightforward and applied uniformly to all businesses and that regulations are less of a burden to business. Bank entry denied is the fraction of bank entry applications that were denied. Domestic bank entry denied is the fraction of entry applications from domestic banks that were denied. Foreign bank entry denied is the fraction of entry applications from foreign banks that were denied. Overhead costs, nonperforming loans are shares of total bank assets. Net interest margins is net interest revenue divided by total bank assets. Bank government ownership is the share of publicly owned bank assets as share of total bank assets. Private monitoring is an aggregator of indexes indicating the degree of private oversight of banking firms. A higher score implies higher degree of private oversight. Source: Demirguc-Kunt and Levine (2001) and Barth, Caprio and Levine (2004).

*** indicates mean difference is significant at the 1% level. ** indicates mean difference is significant at the 5% level.