

IMF Working Paper

Inflation Targeting and Country Risk: an Empirical Investigation

Armand Fouejieu A. and Scott Roger

IMF Working Paper

Offices in Europe

Inflation Targeting and Country Risk: an Empirical Investigation

Prepared by Armand Fouejieu A. and Scott Roger

Authorized for distribution by Emmanuel van der Mensbrughe

January 2013

This Working Paper should not be reported as representing the views of the IMF.

The views expressed in this Working Paper are those of the authors and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the authors and are published to elicit comments and to further debate.

Abstract

The sovereign debt crisis in Europe has highlighted the role of country risk premia as a link between countries' fiscal and external balances, financial conditions and monetary policy. The purpose of this paper is to estimate how adoption of inflation targeting (IT) affects spreads. It is hypothesized that country risk premia for IT countries (especially among emerging market economies) may be lower than for other countries owing to greater policy predictability and more stable long-term inflation. The findings suggest that IT reduces the risk premium, both through adoption of the IT regime, and through the observed track record in stabilizing inflation.

JEL Classification Numbers: E58, F34, H63.

Keywords: inflation targeting, risk premium, external debt

Authors' E-Mail Addresses: armand.fouejieu-azangue@univ-orleans.fr; sroger@imf.org

Contents

I.	Introduction.....	3
II.	An Overview of Evidence on Determinants of the Country Risk Premium.....	4
III.	Inflation Targeting and the Risk Premium.....	6
IV.	The Analytical Framework	9
	A. Model Specification	9
	B. Data and Descriptive Analysis.....	11
	C. Estimates and Results	16
V.	Concluding Comments and Policy Implications.....	23
	References	24
Tables:		
1.	Data availability on government bond yields	13
2.	Determinants of Country Risk Premia	17
3.	Impact of Inflation Targeting on Country Risk Premia	19
4.	Impact of IT on country risk in emerging market and high income economies	22
Figures:		
1.	Bond yield spreads, debt, and GDP growth: Inflation targeters..... versus non-targeters	14
2.	Bond yield spreads and debt: emerging markets versus high income economies	15
	Appendix	27

I. INTRODUCTION¹

1. The ongoing sovereign debt crisis in Europe highlights the importance of sound debt management for internal, as well as international, economic stability. The crisis has also spurred debate and research on the main factors affecting perceived country risk. Research points to a large range of determinants for country risk, including external debt, fiscal policy, external factors, institutional factors, as well as private sector financial balance sheet vulnerabilities. Curiously, although exchange rate arrangements have also been considered as a factor in determining country risk, the role of monetary policy frameworks more broadly has not been paid much attention. The aim of this study is to help fill this gap.

2. The purpose of our empirical analysis is to investigate the extent to which the adoption of inflation targeting monetary policy frameworks, in particular, affects country risk premia.² To the extent that inflation targeting enhances a country's macroeconomic performance and reduces uncertainty about future inflation, it should have a favorable impact on the country risk premium. The exchange rate flexibility associated with inflation targeting is also likely to be beneficial in lowering the risk premium. Additionally, and especially for emerging countries, adoption of inflation targeting may be perceived by investors as a signal of a broader commitment by the authorities to sounder macroeconomic policies and institutional reforms.

3. To assess the impact of adoption of inflation targeting on country risk premia, we use panel data analysis applied to 40 emerging and high-income countries, including 19 inflation targeters, during the period 1989-2010. Our results regarding the main drivers of country risk are in line with the previous research. The results also suggest that the monetary policy framework matters for country risk premium. Adoption of inflation targeting is found to reduce risk premia. The evidence also suggests, however, that while adoption of inflation targeting has some announcement effect on the risk premium, the risk premium also depends on how well the implementation of inflation targeting succeeds in delivering low, stable inflation.

4. The remainder of the paper is structured as follows. Section II reviews the existing literature on the determinants of country risk. In Section III, we discuss the relationship between inflation targeting and country risk. The empirical analysis is conducted in Section IV and Section V concludes.

¹ We are grateful to colleagues at l'Université d'Orléans and the IMF for helpful comments and to Jocelyne Dyer for assistance with the text.

² That is, the spread between yields on a country's internationally traded securities (usually long-term bonds) and those on a comparable security issued by one of the large advanced economies—typically the United States.

II. AN OVERVIEW OF EVIDENCE ON DETERMINANTS OF THE COUNTRY RISK PREMIUM

5. The literature investigating the most important determinants of country risk premium can be classified in three main categories: debt and fiscal policy influences; balance sheet vulnerabilities; and institutional and international factors.

External Debt and Fiscal Policy

6. The level of a country's external debt has been found to be one of the main determinants of the country's risk premium:

- Edwards (1986) uses both international bank loans to emerging countries and bonds issued by these countries to analyze the most relevant determinants of country risk and the best measure of this risk. Based on a panel analysis, he finds that the two major determinants of country risk are the ratios of public debt to Gross National Product (GNP) and gross investment to GNP. He further concludes that the bond spread is a better measure of country risk than the spread on international bank loans rates, since the former is more sensitive to debt.
- Bellas et al (2010) distinguish between long- and short-term determinants of country risk and show that, in the long run, the level of debt is one of macroeconomic fundamentals, which matter most (in addition to fiscal balance, current account, political risk, and trade openness).
- Borio and Packer (2004) find that debt intolerance, defined as the inability of emerging market countries to handle debt levels considered manageable in advanced economies, is one of the important determinants of country risk.

