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Financial Globalization and Monetary Policy Discipline: A Survey with New Evidence From Financial Remoteness

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Abstract

The literature appears to have reached a consensus that financial globalization has had a "disciplining effect" on monetary policy, as it has reduced the returns from – and hence the temptation for – using monetary policy to stabilize output. As a result, monetary policy over recent years has placed more emphasis on stabilizing inflation, resulting in reduced inflation and greater output stability. However, this consensus has not been accompanied by convincing empirical evidence that such a relationship exists. One reason is likely to be that *de facto* measures of financial globalization are endogenous, and that instruments for financial globalization are elusive. In this paper, I introduce a new instrument, financial remoteness, as a plausibly exogenous instrument for financial openness. I examine the relationship between financial globalization and median inflation levels over an 11 year cross-section from 1994 through 2004, as well as a panel of 5-year median inflation levels between 1980 and 2004. The results confirm a negative relationship between median inflation and financial globalization in the base specification, but this relationship is sensitive to the inclusion of conditioning variables or country fixed effects, precluding any strong inferences.

JEL classification: E5, E52, E58, F21, F36, F4

Key words: monetary policy, policy discipline, inflation, globalization, financial globalization

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1 Introduction

This paper offers a contribution to the literature on globalization and macroeconomic performance. To keep the analysis tractable, I restrict my attention to the potential impact of financial globalization, loosely defined as the phenomenon of increased international cross-holdings of assets and its implied increased international asset substitutability. This phenomenon has led to a reduction, but in no sense an elimination of, the so-called "home bias" effect, whereby economic agents are found to hold a disproportionate share of their asset portfolios in assets originating from their home country. The relationship between financial integration and macroeconomic volatility is ambiguous in theory. Volatility may increase in the wake of financial globalization, as agents may rationally respond to enhanced risk-sharing opportunities by increasing the specialization of their home country production bundles [e.g. Kalemli-Ozcan, Sørensen, and Yosha (2003)], or it may decline, as in Caballero and Krishnamurthy (2001), where firms in countries with less-developed domestic financial sectors may enjoy greater capacity to smooth investment.

In a series of recent papers, a group of researchers at the International Monetary Fund have documented the fragility of the evidence of macroeconomic benefits of financial integration. Kose, Prasad, and Terrones (2003a) demonstrate that the ratio of consumption volatility to income increased during the 1990s for more financially-integrated economies. Kose, Prasad, and Terrones (2007) demonstrate that financial globalization has led to little increase risk-sharing among emerging market economies, even among those that are relatively more financially integrated with the rest of the world. Similarly, Kose, Prasad, and Terrones (2003b) demonstrate that consumption correlations across countries did not increase in the 1990s, the period corresponding to rapid increases in financial globalization, as would have been expected. Prasad, Rogoff, Wei, and Kose (2003) also fail to find a statistically significant relationship between financial integration and growth or a negative relationship between financial integration and consumption volatility. Indeed, they find that in the short run, consumption volatility is positively related to levels of financial integration.

Their findings have been corroborated in a number of independent studies. Buch, Doepke, and Pierdzioch (2005) find no systematic relationship between financial integration and output volatility. Bekaert, Harvey, and Lundblad (2006) do find that financial liberalization is associated with reduced consumption volatility, but other studies have obtained different results, as in Fujiki and Terada-Haiwara (2007), who demonstrate that increased financial integration is not measurably associated with reduced consumption volatility in East Asian economies.

Stronger results for financial integration and macroeconomic volatility have recently been found by Rose and Spiegel (2008), using financial remoteness, measured as the natural logarithm of great-circle distance to the closest major financial center (London, New York, or Tokyo) as an indicator of financial integration. Relative to other measures of financial integration in the literature, this measure has the advantage of plausible exogeneity, particularly for their sub-sample that excludes large countries, as small countries are unlikely to have had much influence on the geographic allocation of world financial centers. Using this measure, Rose and Spiegel (2008) find an economically significant relationship between financial remoteness and macroeconomic volatility that is positive and usually statistically significant.

This paper applies the financial remoteness variable to the question of financial integration and the quality of monetary policy outcomes. Obstfeld (1998) and Rogoff (2004) have argued that increased international capital mobility could have a "disciplining effect" on monetary policy. Increased international asset substitutability reduces the effectiveness of using inflation as a source of government revenues. Holding all else equal, this should reduce the inflationary pressure on central banks and result in lower average levels of inflation.

In concentrating on financial globalization, there are a number of other components of globalization in a broad sense that may independently impact monetary policy that I ignore. For example, Rogoff (2004) argues that increased competition worldwide has increased the slope of the Philips curve, reducing the gains from, and hence pressure for, loose monetary policy. Alternatively, some

have argued [e.g. Borio and Filardo (2007)] that increased goods tradability has left global, rather than domestic capacity the relevant metric for measuring the output gap.[1]

Moreover, the rate of inflation is not directly tied to welfare, and therefore represents an intermediate policy goal. For example, price stability is typically valued because it has been shown to be associated superior overall economic performance. As such, one might wonder why it would not be preferable to examine the relationship between financial openness and long-term economic growth directly. One answer may be that it appears to be difficult to detect the growth benefits of financial globalization, which may only appear over long time periods and may even be difficult to detect in panels over long time periods in specifications that condition for institutional and other domestic characteristics whose values may be a function of financial openness and leave little explanatory power to the financial openness variable itself [Kose, Prasad, Rogoff, and Wei (2006)].

Empirical evidence for the disciplining effect on financial openness on monetary policy is relatively limited. One notable exception is Tytell and Wei (2005), who examine the relationship between *de facto* financial openness and monetary and fiscal discipline. They find that financial openness is negatively related to average inflation, but has no measurable affect on the government budget deficit.

In examining the relationship between financial development and policy outcomes, causality is always in question. As an instrument, Tytell and Wei (2005) consider financial openness in neighboring countries in the same geographic region, weighted by distance from the country in question. They motivate using this instrument by noting that countries from some region of the world, such as Latin America, have a disproportionate amount of financial interaction with common countries, in this case the United States.[2]

[1]However, see Ihrig, Kamin, Lindner, and Marquez (2007) which questions the validity of the global capacity hypothesis based on the domestic consumer price level's lack of sensitivity to the foreign output gap.

[2]Tytell and Wei (2005) also move beyond a linear specification to allow for "threshold effects" in macroeconomic policies using a transition matrix approach. They find a significantly negative relationship between financial integration and the probability of transitioning from a low to a moderate inflation regime.