7. Other studies establish a strong connection between fiscal policy management, fiscal performance, and country risk premium:

- Baldacci and Kumar (2010) study the impact of fiscal deficits and public debt on government bond yields, including non-linear effects. Their findings show that higher public debt and, especially fiscal deficits, increase long-term bond yields.
- Akitoby and Stratmann (2006) focus on the impact of different methods of achieving fiscal adjustment. Their findings suggest that adjustments through reductions in expenditures are more effective in reducing the country spread than adjustment through increases in revenue. They also find that tax-financed increases in current spending have less impact on spreads than debt financed spending increases.
- The link between fiscal rules and sovereign default premia is analyzed in Hatchondo et al (2012). The paper finds that the optimal fiscal rule, including a debt ceiling, can lower the rate at which the government borrows and reduces the default risk premium.

Balance Sheet Vulnerabilities

8. A second major influence on country risk premia is through the vulnerability of private sector balance sheets to external shocks. In this context, unhedged balance sheet exposures (through denomination of assets or liabilities in foreign currencies) to exchange rate movements are viewed as particularly important:

- Powell and Sturzenegger (2000) investigate the effect of currency risk on the country risk premium in a context of dollarization. The empirical tests through an event study analysis show that currency risk is positively correlated to country sovereign risk.³
- In the same vein, Berganza and Garcia-Herrero (2004) investigate how the balance sheet effect of depreciation affects the country risk premium. Empirical tests suggest that depreciation is associated to higher country risk premium. Furthermore, the effect of exchange rate movements on the risk premium is symmetric, since their results show a positive effect of currency appreciation on country risk premium.
- Jahjah and Yue (2004) find that exchange rate appreciation is associated with increased bond issuance and an increase in the default premium. These effects seem to be more relevant in the case of less flexible exchange rate policy. Large exchange rate appreciation makes it more favorable for a country to borrow abroad (owing to the lower cost of debt service in local currency). But it also raises the risk premium by increasing the stock of debt and the probability of default, especially if exchange appears to adjust in the subsequent periods.
- In a more general assessment, Elekdag et al (2005) develop a small open economy model with a financial accelerator in order to investigate the existence of a risk premium in foreign currency denominated debt. The risk premium on indebtedness depends on the unanticipated changes in exchange rate and entrepreneurs' capital-to-net-worth ratio. The model calibration confirms the existence of a premium on external indebtedness.

9. Financial vulnerabilities can also refer to the conditions of access to international financial markets and the stability of the financial environment. In Borio and Packer (2004), original sin, which reflects the inability of a country to borrow abroad in domestic currency, and currency mismatch are also found to be determinants of country risk premia. Bellas et al (2010) also find that, in the short run, financial indicators matter more than macroeconomic fundamentals. In particular, they show that financial vulnerabilities, as proxied by the Emerging Market Financial Stress Index and the VIX index, are important determinants of country risk.

³ This result does not hold for all countries in the sample, suggesting in some cases the inverse effect.

Institutional, Non-economic, and International Factors

10. Institutional, non-economic, and external factors also matter for country risk premia:
- Ciocchini et al (2003) find a statistically significant and robust effect of corruption on bonds spreads. Countries with higher level of corruption are also perceived as relatively risky by investors.
 - Baldacci and Kumar (2010) also find that structural characteristics, such as a financial sector, which relies on banking system rather than financial market, affects country risk, as it reduces the effects of fiscal deficits on bonds yields.
 - Baldacci et al (2011) pay special attention to political risk, which is found to be relevant in emerging countries. Besides, during a period of crisis, political factors are found to have a greater effect for countries with initial high level of debt (higher than 80 percent of GDP).
11. As regards external factors, which can influence the country risk premium, the most prominent are foreign interest rates and global liquidity conditions. These are usually accounted for through the U.S. interest rate policy. The reference rates used in the related papers, as well as their findings, are mixed:
- Using the U.S. Treasury bill yields, Cline and Barnes (1997) find a positive but not significant effect on emerging market spreads, while Eichengreen and Mody (1998) find that the Treasury bill rate is negatively correlated to the sovereign spread for Latin-American and East-Asian emerging markets. Kamin and Von Kleist (1999), however, find no effect of the Treasury bill rate on emerging market rate spreads.
 - Arora and Cerisola (2001), using the federal funds target rate rather than the Treasury bill yield, find a significant and positive effect on sovereign spread for a sample of emerging countries.
12. Garcia-Herrero (2005) identifies two additional external determinants of country risk premium. Global risk aversion is found to increase risk premia in emerging markets, and contagion effects lead to spillovers of increases in sovereign bond spreads across countries.

III. INFLATION TARGETING AND THE RISK PREMIUM

13. Although the previous section shows that considerable attention has been paid to the determination of country risk premia, the role of monetary policy has received much less attention than fiscal policy. Research on the links between the monetary framework has tended to focus on the monetary policy implications of specific assumptions about the determination of the risk premium, together with particular country characteristics, rather than the impact of the monetary policy framework on the risk premium:

- Chang and Velasco (2001) study the implications for monetary policy of liability dollarization in a small open economy. The shocks to export demand and world interest rates can affect the rest of the economy through risk premium (which is modeled as a function of the ratio of the investment value-to-net worth and the real exchange rate, so that depreciation, while increasing exports, raises the risk premium at the same time by increasing the real value of external debt). The paper concludes that if the exchange rate regime is floating, the counter-cyclical measures of central bank can still hold in case of external real shocks.
- Ghironi and Rebucci (2002) compare the relative performance of alternative monetary policy frameworks (currency board, inflation targeting and dollarization) in small open developing economies with liberalized capital accounts. This comparison relies on the transmission of shocks to risk premia in international financial markets, which is considered as source of macroeconomic volatility. Country risk is modeled as the inverse of country's discount factor. Calibrating the model for Argentina, they find that dollarization is preferable because it eliminates currency premium volatility.

14. To the best of our knowledge, however, no empirical investigation has been conducted to test the potential effect of inflation targeting on country risk premium. In this section, we argue that this monetary policy framework provides some characteristics, which could be related to lower risk premium for inflation targeters.

15. The first line of argument is that if inflation targeting can lower inflation uncertainty relative to other policy regimes, this should have a beneficial impact on the country risk premium. High inflation is typically associated with relatively high inflation volatility.⁴ Inflation targeting frameworks, which focus primarily on reducing both the level and variability of inflation to low levels, may reduce inflation uncertainty relative to alternative policy frameworks. Vega and Winkelried (2005), Mishkin and Schmidt-Hebbel (2007), Gonçalves and Salles (2008), Lin and Ye (2009) among others, find that inflation targeting does indeed generally lead to better outcomes in terms of inflation performance, and especially so for emerging market economies. If so, the reduced inflation uncertainty should be reflected in lower country risk premia.

16. A related line of argument concerns the credibility of the monetary policy framework. Since risk premia are inherently forward-looking, the formation of expectations of the future level and variability of inflation, and the effects on the risk premium, depend importantly on the credibility of the authorities' commitment to the policy framework. In this regard, the rules-based approach of inflation targeting, together with its emphasis on transparency and accountability, may enhance policy credibility relative to other frameworks:

⁴ Fisher (1982).

- Palomino (2012) shows in a theoretical model that monetary policy with a high level of commitment succeeds better in reducing the bond risk premium. He compares two types of monetary policy regime, one relying on discretion and the other on commitment. The findings suggest that thanks to its better credibility improvement, commitment reduces the exposure to inflation risk and the risk premium declines.⁵
- Gürkaynak et al (2006) examine the performance of inflation targeting in anchoring inflation expectations, and find that under inflation targeting, long run inflation expectations of the private sector are much less responsive to economic news than under alternative frameworks with less explicit inflation objectives. More specifically, the authors determine what they call “inflation compensation,” which is the premium on long-term bond yields that private agents will require to compensate for uncertainty regarding the long-term evolution of inflation. They find that there is no effect of economic news on the “inflation compensation” under inflation targeting, indicating that expectations are well anchored within this framework.

17. These findings support the hypothesis that inflation targeters should face lower risk premium on debt, and corroborate findings by other researchers, including Johnson (2002, 2003), Levin et al (2004), Crower (2010) that adoption of inflation targeting strengthens monetary policy credibility.

18. Adoption of inflation targeting may also send a broader signal of the authorities’ commitment to economic reforms and sounder macroeconomic policies, especially in emerging market and developing economies. In particular, the adoption of inflation targeting may be complemented by introduction of fiscal policy reforms, which will also serve to reduce the risk premium.

19. Additionally, an important feature of inflation targeting is the need for nominal exchange rate flexibility. This may reduce the sensitivity of the risk premium to external debt in so far as the flexibility of the exchange rate provides mechanism for correction of external imbalances not available with an exchange rate peg.⁶ Moreover, the flexibility of the exchange rate is likely to induce private agents to hedge foreign exchange risks, reducing currency risk in their balance sheets. This too is likely to have a beneficial impact on the country risk premium.

⁵ Although the model is a closed economy, implying that all debt is in domestic currency and held domestically, we expect that the results would also hold in an open-economy context.

⁶ Jahjah and Yue (2004).

IV. THE ANALYTICAL FRAMEWORK

20. Before addressing the specific issue of inflation targeting and the country risk premium, we begin by examining some of the more traditional explanators of the risk premium. In particular, we examine the role of external debt, and specifically whether it is the level or the change in external debt which matters most for country risk premium. We also consider whether private external debt affects country risk, and the effect of regional contagion of risk premia through the sovereign debt crisis.

21. After examining standard risk premium determinants with our particular data set, we then turn to the main issue of whether inflation targeting countries face lower country risk premia than countries with other frameworks. Questions of particular interest include:

- Does adoption of inflation targeting have a beneficial impact on a country's risk premium?
- If so, does the benefit accrue immediately—implying high credibility *ex ante*—or does it depend on actual performance? In this latter case, we consider whether credibility, and the impact of inflation targeting on the risk premium, is only established when the country shifts to a stable inflation target after a period of disinflation. An intermediate case we consider as well is whether the impact of inflation targeting depends on actual performance in achieving the inflation targets—that is, earned credibility.
- Does adoption of inflation targeting mitigate the effect of debt on risk premium?
- Do the effects of inflation targeting on risk premia differ between emerging market and high income economies?

A. Model Specification

22. Country risk is measured by the risk premium defined as the spread between the rate at which a country borrows (here, the government bond yield), and the “risk free” rate, defined here as the yield on U.S. Treasury bonds. Following the empirical literature (See Edwards (1986), Baldacci et al (2011) among others), the spread is regressed on its main determinants as follows:

$$spread_{it} = \alpha_i + \theta_t + \beta X_{it} + \varepsilon_{it} \quad (1)$$

23. Where α_i is country i 's specific or fixed effects on the risk premium; θ_t is the time fixed effects;⁷ X_{it} is a vector of variables that affect the country risk premium; and ε is a random error term. The indexes " i " and " t " indicate the individual country and time period, respectively. All the variables are taken in logs, so that the estimated parameters (β) can be interpreted as direct elasticity.