This paper uses the same *de facto* measure of financial integration as that used in Tytell and Wei (2005), the sum of international capital outflows and inflows as a share of GDP using the Lane and Milesi-Ferretti (2001) data set as the measure of capital flows. Kose, Prasad, Rogoff, and Wei (2006) argue that this provides the best indicator of financial integration, as gross flows are less volatile than net flows and are particularly appropriate as measures of risk sharing. However, the analysis here differs from that in Tytell and Wei (2005) in that it makes use of financial remoteness as a plausibly exogenous instrument for the level of financial integration.[3] This instrument is not time-varying, as the Tytell and Wei (2005) instrument is, but as we argue in Rose and Spiegel (2008), it has a strong claim to plausible exogeneity. It seems possible that some shock, such as a large change in the price of oil, could have common implications for capital flows within a region, as well as macroeconomic policies within that region, depending on whether the region is a net oil importer or exporter, that could be problematic for the instrument used in Tytell and Wei (2005). Still, as one instrument is time-varying while the other is not, I view the analysis here to be complementary to that done in their paper.

In addition, I introduce some conditioning variables not considered in Tytell and Wei (2005). These latter extensions appear to have substantive implications. I largely confirm a negative relationship between *de facto* financial openness and inflation for a univariate specification with or without instrumenting, but these findings do not appear to be robust to conditioning for country wealth or simply for introducing country fixed effects in a non-instrumented specification.

In the end, then, the results with this new instrument appear to be similar to much of the existing literature: While there is clearly a negative univariate relationship between financial integration and monetary stability, and indeed one that appears to stand up to instrumenting to address endogeneity issues, the importance of this relationship is very sensitive to sample specification. In particular, both financial integration and monetary stability appear to be characteristics

[3] As a robustness check, I also follow Rose and Spiegel (2008) and consider financial remoteness as a possible indicator of financial integration itself, with similar results.

of well-functioning economies, but so are a myriad of other factors examined in the literature, such as the level of development of the domestic financial sector, the quality of institutions, or indeed, simply an economy's level of GDP per capita. The prospects of ever isolating the role of financial globalization empirically do not seem promising.

The remainder of this paper is divided into six sections. Section 2 provides a brief review of the marked recent increase in financial globalization. Section 3 discusses normative implications of financial globalization for monetary policy. Section 4 reviews monetary policy performance under financial globalization. Section 5 introduces the new empirical evidence using financial remoteness as an instrument. Section 6 concludes.

2 Scope of financial globalization

I follow the literature [e.g. Lane and Milesi-Ferretti (2001) and Prasad, Rogoff, Wei, and Kose (2003)] in defining *de facto* financial openness as gross international asset positions as a share of GDP, measured as the sum of stocks of external assets and liabilities of FDI and portfolio investmentas a share of GDP. This is the measure advocated in (Kose, Prasad, Rogoff, and Wei, 2006).

As is well-documented, financial globalization according to this measure took off in both industrial and emerging market countries in the latter half of the 1990s [e.g. Lane and Milesi-Ferretti (2003)]. There are a number of reasons for this dramatic upturn in international capital movements: Technological progress has reduced the cost of acquiring and managing holdings of foreign assets, and thereby increased investors' demand for internationally diversified portolios. In addition, innovations in finance have increased the capacity for hedging investment positions, leading to a proliferation of available international investment vehicles.

These flows have coincided with a large buildup of net surplus positions by emerging market

economies, and, in particular, by emerging Asian and commodity-producing nations. Current account surpluses of emerging Asian nations are now at levels comparable to those that followed the Asian financial crisis. As of the current year, overall Asian holdings of foreign exchange reserves excluding gold reached close to 3.3 trillion dollars. These increased capital flows have had a number of important impacts on the international economy. In particular, the emergence of emerging market economies as net creditors has allowed some developed economies, notably the United States, to finance large current account imbalances at relatively favorable rates.

This pattern of capital flows, with developed economies being net borrowers from emerging economies, is generally considered to be nonstandard for a number of reasons: First, standard theory suggests that capital scarcity in developing countries leaves their marginal products of capital higher than the developed countries as a group. This implies that holding all else equal, investors should find more attractive opportunities in emerging market economies than in their developed counterparts. Second, at least for the rapidly growing developing countries, higher expected future incomes provide an incentive to run current account deficits now to smooth consumption. Instead, paradoxically, the largest net surpluses we observe in the data come from some of the most rapidly growing countries, such as China.

Much work recently has gone into explaining this paradoxical investment pattern. These include theories about differences in the quality of financial intermediation between developed and emerging market economies, where portfolio capital moves from South to north, to return as foreign direct investment [e.g. Mendoza, Quadrini, and Rios-rull (2007)].

Alternatively, the so-called Bretton Woods II School [e.g. Dooley, Folkerts-Landau, and Garber (2004)] argue that net outflows from China serve as collateral against future opportunistic behavior. While these arguments are interesting, they appear to run into problems when confronted by the data. In particular, Figure 1 demonstrates that the pattern of buildup in Chinese reserves, which represents the majority of the net imbalances run by the United States with the Asian region, comes

much later than its buildup of foreign direct investment. As a result, it would appear difficult to motivate this buildup by the desire to encourage inward foreign direct investment.

Another explanation is associated with Federal Reserve Chairman Bernanke (2005), who argued that poor investment opportunities in Asia have resulted in a global "savings glut," that has freed up capital for lending to developed economies. This argument probably accounts for some of the imbalances we observed, but low public and private savings rates in the developed economies, particularly the United States, most likely also have played a role.

3 Monetary policy in a financially-globalized environment

The increased volume of trade in financial assets has had a significant impact on international borrowing terms. Spreads on emerging market bonds have decreased markedly over time, with the EMBI index yield falling from over 16% in 1998 to just over 6% in 2006 [Spiegel (2007)]. While this decline reflects a benign decrease in the cost of borrowing by emerging market economies, it also reflects the fact that debt obligations across countries are being treated as more substitutable than they have been in the past. This convergence in yield curves has been accompanied by convergence in other types of asset returns. For example, convergence in cross-country equity returns has also been documented [e.g. Ferguson (2005) and Rogoff (2006)].

What does this convergence imply for monetary policy? If assets are close substitutes worldwide, domestic interest rates are likely to be influenced by global factors. A "savings glut" in Asia can play a role in reducing real interest rates in the United States. In this type of environment, it is likely to be the case that longer-term interest rates are less sensitive to transitory movements in the Federal Funds rate, the interest rate targeted by the United States Federal Reserve, leaving the impression that financial globalization has left interest rates less sensitive to monetary policy than in the past.

Does this mean that monetary policy loses its effectiveness under financial globalization? Some have argued that that is the case, as in Rogoff (2006), which claims that in the wake of increased financial globalization even the largest central banks " ... have less direct impact on medium and long-term interest rates than might once have been the case."