24. In the baseline model, the regressors are variables commonly found in the literature to be relevant for country risk. The standard macroeconomic variables include:

- Gross external debt in percentage of GDP is expected to increase the risk premium, since it raises the probability that the country will be unable or unwilling to service its debts.
- Foreign exchange reserves in percentage of GDP are expected to lower the risk premium, since it improves the country's capacity to service its external debt.
- The fiscal deficit in percentage of GDP, as measure of fiscal soundness, is expected to raise the risk premium since investors are likely to be less confident of the government's ability to honor its external debts. We use the change in government debt as share of GDP to approximate the fiscal deficit, as data on government debt are more reliable and available for all countries in our sample. Even if government debt does not always strictly reflect the fiscal deficit, we assume that it is a good proxy in most cases.⁸
- The current account balance as a share of GDP should also be negatively correlated with the risk premium, since a higher current account balance should improve the country's ability to service its external debt.
- Exchange rate volatility is expected to be positively correlated with country risk. High exchange rate volatility will increase the uncertainty about the debt service outstanding (especially if debt is foreign-currency denominated).
- Inflation rate and inflation volatility are expected to increase the risk premium, as discussed in Section III.

⁷ The fixed effects dummies are based on 5-year long sub-periods in order to account for the common global trend in the evolution of bond spreads. This specification seems also to be more econometrically reliable than using year-by-year fixed effects, since the very high Hansen P-value is obtained (close or equal to 1) points to over-fitting.

⁸ Below the line (non-budgetary) items can create a significant wedge between the fiscal (above the line) balance and the change in government debt.

25. To account for institutional quality, we control for political risk and corruption, following Baldacci et al (2011) and Ciocchini et al (2003). Greater political stability is expected to lower the risk premium, while higher corruption is likely to increase the risk premium.

26. Two external factors are accounted for:

- The U.S. federal funds rate, which has been found to be positively correlated with country risk (Arora and Cerisola (2001));
- Sovereign debt crisis contagion. This variable is expected to be positively correlated with country risk. We build a proxy of sovereign debt crisis contagion as follows: first, we split the sample countries by regions (following the classification of the World Bank). Then, we build a dummy variable which takes the value of 1 for country i in period t if at least one of the other countries in the same region faces a sovereign debt crisis, and 0 otherwise.

27. The role of monetary policy framework is investigated by analyzing the effect of inflation targeting on country risk premium. To this end, in addition to the previously listed determinants of the spread, an inflation targeting dummy (IT) is introduced in the estimated equation. IT takes the value of 1 if country i is classified as inflation targeter at period t , and 0 otherwise. Furthermore, among countries implementing inflation targeting, we differentiate between:

- *Stable inflation targeting* which is a dummy variable taking the value of 1 as soon as the inflation targeting country sets a stable inflation target from one period to another, and 0 otherwise.
- *Credible inflation targeting* is measured through the inflation volatility relative to the announced inflation target. The higher the volatility, the lower the credibility of IT. Generating the series of inflation volatility from target for each IT country, we rescale these data to make them vary from 0 to 1, defining the lowest level of credibility (highest volatility) and the highest level of credibility (lowest volatility) respectively.

B. Data and Descriptive Analysis

28. We use annual data from 1989 to 2010. The sample consists of 40 emerging and high income countries, including 19 inflation targeters. We rely on Roger (2009) for the list of inflation targeting countries and their effective adoption date (see Table 1 in Appendix). The sample of advanced country comparators is always challenging in this type of analysis, as several, including the Eurozone countries, the United States, and Switzerland, are often classified as inflation targeters. This tends to bias the sample against finding a significant inflation targeting result for these countries. So far as emerging markets are concerned, the starting point is the group of EMBI countries, with additions and subtractions based on

availability of data. There is no reason a priori to believe that this selection of non-IT countries might bias the results. Both the IT and non-IT economies in the sample may be biased in the sense that the availability of bond market data for these countries may indicate that both are more financially and statistically developed than other emerging or developing economies.

29. Data on long-term bond yields are collected from *International Financial Statistics (IFS)* and Bloomberg.⁹ Data on total external debt and government debt are from the Reinhart and Rogoff (2011) database. Data on exchange rate and inflation are from *IFS*.¹⁰ Data on current account balances are from the *World Economic Outlook*. Data on foreign exchange reserves are from the World Bank's *World Development Indicators*. The data on institutional quality (political risk and corruption) are collected from *International Country Risk Guide*. The Reinhart and Rogoff (2010) data set on "Crises varieties dummy variables" is used for sovereign debt crisis contagion. The data on inflation targets for IT countries have been collected from the respective central bank websites and publications.

30. It should be noted that for some countries in our sample, data on bond yields are not available for the entire period since they are provided only from the mid- or late 1990s (see Table 1). In these cases, data are used for the available period.

⁹ *IFS* provides data on long-term government bond yields with maturity of 10 years in most of the cases, although for some countries the maturity is 5, 7 or 15 years. Data from Bloomberg are all for 10-year government bond yields.

¹⁰ Inflation and exchange rate volatility are calculated for each country, each year, by calculating the standard deviation of the monthly inflation rate and real effective exchange rate, respectively.

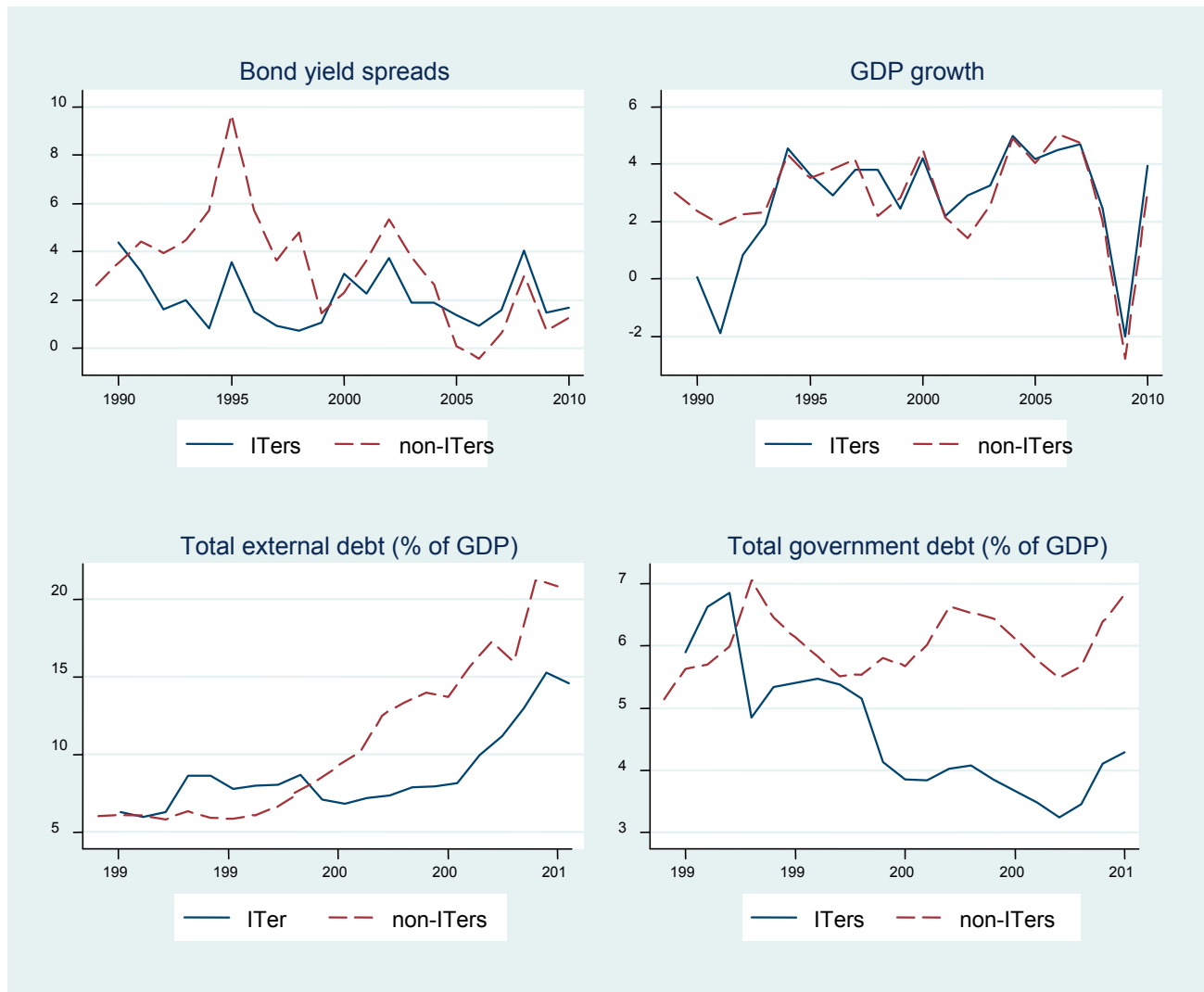
Table 1: Data availability on government bond yields

Country	Number of observations	Period	Gap	Country	Number of observations	Period	Gap
Argentina	14	1997 - 2010	none	Japan	22	1989 - 2010	none
Australia	22	1989 - 2010	none	Malaysia	18	1993 - 2010	none
Austria	22	1989 - 2010	none	Mexico	15	1995 - 2010	1
Belgium	22	1989 - 2010	none	Morocco	11	1998 - 2010	2
Brazil	14	1997 - 2010	none	Netherlands	22	1989 - 2010	none
Bulgaria	15	1994 - 2010	2	New Zealand	22	1989 - 2010	none
Canada	22	1989 - 2010	none	Norway	22	1989 - 2010	none
Chile	12	1999 - 2010	none	Peru	14	1997 - 2010	none
China	14	1997 - 2010	none	Philippines	14	1997 - 2010	none
Colombia	14	1997 - 2010	none	Poland	14	1997 - 2010	none
Denmark	22	1989 - 2010	none	Portugal	22	1989 - 2010	none
Finland	22	1989 - 2010	none	Singapore	12	1999 - 2010	none
France	22	1989 - 2010	none	South Africa	22	1989 - 2010	none
Germany	22	1989 - 2010	none	Spain	22	1989 - 2010	none
Greece	18	1993 - 2010	none	Sweden	22	1989 - 2010	none
Honduras	19	1989 - 2007	none	Switzerland	22	1989 - 2010	none
Hungary	12	1999 - 2010	none	Thailand	22	1989 - 2010	none
Iceland	19	1992 - 2010	none	United Kingdom	22	1989 - 2010	none
Ireland	22	1989 - 2010	none	United States	22	1989 - 2010	none
Italy	22	1989 - 2010	none	Venezuela	22	1989 - 2010	none

Sources: *IFS* and Bloomberg

31. Figure 1 shows that in the last two decades the economic cycle exhibited a similar picture between inflation targeting countries (ITers) and non-inflation targeting countries (non-ITers). Indeed, the evolution of growth in GDP is very similar for the two groups. However, this is not the case as regards government bond yield spreads or external and government debt. The spreads seem to be higher for non-ITers from the early 1990s to the mid-2000s and converge to the same level in the late 2000s. During the first three years of the analysis period, the level of total external debt was similar for the two groups (around 60 percent of GDP). From 1992 to 1998, the increase in the level of external debt was higher for ITers, but from the late 1990s to 2010, we observe a rapid growth in external debt for both groups, especially non-ITers. Regarding government debt, for most of the period, government debt has shown no clear trend, while in IT countries the trend was clearly downward through until the financial crisis and recession in 2008.