In a recent paper, Woodford (2007) examines the implications of increased international financial integration for the monetary transmission mechanism in a simple version of the Clarida, Gali, and Gertler (2002) model, in which real interest rates are equal across countries. He demonstrates that in the special (but by no means extreme) case of unitary elasticity of substitution of domestic and foreign goods, the degree of financial openness has no impact on domestic aggregate demand for a given monetary policy.[4] This raises the possibility that the impact of changes in openness need not be large. Moreover, Woodford demonstrates that in an environment of equalized real interest rates it is still possible for monetary policy to control both nominal expenditure and inflation. In contrast, foreign monetary policy can only impact domestic demand and inflation through its impact on foreign output levels. The conclusion is therefore that even under financial globalation, standard theory suggests that the monetary authority should retain the ability to control the domestic price level.

Moreover, as noted by Rogoff (2004), the fact that an individual central bank has lost some of its short-term influence over real interest rates does not imply that central banks as a group have lost the ability to act in concert and influence rates over the short-term. Central banks acting in concert, such as the recent move by a number of banks to inject liquidity into the financial system, can still have a substantial impact. To the extent that countries in central banks in Asia as well as the oil-exporting countries target the dollar in their monetary policies, the impact of policy actions by the Federal Reserve will also be amplified [Rogoff (2006)].

Finally, while financial globalization raises opportunities for emerging market economies to

[4]Woodford attributes original discovery of this result under unitary elasticity of substitution to Cole and Obstfeld (1991).

acquire capital at more favorable interest rates, it also brings new challenges to these economies. In particular, globalization raises the possibility of exacerbated exchange rate volatility, which can be a source of output variability; that is, emerging economies may suffer terms of trade shocks from real exchange rate changes when nominal exchange rate movements are not passed through to changes in domestic prices. Exchange rate depreciations can also lead to inflationary pressure through increased import prices.

Others, such as Obstfeld (1998) and Tytell and Wei (2005) have stressed the potential disciplining effect that increased international capital mobility could have on monetary policy. Increased international asset substitutability reduces the effectiveness of using inflation as a source of government revenues. Holding all else equal, this should reduce the inflationary pressure on central banks and result in lower average levels of inflation. Kose, Prasad, Rogoff, and Wei (2006) argue that superior monetary policies is one of the primary "collateral benefits" associated with financial integration. This disciplining effect has been recently noted in a number of speeches by monetary policy makers [e.g. (Ferguson, 2005) and Kroszner (2007)].

The discipline effect also applies to the overall stability of the monetary policy regime. If anything, it would appear to be the case that globalization raises the sensitivity of prices and inflation to changes in the monetary policy regime. The reason for this heightened sensitivity stems from the increased substitutability of assets internationally. With increased asset substitutability, global investors can avoid financial markets with excessive exposure to currency risk or the risk of the imposition of capital account restrictions, as they did to Malaysia subsequent to its imposition of capital controls following the 1997 crisis.

Difficulties for monetary policy raised by financial globalization have also been noted. Bernanke (2007) notes that financial globalization may make analysis of financial and economic conditions more complex, arguing that increased foreign demand for U.S. assets had contributed to recent inversions of the yield curve. Kohn (2008) acknowledges that asset price determination is more

dependent on worldwide financial conditions in the wake of financial globalization, reducing the correlation between the federal funds rate, which is directly controlled by the Federal Reserve, and longer-term Treasury bills.

Financial globalization also has implications for the desirability of monetary policy coordination. Sutherland (2004) demonstrates that the welfare gains from monetary policy coordination increase with increased financial integration. The potential benefits of coordination are also heightened by the ability of central banks acting in concert to overcome some of the diminished traction between long-term rates and the federal funds rate discussed above. However Taylor (2008) argues that even in under financial globalization the benefits from policy coordination are still likely to be second order relative to to a central bank acting to control its domestic inflation rate.

Increased exposure to global shocks under financial integration may also lead to greater susceptibility to financial crises. As many emerging market economies continue to have liabilities denominated in dollars, exchange rate depreciations can lead to "currency mismatch" issues, as exchange rate movements raise the relative value of liabilities and damage the nation's balance sheet as a whole.

As such, counter to the "discipline effect" noted above, some believe that financial globalization hinders the ability of emerging market central banks to pursue price stability, or even formal inflation targets, as doing so leaves them open to exchange rate volatility. The intuition behind this concern is the so-called "impossible trinity," which notes that a country cannot simultaneously pursue price and exchange rate targets while maintaining open capital accounts. However, recent studies, such as Rose (2007) have found that countries that target inflation experience no more exchange rate volatility on average than do countries that do not target inflation.

The increased prevalence of global shocks may also make it more difficult for emerging market economies to conduct domestic monetary policy, as increases in the difficulty of assessing the value of the domestic output gap may be more severe in these types of economies, as they often find it

more difficult to assess domestic economic conditions than their industrial counterparts [Wagner (2004)].

There are also concerns that financial globalization may be more disruptive in emerging market economies because of the relative lack of development of their domestic financial sectors. For example, Levchenko (2004) demonstrates that opening up to international markets can actually increase consumption volatility if domestic financial markets are relatively undeveloped and agents within the economy have heterogeneous access to external financial markets. The reason is that risk-sharing within the domestic economy can deteriorate if a subset of domestic agents face increased external risk-sharing opportunities not available to all.

4 Monetary policy responses to financial globalization

The discipline hypothesis contends that financial globalization reduces the optimal reliance on the inflation tax, as investors can more easily flee a currency than in the past. It also reduces the optimal intensity of optimal output stabilization, as the increased substitutability of assets internationally increases the relative desirability of targeting inflation.

Recent experience concerning monetary policy appears consistent with this hypothesis: The additional discipline placed on monetary authorities from enhanced financial integration has led to advances globally in monetary policy. Countries are paying more attention to targeting the inflation rate, formally or informally, as their policy goal. Indeed, formal inflation targeting is now a common policy. As reported by Rose (2007), 14 of the 30 OECD countries now formally target inflation, while the twelve countries in the European Monetary Union have an inflation target as one of their policy goals, and the United States holds the pursuit of "price stability" as one of its dual monetary policy targets. Moreover, inflation targeting has been formally adopted by 10 emerging market economies with over 750 billion in population. Overall, formal inflation targeting

is practiced in countries representing over a quarter of the world economy.

Inflation targeting regimes have also been shown to be durable. The first explicitly formal inflation targeter, New Zealand, adopted its regime 17 years ago. The durability of inflation targeting regimes also compares favorably to that of exchange rate pegs. Rose (2007) finds that there is only a 3 in 10 probability of an exchange rate regime lasting more than 8 years. Over the history of inflation targeting, only Finland and Spain have left inflation targeting regimes, and in their case they left to join the EMU, which of course has an inflation target as one of its objectives.