Figure 1: Bond yield spreads, debt, and GDP growth:
Inflation targeters versus non-targeters



Source: authors' calculations based on *IFS*, Bloomberg, Reinhart and Rogoff (2011), and *WDI*

Figure 2: Bond yield spreads and debt: emerging markets versus high income economies



Source : Author's calculations based on *IFS*, Bloomberg, Reinhart and Rogoff (2011), and *WDI*

32. A more mixed picture emerges when we distinguish between emerging market and high-income countries. Figure 2 shows that bond yields spreads are higher for emerging non-ITers than for emerging ITers, with a convergence of these spreads between the two groups in the late 2000s. For high-income countries, the spreads are very similar for ITers and non-ITers throughout the sample period.

33. With regard to external debt, emerging market ITers have generally had lower levels of debt relative to GDP, but the evolution of debt has been similar. Government debt-to-GDP ratios in non-IT emerging markets, however, have fallen since the early 2000s towards levels in emerging market ITers. In contrast, among high-income economies, government debt-to-GDP ratios have remained persistently higher than in IT economies; indeed the gap widened through until the financial crisis. Unlike the emerging market economies, both IT and non-IT high-income economies have seen significant increases in external debt-to GDP ratios over time, with ratios in ITers rising above those in non-ITers following the financial crisis.

C. Estimates and Results

34. Equation (1), relating the country risk premium to the various explanatory variables, was estimated using panel data. We first run fixed effects estimates, but we suspect the results to be biased because of endogeneity. At least two sources of endogeneity can be pointed out here. The first is the inverse causality between some covariates and the dependent variable. For example, since fiscal policy can affect the country risk premium, the fiscal authorities in some countries may adjust their policy in order to avoid increasing the country risk premium. In this case, the fiscal position is partly driven by the risk premium rather than the converse. A second source of endogeneity is the omitted variable bias, since we are certainly not controlling for all the determinants of country risk.¹¹ To deal with these concerns, the main results discussed in this section are based on an instrumental variables approach, system GMM. This dynamic panel data approach also allows us to account for the persistence of country risk over time. System GMM (Blundell and Bond (1998)) is also appropriate given the structure of our sample (small time dimension relative to the number of countries). However, the results with fixed effect estimates are provided in the appendix.

35. Prior the estimation of equation (1), we check the stationarity of the variables using a panel unit root test (Appendix table 2). The results suggest that, except for external debt and exchange reserves which are stationary in first difference, the other variables do not have a

¹¹ The error terms should contained the omitted variables. In case of correlation between one of those omitted variables and one of the regressors, the estimated coefficients are biased (correlation between error term and explanatory variables).

unit root in level. Since one of the equations in system GMM is estimated in first difference, this might solve the non-stationarity issue of the two variables mentioned above.

Table 2: Determinants of Country Risk Premia

	Dependent variable : bond yields spread				
	(1)	(2)	(3)	(4)	(5)
Lagged spread	0.451*** (31.11)	0.520*** (12.50)	0.455*** (38.52)	0.452*** (30.14)	0.435*** (37.15)
External debt	0.0149*** (8.931)	0.0132*** (9.750)	0.0152*** (10.59)	0.0143*** (6.855)	
Exchange reserves	-0.00482*** (-2.611)	-0.00429*** (-3.002)	-0.00524*** (-3.837)	-0.00486** (-2.473)	-0.00974*** (-6.043)
Exchange rate volatility	0.00766*** (9.189)	0.00765*** (9.212)	0.00848*** (14.08)	0.00757*** (9.030)	0.00762*** (8.074)
Inflation volatility	0.0103*** (11.73)	0.00862*** (12.58)	0.00938*** (10.89)	0.00989*** (10.21)	0.0122*** (16.14)
Political stability	-0.181*** (-9.161)	-0.149*** (-6.751)	-0.180*** (-8.439)	-0.192*** (-9.337)	-0.182*** (-7.806)
Corruption	0.00698 (1.300)	0.00169 (0.271)	0.00525 (0.974)	0.00759 (1.463)	0.0114** (2.061)
Fiscal deficit	0.0247*** (6.784)	0.0323*** (10.43)	0.0241*** (5.442)	0.0218*** (5.658)	0.0297*** (9.089)
Current account surplus	-0.0135 (-0.942)	-0.00975 (-0.269)	0.000868 (0.0732)	-0.00644 (-0.394)	-0.0102 (-0.684)
Federal funds rate		0.00480*** (4.426)			
Contagion of debt crisis			0.00338* (1.844)		
Change in external debt				0.0157*** (3.465)	
Private external debt					0.00198 (1.519)
Constant	0.750*** (9.200)	0.611*** (6.934)	0.745*** (8.552)	0.798*** (9.624)	0.814*** (8.444)
Observations	651	651	651	651	633
Number of country	40	40	40	40	39
Wald test	0.00	0.00	0.00	0.00	0.00
Test for AR(1)	0.0315	0.0242	0.0373	0.0376	0.0278
Test for AR(2)	0.529	0.215	0.608	0.806	0.401
Hansen test for over-identification	0.311	0.712	0.467	0.315	0.338

System GMM estimates; fixed effects discarded; Wald test is a test for the null hypothesis that all the coefficients except the constant, are jointly equal to zero; test for AR(1) and AR(2) are tests for absence of autocorrelation of the error terms at first and second order respectively; ***, **, * indicate the statistical significance at 1, 5 and 10% respectively.

36. As a baseline model, we first run a set of regressions with the standard determinants of the country risk premium (Table 2). Our results are in line with the findings in previous empirical research. Almost all the control variables are highly significant, with the expected effect. External debt is positively correlated with country risk, while foreign exchange

reserves exhibit a negative effect on spread. As expected, inflation and exchange rate volatility increase the country risk premium. The fiscal deficit is positively correlated with country risk. Although the current account balance is negatively correlated with the risk premium, this effect appears to be statistically insignificant.

37. The effect of institutional quality is also found to be highly relevant for country risk. Higher political stability leads to a lower risk premium, while higher corruption tends to increase the premium (despite the lower robustness of this effect). The two external factors are also significant: the U.S. federal funds rate and our proxy for sovereign debt crisis contagion are both positively correlated with country risk (columns 2 and 3).

38. The regression results reported in column 4 concern the issue of whether it is the level or the change in external debt, which matters most for the risk premium. The findings show that the coefficient associated to the change in external debt is higher, suggesting a greater effect of change in external debt on spread. Finally, in column 5, the concern is whether private external debt matters for country risk premium.¹² According to the findings, private sector external debt does not have a significant effect on risk premium.

39. We now turn to the investigation of the impact of inflation targeting on country risk. Table 3 gives the estimates results of the effect of inflation targeting for the whole sample. In column 1, we add the *IT* dummy to the specification, including the standard major determinants reported in Table 2. This is found to have a negative and significant coefficient, suggesting that, as expected, introduction of inflation targeting lowers the country risk premium relative to other monetary policy frameworks.

40. To understand more clearly why adoption of inflation targeting lowers the risk premium, we modify the equation in column 1 by adding in the volatility and level of inflation in column 3. By controlling for those two variables, we would like to see if there is a remaining effect of the *IT* dummy. Column 3 shows that both the inflation rate and inflation volatility are highly significant with a positive effect on spread. It can also be seen that the coefficient on the *IT* dummy remains significant although with a lower magnitude (the coefficient is halved from 0.016 in column 1 to 0.007 in column 3).

41. These results indicate that the effect of inflation targeting on the country risk is not only related to the direct current impact of inflation targeting on a country's inflation performance. Our interpretation of the result is that the remaining significant effect of inflation targeting on the risk premium represents an "announcement effect" or "signaling effect" affecting forward-looking expectations. In addition, the coefficient may also pick up

¹² Private sector external debt is approximated by the financial sector external debt in percentage of GDP. Data are from BIS.

the impact on the premium of various other economic and institutional reforms accompanying the introduction of inflation targeting.

Table 3: Impact of IT on Country Risk Premia

	Dependent variable : bond yields spread				
	(1)	(2)	(3)	(4)	(5)
Lagged spread	0.508*** (31.29)	0.593*** (38.59)	0.254*** (9.138)	0.252*** (15.84)	0.256*** (8.731)
External debt	0.0139*** (9.101)	0.0104*** (6.014)	0.0100*** (6.034)	0.00972*** (5.368)	0.00950*** (5.630)
Exchange reserves	-0.00126 (-0.762)	2.91e-06 (0.00227)	-0.00439** (-2.411)	-0.00528*** (-3.574)	-0.00417** (-2.386)
Exchange rate volatility	0.00952*** (19.64)	0.00725*** (11.82)	0.00718*** (7.232)	0.00852*** (8.044)	0.00802*** (10.54)
Political stability	-0.199*** (-10.19)	-0.0899*** (-4.590)	-0.169*** (-6.827)	-0.181*** (-10.47)	-0.173*** (-9.426)
Corruption	0.00814* (1.661)	-0.00778* (-1.889)	0.0143*** (3.254)	0.0198*** (4.634)	0.0178*** (3.735)
Fiscal deficit	0.0331*** (13.69)	0.0223*** (7.888)	0.0316*** (8.132)	0.0370*** (9.896)	0.0350*** (8.035)
Current account surplus	-0.0685*** (-3.300)	-0.0541 (-1.573)	-0.0111 (-0.263)	0.0189 (0.639)	-0.0184 (-0.602)
Inflation rate			0.410*** (9.556)	0.401*** (25.16)	0.439*** (8.873)
Inflation volatility			0.00305*** (3.216)	0.00446*** (5.906)	0.00207** (2.145)
IT	-0.0155*** (-8.731)	-0.00268** (-2.389)	-0.00668*** (-3.565)		
IT*External debt		-2.04e-05*** (-2.587)			
Stable_IT				-0.00299** (-2.053)	
Credible_IT					-0.0142*** (-6.037)
Constant	0.815*** (10.46)	0.375*** (4.593)	0.682*** (6.679)	0.732*** (11.15)	0.692*** (9.821)
Observations	661	661	651	651	641
Number of country	40	40	40	40	40
Wald test	0.00	0.00	0.00	0.00	0.00
Test for AR(1)	0.0373	0.0377	0.0518	0.0452	0.0578
Test for AR(2)	0.112	0.128	0.387	0.383	0.354
Hansen test for over-identification	0.229	0.765	0.832	0.226	0.732

System GMM estimates; fixed effects omitted, Wald test is a test for the null hypothesis that all the coefficients except the constant, are jointly equal to zero; test for AR(1) and AR(2) are tests for absence of autocorrelation of the error terms at first and second order respectively; ***, **, * indicate the statistical significance at 1, 5 and 10% respectively.

42. An alternative hypothesis is that inflation targeting may have essentially no credibility at the outset, and only become a credible framework at a later point, when the authorities are

confident enough to establish a stable “steady state” target. To test this hypothesis, we replace the *IT* dummy in the equation of column 3 with the *stable IT* dummy in the equation reported in column 4. Although this specification also shows a significant negative impact of inflation targeting on the spread, the magnitude of the coefficient is lower than on the *IT* dummy in column 3.