Inflation targeting regimes also tend to exhibit capital account openness. With monetary policy concentrated on fixing the price level, most inflation targeters have abandoned conflicting exchange rate targets and allowed free international capital movements. This has on some occasions led to increased exchange rate volatility, but on the whole observed capital movements have not been as disruptive as observed speculative attacks on pegged exchange rate regimes.

The increased focus on price stability has also not been limited to formal inflation targeting regimes. Inflation rates in emerging market economies have declined dramatically since ten years ago. As shown in Figure 2, average inflation rates for a representative group of emerging market economies in 1998 stood at 16% higher than those prevailing in the industrial countries. By 2006, that gap had been reduced to 6%, or just 4% above average levels in industrial countries. I should also note that maintaining the industrial country average at around 2% over this period was also an achievement attributable to countries' paying greater attention to focusing monetary policy on maintaining price stability.

The variability of inflation has also declined markedly over this period. This is relevant for a number of reasons: First, one might suspect that a few outlier countries, such as Brazil in the case of the emerging market economies and Japan in the case of the industrial countries, are by themselves driving the decline in observed average inflation rates. This figure demonstrates that instead inflation rates have converged across the board. Second, most economic theory would

suggest that it is the variability of inflation, rather than its overall rate, that is important in determining output volatility, so we should be concerned with the variability of inflation rather than its level. In practice, high inflation tends to coincide with variable inflation, which is why keeping the rate of inflation under control is usually sufficient to control its variability as well. The previous ten years have been no exception to this rule. As average inflation rates fell worldwide, the variability of inflation has fallen as well.

The renewed focus on controlling inflation and inflation expectations has led to improved conditions in capital markets, neglecting the recent short-term volatility that has occurred. Long-term yields have decreased globally and the slopes of yield curves throughout the world have flattened considerably. These lowered reduced curves worldwide have also allowed emerging market economies to issue longer-term debt at favorable terms. Firms in emerging market economies have moved from bank borrowing in external so-called "hard" currencies towards external borrowing in bonds denominated in their domestic currencies with relatively long maturities and fixed interest rates. Korea and Thailand introduced 10-year domestic-currency bonds in the 1990s, while by the year 2000, Brazil, Chile, Colombia, Indonesia, Mexico and Russia had also issued domestic currency bonds [(Kroszner, 2007)]. As these instruments have become more standard, their yields have decreased.

This shift has accomplished a number of desirable achievements: First, currency risk has been shifted from borrower to lender. Second, the fixed interest rates have shifted interest rate risk to creditors as well. Third, the longer maturities reduce the risk of disruptive "sudden stops" in credit that have resulted in costly failures in the past. Fourth, government issues in local currency have helped encourage the development of local bond markets by providing "benchmark" yield curves for pricing private debt.

Finally, when defaults do take place, contagion is limited by the wide dispersion of creditors. One can contrast the implications of the immense recent Argentine default to outcomes in Latin

America in the early 1980s, when the balance sheets of a number of prominent global commercial banks were devastated by losses from default. However, the large number of creditors may also leave it leave it more difficult to pursue renegotiation with problem debtors.

To summarize, financial globalization has decreased the relative desirability of using monetary policy to stabilize output in favor of increasing attention towards the pursuit of price stability. In response, monetary policy makers have shifted their emphasis towards achieving price stability, with many formally adopting inflation targeting regimes. The response from financial markets has been relatively benign, with lower and less variable inflation and better borrowing terms for emerging market economies. Notably, this pattern has not been markedly reversed under the recent sub-prime financial market turmoil.

5 Evidence on globalization and monetary policy

5.1 Specification

In this section, I examine the evidence on financial integration and monetary policy outcomes, measured as median inflation rates over a variety of periods. As in much of the literature, the analysis is not structural and measurement of a number of key variables is almost certainly done with error. As a result, I examine a reduced-form specification of the determinants of inflation that includes my variable of interest and then subject the analysis to a battery of robustness tests.

As discussed above, the instrument introduced in this paper, a measure of financial remoteness, is time-invariant and hence not conducive to use in a panel. As a result, I examine both cross-sectional and panel results depending on whether the geography-based instrument is used.

Data for financial remoteness and most of the conditioning variables are taken from Rose and Spiegel (2008). As in that paper, the cross section data primarily comes from 11-year period averages from 1994 through 2004 inclusive, while panel data consists of 5-year averages from 1980

through 2004 inclusive. Exceptions include inflation data which comes from the IMF International Financial Statistics, and measures of financial openness, which are taken from Lane and Milesi-Ferretti (2007).

The default specification for the cross-sectional analysis is as follows

$$log(\pi_i) = \alpha + \beta_1 FinOpen_i + \beta_2 TrdOpen_i + \beta_3 Gov_i + \beta_4 Pol_i + \beta_5 Pop_i + \epsilon_i, \quad (1)$$

where $log(\pi_i)$ represents the log of the absolute value of median inflation of country i over the 11-year period. $FinOpen_i$ represents our variable of interest, the level of financial integration. This variable is measured as the sum of stocks of external assets and liabilities of FDI and portfolio investment as a share of GDP,[5]

I include the following conditioning variables: $TrdOpen_i$ represents trade openness, measured as the average of the sum of exports plus imports as a share of GDP. I include this variable because countries that are open on their capital account are likely to be open on their trade account as well, so there is a danger that the variable of interest would actually be picking up the effect of trade openness if one did not condition for this characteristic. Gov_i represents government spending, measured as the average of government spending as a share of GDP. holding all else equal, one would expect a positive coefficient on government spending, as a nation's central bank may be induced to resort to the inflation tax to some degree with increases in government expenditures. Pol_i represents the average polity score, indicating the quality of domestic institutions,[6] One would probably expect a negative coefficient on this variable, as nations with superior domestic institutions should be less susceptible to timing-inconsistency-based inflationary biases. I control for country

[5]Unlike (Tytell and Wei, 2005), we do not include debt stock data in our openness measure. As discussed in their paper, either measurement method would be biased as coverage of debt volumes is not complete. In any event, our base specification yields results that are similar to theirs, suggesting that the results are insensitive to the inclusion or exclusion of debt flows in the financial openness measure.

[6]The measure is actually the "polity2" score, obtained from the Polity IV Project Data Set. For details see http://www.cidcm.umd.edu/polity.

size via Pop_i, which measures average population levels. It is unclear what sign one should expect on this variable. Finally, ϵ_i represents an error term assumed to be i.i.d.

I first test the above specification in a cross-section, with and without the financial remoteness instrument, $FinRem_i$, which is measured as the minimum distance from one of the major three international financial centers, London, New York, or Tokyo. Using this measure, Mauritius and South Africa are the most financially remote countries in our sample, while Belgium and the Netherlands are the least financially remote.[7] I then move to pooled and panel specifications of averages over 5-year periods from 1984 through 2004. I use panel specifications correcting for country fixed effects in the direct 5-year specifications without instrumenting, and also report results for pooled specifications with financial remoteness used as an instrument for financial integration. In the latter specification, I allow for error clustering by country. Heteroskedasticity-consistent standard errors are reported throughout.

Summary statistics for the 11-year cross-section sample are shown in Table 1. It can be seen that there are notable differences between high income countries and the rest of the sample. High income countries have median inflation rates that are substantially lower, 0.80 vs. 1.93, and much lower inflation volatility as well, 0.51 vs. 1.04. It can also be seen that higher income countries are more financially open and less financially remote. It can also be seen that correlations between both our measure of financial openness and our measure of financial remoteness and median inflation rates are relatively igh in absolute value, at -0.32 and 0.28 respectively.

5.2 Results

Results for the cross-section sample are shown in Table 2. Model 1 runs our base specification. It can be seen that the variable of interest, $FinOpen_i$, enters with its predicted negative sign at a

[7] As in Rose and Spiegel (2008), the United Kingdom, the United States, and Japan are dropped from the sample. I also drop Luxembourg, which is an outlier in the financial openness measure at over 10,000. The next highest value in the sample, Hong Kong, has a 508 score.

highly statistically significant level. Moreover, the coefficient point estimate suggests that a one standard deviation increase in financial integration, which would equal 74.89 in our sample, would result in a decrease in expected median log inflation of 0.45, an economically significant decline. Concerning the other conditioning variables, the only one that enters significantly is Pop_i, which enters with a negative coefficient, suggesting that inflation levels are lower on average in larger countries in our sample.

Model 2 introduces the conditioning variable $DomCrd_i$, which measures domestic credit held by domestic commercial banks as a share of GDP. This variable is introduced as an indicator of the level of development of the domestic banking sector. The intuition behind adding this variable is that international financial integration is likely to have a smaller impact on domestic macroeconomic performance the more developed is the domestic financial sector. It can be seen that the variable of interest is robust to the inclusion of this conditioning variable, as it continues to enter with its expected negative at statistically significant levels. However, the coefficient estimate drops by 50% relative to the base specification.

Concerning the other conditioning variables, the polity variable, Pol_i enters with a positive coefficient at a marginal 10% level of statistical significance, suggesting that democracy is associated with increased inflation in our cross-section. The $DomCrd_i$ variable is enters negatively, as expected, at a 1% confidence level.

Model 3 introduces a conditioning variable for country wealth, $GDPC01_i$, which measures GDP per capita in 2001. As was the case for the domestic credit variable, this variable also enters negatively and is highly statistically significant, suggesting that wealthier countries exhibit lower average inflation.[8]

[8]I also examined the implications of including an OECD dummy into the cross-section specifications. Unsurprisingly, this variable acted similarly to conditioning for per capita income. Its inclusion knocked out the $FinOpen_{i,t}$ variable when it was introduced on its own. When introduced in the presence of the $GDPC01$ variable, these two variables tended to cancel each other out, with one entering positively and one negatively, which is not surprising as we would expect them to be quite collinear. These results were submitted to the referee and are available from the author upon request.

It can be seen that the variable of interest, $FinOpen_i$, is not robust to the inclusion of this variable. The Pop_i and Pol_i again enter with their negative and positive signs at statistically significant levels.

Models 4 through 6 report results for instrumental variable estimation of the same specifications, using $FinRem_i$ as an instrument for $FinOpen_i$. The variable of interest continues to enter negatively at a statistically significant level in the base specification, Model 4, and is even larger in size. This suggests that the base results are robust to instrumenting for observed levels of financial integration. Moreover, the coefficient estimate on the variable of interest in the instrumented specification is close to triple the level obtained under OLS. However, Models 5 and 6 demonstrate that the financial openness variable is not robust to conditioning for either the level of development of the domestic financial sector or country wealth.

Table 3 reports the results from the pooled and panel 5-year sample. Model 1 reports the results of 5-year panel estimation with time and country fixed effects included.[9] Estimation is again done using robust standard errors and I also allow for error clustering by country. It can be seen that the financial openness variable is almost completely insignificant. Indeed, the only conditioning variable that enters at any standard significance level is the Pol_i, which again enters at a 10% confidence level, suggesting again that increases in democracy are also associated with increased inflation.[10]

Model 2 adds the $DomCrd_{i,t}$ conditioning variable, with similar results. The financial openness variable coefficient estimate is close to 0 and very insignificant, and the only variable that enters at any standard significance level is again the polity variable. Model 3 adds the conditioning variable for country wealth, $GDPC01_i$. As this variable is time-invariant, country fixed effects are dropped.

[9] Coefficient estimates for fixed effects are suppressed in the tables, but are available upon request from the author.

[10] The polity index is censored at a score of 10, and many of the most industrial countries, such as the G7 countries, earn a score of 10 through our sample. As such, this variable is not time-varying for these countries in panel estimation. As a robustness check, I ran the panel specification without the polity variable and obtained similar results. In particular, the coefficient estimate on $FinOpen_{i,t}$ is close to 0 and very insignificant.

It can be seen that the coefficient estimate on the financial openness variable remains close to 0 and is very insignificant. Concerning the conditioning variables, the Pol_i again enters with a positive sign at statistically significant levels, and the trade openness variable enters significantly with its expected negative sign. In addition, the GDP per capita variable is significantly negative, again suggesting that wealthier countries have lower median inflation levels.

Models 4 through 6 run the same instrumental variable specifications as in the previous table. Country fixed effects are dropped as the financial remoteness instrument is time-invariant, leaving this a pooled 5-year sample. I again allow for error clustering by country and report robust standard errors. The variable of interest, $FinOpen_{i,t}$, enters with its expected negative sign in Model 4 at a 5% significance level. However, Models 5 and 6 demonstrate that this result is not robust to conditioning for either the level of development of the domestic financial sector or cross-country differences in income per capita, as this variable is very insignificant in both of these alternative specifications.

Overall, our results confirm a negative relationship between financial openness and median inflation levels in our base specification. Moreover, this relationship appears to be robust to instrumenting for financial openness with our measure of financial remoteness, in the sense that the financial openness variable retains its significance under IV in both the cross-section and the panel exercises. However, the performance of the financial openness variable was shown to be sensitive to either adding variables to condition for cross-country differences in income or the sophistication of the domestic financial sector, or including country fixed effects in our panel specification. This raises the troubling possibility that financial openness may be just one of a number of features of low inflation countries, leaving it difficult to assess empirically which of the features are those that are crucial to achieving monetary stability.[11]

[11] As a robustness check, I added lagged values of inflation, $FinOpen_{i,t}$, and $TrdOpen_{i,t}$ to the specifications in Table 3. The results were largely robust to the inclusion of these variables. For the OLS specifications, the $FinOpen_{i,t}$ variable of interest remained insignificant, as did its lagged value. For the instrumented specifications, the results were actually somewhat stronger than those reported in the text, in the sense that the coefficient estimate on $FinOpen_{i,t}$

5.3 Robustness Checks

In this section, I move to examine the robustness of the results above. For each perturbation of the specifications or samples reported above, I consider four models: I run the base specification with and without instrumenting using the financial remoteness for the 11-year cross section and then run the panel 5-year sample with time and country fixed effects and then a pooled version of the 5-year sample without country fixed effects, but with instrumenting using the financial remoteness variable and allowing for error clustering by country. To save space, I only report the coefficient estimate on the variable of interest, $FinOpen_{i,t}$.

I first introduce a number of additional conditioning variables. First, I introduce a measure of *de jure* capital account openness. It can be seen that the financial openness variable enters at statistically significant levels with its expected negative sign for both specifications using the 11-year cross-section, and for the pooled IV specification. However, the variable is insignificant when country fixed effects are included (Model 3). Second, I introduce a measure of "trade remoteness," measured as distance from the rest of the world weighted by GDP, and achieve similar results. The financial openness variable continues to enter negatively at statistically significant levels for models 1, 2, and 4, but enters positively at 5% statistical significance with fixed effects included in Model 3.

I next report the base IV specifications with an alternative instrument, namely proximity to the nearest offshore financial center. In a recent paper, Rose and Spiegel (2007) demonstrate that proximity to offshore financial centers have an influence on domestic financial sectors, suggesting that distance from the nearest offshore financial center is an alternative measure of international financial remoteness. The financial openness variable fails to enter significantly in either IV specification, although it does obtain its expected negative coefficient estimate. However, this alternative

continued to enter negatively at statistically significant levels in Model 4, but was also significantly negative in Model 5. The $FinOpen_{i,t}$ variable again became insignificant after conditioning for GDP per capita. These results were submitted to the referee and are also available from the author upon request.

instrument has a much lower correlation with the instrumented variable in our sample (-0.12). As such, its failure to enter significantly sheds little light on the importance of the financial openness variable for inflation.

I next examine the implications of a number of changes in the sample. First I exclude "rich" countries, proxied in our sample as the set of OECD members. It can be seen that the financial openness variable fails to achieve statistical significance for any of the four specifications. Next, I exclude "very big" countries, defined as those exceeding populations of 150 million. In this case, the results are similar to those in the base specifications: The financial openness variable enters significantly with its expected negative coefficient using the 11 year sample, with or without instrumenting. The variable also enters significantly with its expected sign for the pooled 5-year sample using financial remoteness as an instrument for financial openness (Model 4). However, it fails to enter significantly for the panel specification with fixed effects included (Model 3).

Similar results are obtained when very small countries, defined as those with populations fewer than 10 million, are excluded. The financial openness variable enters negatively using the 11-year sample, although it marginally misses 10% significance under the IV specification. With the five-year panel and pooled-IV samples, the variable of interest is again insignificant. However, the variable is close to 10% significance in the instrumented pooled specification.

Lastly, I drop some geographic groups. The cross-sectional results obtained in the base specification are robust to dropping Sub-Saharan Africa, although the variable of interest only enters in the IV specification at 10% significance. Similarly, dropping countries from Latin America and the Caribbean does not markedly affect the performance of our variable of interest, as financial openness continues to enter negatively at statistically significant levels in our 11-year cross-section, or in the instrumented pooled sample, but is insignificant in our panel specification with country fixed effects included.

Taking Table 4 as a whole, it appears that the base specification appears to be relatively robust

to these additional conditioning variables or changes in samples for the 11-year cross-section, with the lone exception being the exclusion of the rich countries. The pooled IV specification (Model 4) also appears to be relatively robust to specification or sample changes. However, the financial openness variable is almost universally insignificant when country fixed effects are added, and indeed usually obtains an incorrect positive point estimate. Overall, these results echo the sensitivity of the results above to conditioning for levels of GDP per capita, and raises the concern that *de facto* measures of financial openness empirically are too closely linked to country income levels or other cross-country discrepancies to isolate their role in such a specification.

6 Conclusion

The relatively large literature reviewed above suggests that financial openness, while increasing the exposure of nations to foreign shocks, has provided an additional source of market discipline and has encouraged central banks to place greater emphasis on stabilizing prices relative to output. This change in policy appears to have contributed to the benign conditions observed in financial markets over the past fifteen years, as nations have experienced decreased output volatility, lower inflation rates, and reduced borrowing costs worldwide.

While neither the positive aggregate performance of the recent past nor the explosion of gross holdings of international assets over the same period can be denied, it must be granted that it has proven to be challenging to establish a link between financial globalization and macroeconomic stability. Sadly, it appears that establishing a robust connection between financial openness and monetary policy will be challenging as well.

This paper examines the relationship between inflation levels and financial globalization in both a cross-country cross-section and a panel sample, and introduces financial remoteness as a plausibly exogenous instrument for financial openness. By and large, I confirm the findings in the

previous literature of a negative relationship between financial openness and median inflation levels in my base specification. Moreover, these basic results appear to be largely robust to instrumenting for financial openness using the financial remoteness variable. However, financial openness almost universally became insignificant in the presence of conditioning for country fixed effects in panel specifications, or for cross-country discrepancies in national income, either by explicitly introducing per capita income as an additional conditioning variable, or by excluding the set of OECD countries from our sample.

It therefore appears to be the case that financial openness is one of a number of characteristics of countries that exhibit monetary policy stability, and that it would be difficult to isolate the "crucial" policy characteristic in this framework. Indeed Kose, Prasad, Rogoff, and Wei (2006) recently concluded that the primary benefits of financial globalization may precisely be "collateral benefits," such as the possibility of enhanced monetary policy outcomes examined here, that may resist empirical detection in cross-country studies, or even in medium-length panels, such as those examined above.

Finally, it should be noted that the recent "sub-prime" financial turmoil warrants reassessment of the relatively benign characterization of the impact of financial globalization in the literature reviewed above. One of the primary causes of the rapid increase in financial globalization over the past years has been the innovations in financial vehicles for hedging global investment positions. The recent sub-prime crisis has highlighted the downside of this increased sophistication: As asset bundles became more diversified, they also tended to become more opaque, and it became more difficult to assess underlying asset quality of investment positions, and indeed ultimate exposure positions as well.

While the implications of the current crisis are beyond the scope of this survey, the crisis does raise the question of whether losses incurred from investment vehicles increasingly used in the globalization period will lead investors to avoid these types of vehicles in the future, and

in the process reduce the pace of financial globalization. At this point, the implications of the current crisis is uncertain, but it seems unlikely that the pace of financial globalization will quickly diminish. Increased internationalization of investment portfolios is still associated with reduced overall portfolio risk, holding all else equal, as investors worldwide still appear to be excessively exposed to home assets. However, it seems likely that investors will be more hesitant to hold as opaque bundles of investment vehicles in the future.

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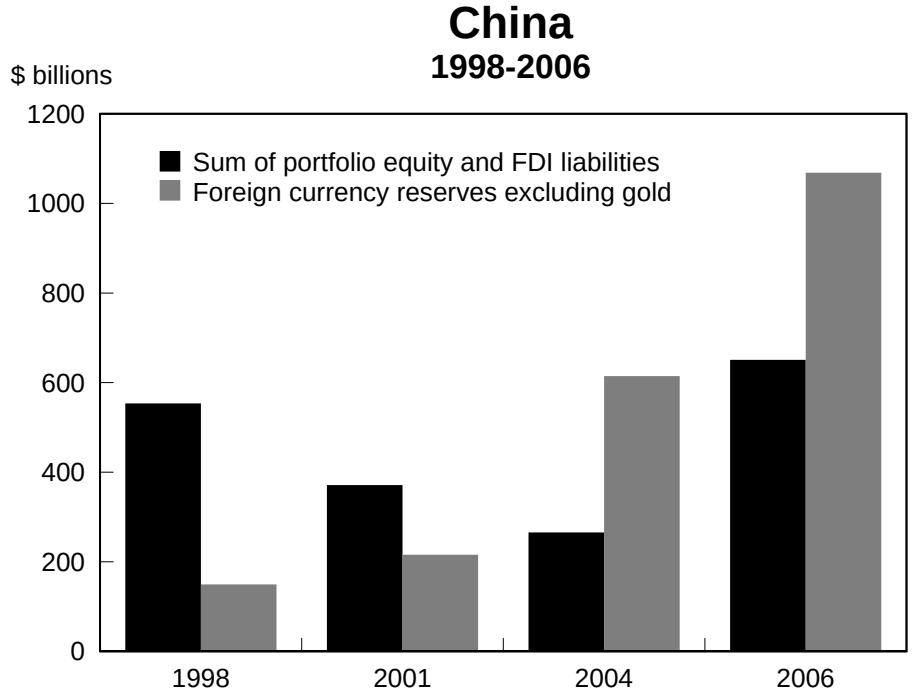
Table 1: Summary Statistics

	No. of Countries	$log(\pi)$	$FinOpen$	$FinRem$	$\rho_{\pi,FinOpen}$	$\rho_{\pi,FinRem}$
Full Sample	127	1.67	53.59	7.71	-0.32	0.28
		[1.06]	[74.89]	[0.65]		
High Income Countries	29	0.80	130.11	7.07	-0.30	0.10
		[0.51]	[125.96]	[0.83]		
Average to Low Income Countries	98	1.93	31.72	7.87	-0.10	0.07
		[1.04]	[25.09]	[0.49]		

Notes: Statistics shown are for 11-year sample, 1994-2004. Standard deviation reported in brackets. $\rho_{x,y} \equiv$ correlation of x and y.

Figure 1: Portfolio and FDI flows into China versus foreign reserves



Sources: Lane and Milesi-Ferretti (2006); *International Financial Statistics,* IMF

Notes: Sum of portfolio, equity, and foreign direct investment (FDI) liabilities, and foreign currency reserves excluding gold, in China from 1998 through 2006.

Table 2: Cross sectional evidence on financial openness and inflation volatility

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	1.745***	2.288***	2.171***	1.889***	2.240***	2.383***
	(0.381)	(0.368)	(0.353)	(0.412)	(0.382)	(0.818)
FinOpen	-0.006***	-0.003**	-0.001	-0.016**	-0.007	0.015
	(0.002)	(0.001)	(0.002)	(0.007)	(0.008)	(0.057)
TrdOpen	0.001	0.001	-0.000	0.009	0.003	-0.010
	(0.002)	(0.002)	(0.002)	(0.006)	(0.005)	(0.035)
Gov	0.009	0.001	0.003	-0.007	-0.003	0.017
	(0.011)	(0.010)	(0.010)	(0.015)	(0.013)	(0.050)
Pol	0.008	0.030*	0.037**	0.030	0.033**	0.039**
	(0.017)	(0.016)	(0.016)	(0.020)	(0.016)	(0.019)
Pop	-0.000**	0.000	-0.000***	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DomCrd		-0.012***			-0.010**	
		(0.002)			(0.005)	
*GDPC*01			-0.000***			-0.000
			(0.000)			(0.000)
Observations	122	121	122	122	121	122
R-squared	0.15	0.28	0.31			

Notes: Dependent Variable is $log(\pi)$. 11-year cross section estimation with White's heteroskedasticity correction. Standard errors in parentheses. Models 1 through 3 report OLS estimation, while Models 4 through 6 report IV estimation with financial remoteness used as an instrument for the *FinOpen* variable. *** significant at 1 percent confidence level. ** significant at 5 percent confidence level. * significant at 10 percent confidence level.

Table 3: 5-year pooled evidence on financial remoteness and monetary policy

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	3.740	1.546***	2.265***	2.736***	2.605***	2.722***
	(4.248)	(0.564)	(0.281)	(0.310)	(0.435)	(0.507)
FinOpen	0.000	-0.000	0.000	-0.028**	-0.031	-0.029
	(0.001)	(0.001)	(0.002)	(0.012)	(0.024)	(0.048)
TrdOpen	0.001	0.001	-0.006***	0.007	0.008	0.007
	(0.003)	(0.003)	(0.002)	(0.008)	(0.014)	(0.027)
Gov	-0.008	-0.010	0.002	-0.015	-0.017	-0.016
	(0.014)	(0.014)	(0.008)	(0.013)	(0.018)	(0.031)
Pol	0.032*	0.034*	0.034***	0.030*	0.031	0.031
	(0.018)	(0.019)	(0.011)	(0.017)	(0.021)	(0.023)
Pop	-0.000	-0.000	-0.000**	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
DomCrd		0.004			0.003	
		(0.003)			(0.008)	
*GDPC*01			-0.000***			0.000
			(0.000)			(0.000)
Observations	511	506	511	511	506	511
R-squared	0.74	0.74	0.31			

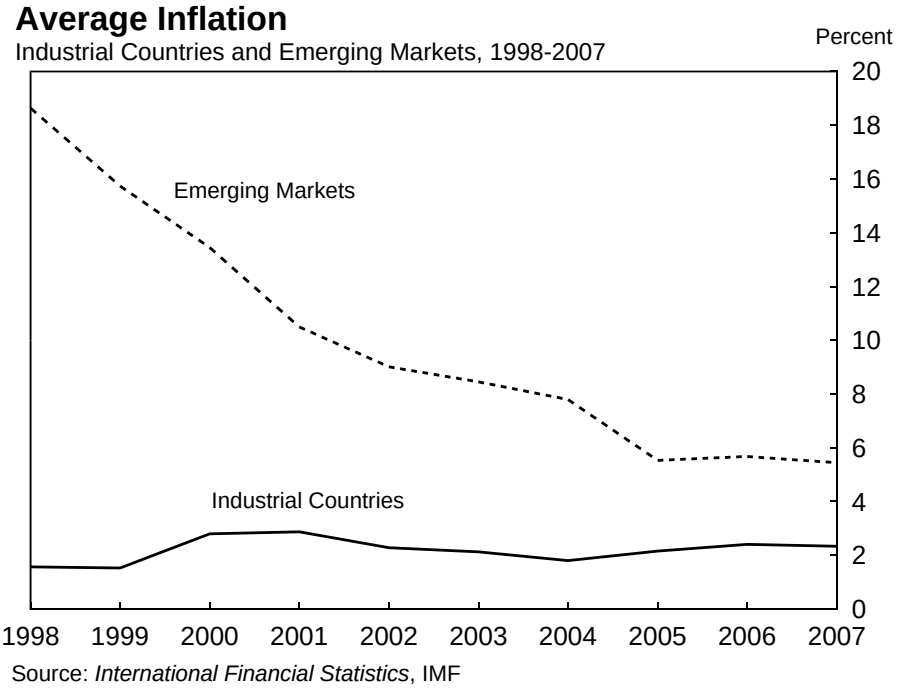
Notes: Dependent Variable is $log(\pi)$. 5-year pooled sample estimation by OLS with White's heteroskedasticity correction and clustering by country. Standard errors in parentheses. Models 1 through 3 report OLS estimation, while Models 4 through 6 report IV estimation with financial remoteness used as an instrument for the *FinOpen* variable. Country fixed effects are included in Models 1 and 2. *** significant at 1 percent confidence level. ** significant at 5 percent confidence level. * significant at 10 percent confidence level.

Table 4: Robustness Checks

	(1)	(2)	(3)	(4)
Add de jure capital controls	-0.006***	-0.015**	0.000	-0.033**
	(0.002)	(0.007)	(0.001)	(0.016)
Add trade remoteness	-0.006***	-0.015**	0.005**	-0.022**
	(0.002)	(0.006)	(0.002)	(0.010)
Use alternative instrument: $ofcmingr$		-0.047		-0.076
		(0.043)		(0.107)
Exclude rich countries	-0.003	0.016	-0.006	0.014
	(0.005)	(0.031)	(0.005)	(0.037)
Exclude very big countries	-0.006***	-0.016**	0.000	-0.027**
	(0.002)	(0.007)	(0.001)	(0.012)
Exclude very small countries	-0.012***	-0.017**	0.001	-0.029
	(0.004)	(0.008)	(0.003)	(0.018)
Drop Sub-saharan Africa	-0.006***	-0.009*	0.001	-0.022*
	(0.002)	(0.005)	(0.001)	(0.011)
Drop Latin America & Caribbean	-0.006***	-0.017**	0.001	-0.021**
	(0.002)	(0.007)	(0.001)	(0.009)

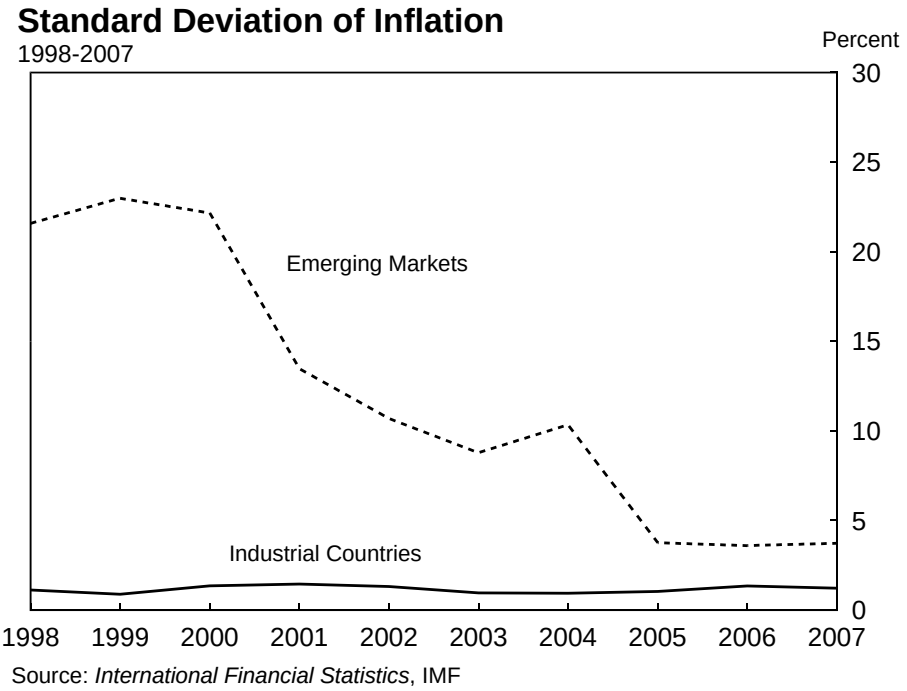
Notes: Dependent Variable is $log(\pi)$. Table reports coefficient estimates for $FinOpen$ variable. Coefficient estimates for full specification available upon request. Standard errors are shown in parentheses. Models 1 and 2 report results for 11-year cross section, while Models 3 and 4 report results for 5-year panel. Models 1 and 3 estimated by OLS while Models 2 and 4 by IV with financial remoteness variable used as an instrument for $FinOpen$ variable. Country fixed effects included in Model 3. *** significant at 1 percent confidence level. ** significant at 5 percent confidence level. * significant at 10 percent confidence level.

Figure 2: Average Inflation 1998-2007, industrial and emerging market economies



Notes: Average inflation rates from 1998 through 2007 for 22 industrial countries and 24 emerging market economies. Lists of included countries available upon request.

Figure 3: Std. Dev. of Inflation 1998-2007, industrial and emerging market economies



Notes: Standard deviation of inflation rates from 1998 through 2007 for 22 industrial countries and 24 emerging market economies. Lists of included countries available upon request.