43. This result seems counterintuitive since the period of stable inflation targeting might be expected to provide a stronger effect on risk premia than the initial announcement of *IT*. The main explanation for this finding may be that the observations corresponding to the *stable IT* period are heavily dominated by high-income economies, while the observations corresponding to the *IT* period include a much higher proportion of emerging market economies. So to an important extent, the effect of the *stable IT* dummy could reflect the fact that the impact of *IT* (the announcement effect) may be lower for high-income countries than for emerging markets (an issue we look at further below).

44. In a sense, an intermediate hypothesis is that policy credibility and its impact on the risk premium, accrues relatively gradually, depending heavily on actual performance in achieving the inflation target. To test this hypothesis, we include a *Credible IT* index, inversely related to the variability of inflation relative to the target (as described earlier). We interpret the index as an indicator of policy credibility, since the lower the volatility of inflation around the target, the greater is likely to be the perceived commitment of the authorities to the inflation target. Based on this interpretation, we expect that a higher value of the index (greater credibility) should reduce the risk premium.

45. This hypothesis is tested in the equation in column 5, in which the *IT* dummy is replaced by the *Credible IT* variable. While the effect of the inflation rate and inflation volatility remains relatively stable, the coefficient associated to *Credible IT* is negative and significant, and with a magnitude higher than the *IT* coefficient in column 3. We interpret this result as follows. First, the result is specific to the inflation targeting regime and is above and beyond the independent effects of lower inflation and inflation volatility on the risk premium. Consequently, as with the *IT* result in column 3, we regard the result as indicating a pure credibility effect. Second, the higher coefficient than found with either the *IT* or *Stable IT* dummies suggests that this is probably a better characterization of the way in which credibility of inflation targeting is gained than a simple binary process. In short, the benefit of inflation targeting in reducing the risk premium has to be earned, but it is a benefit that does not accrue to non-targeters, even if they do just as well in terms of inflation performance.

46. Finally, we also examine the proposition that adoption of inflation targeting may partly mitigate the adverse effects on the risk premium of higher external debt. This is tested by adding an interactive variable (multiplying *External debt* variable by the *IT* dummy) to the

basic equation shown in column 1. The results, shown in column 2, indicate that while the effect of external debt on the risk premium remains positive and significant, the interaction shows a negative and significant effect, which means that the magnitude of the effect of external debt on risk premium is lower for inflation targeters than for other monetary policy frameworks. However, the magnitude of the coefficient is very low, and therefore not very significant in economic or policy terms.

Inflation targeting in high income versus emerging market economies

47. In this section, we examine whether the adoption of inflation targeting has a significantly different impact on country risk premia in emerging market economies than in high-income economies. This is a relevant question since the empirical literature on the effect of inflation targeting reach, in some cases, different conclusions when considering these two categories of countries separately. Moreover, our descriptive statistics suggest a more significant difference in risk premia between inflation targeters and others among emerging countries than among high-income economies.

48. To examine this issue, we re-run the regressions in Table 3, differentiating between emerging markets and high-income economies. The findings are given in Table 4.

49. For the two groups of countries, the *IT* dummy shows a negative and significant coefficient (columns 1 and 6). The ability of IT to mitigate the effect of external debt on country risk also seems to hold among the two groups (columns 2 and 7). This effect seems to be more relevant among the sub-samples given that the coefficient is higher for both emerging and high-income countries (in comparison with the whole sample in Table 3, column 2). However, as columns 3 and 8 show, when controlling for the inflation rate and inflation volatility, the *IT* dummy is no longer significant for high-income countries, suggesting that the so called “announcement effect” does not hold for the latter. As regards *stable IT*, it seems to matter only for high income economies since the coefficient is not significant for emerging countries (columns 4 and 9).

Table 4: Impact of IT on country risk in emerging market and high income economies

	Dependent variable : bond yield spreads									
	Emerging market					High income economies				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Lagged spread	0.447*** (5.129)	0.443*** (6.030)	0.304*** (4.076)	0.322*** (3.117)	0.304*** (4.058)	0.431** (2.511)	0.439** (2.567)	-0.0853 (-0.626)	0.296*** (3.480)	0.109 (0.795)
External debt	0.0297* (1.851)	0.0303*** (2.817)	0.0222** (2.138)	0.0171 (0.791)	0.0221** (2.150)	0.00688 (1.261)	0.00966** (2.117)	0.00413 (0.937)	0.0115** (2.356)	0.00170 (0.437)
Exchange reserves	-0.0240* (-1.648)	-0.0241** (-2.116)	-0.0232** (-2.353)	-0.0151 (-1.209)	-0.0234** (-2.392)	0.0203*** (2.828)	0.0186** (2.451)	-0.00706 (-1.102)	-0.0224*** (-2.646)	-0.000642 (-0.109)
Exchange rate volatility	0.0121 (1.438)	0.0116** (2.535)	0.00622 (1.514)	0.00245 (0.148)	0.00635 (1.558)	0.0321*** (4.390)	0.0325*** (4.046)	-0.00192 (-0.347)	0.00345 (0.803)	0.00253 (0.558)
Political stability	-0.0668*** (-2.725)	-0.0675** (-2.298)	-0.0429* (-1.774)	-0.0537 (-0.943)	-0.0420* (-1.787)	0.0594 (0.327)	0.0956 (0.548)	-0.155 (-0.956)	-0.312** (-2.505)	0.0948 (0.857)
Corruption	-0.0219* (-1.846)	-0.0212*** (-2.789)	-0.0167** (-2.326)	-0.00983 (-0.312)	-0.0168** (-2.364)	-0.00883 (-0.351)	-0.00605 (-0.223)	0.0179 (0.393)	-0.0706** (-2.311)	-0.0501*** (-3.402)
Fiscal deficit	0.0376 (0.473)	0.0246 (1.602)	0.0405** (1.974)	0.0586 (0.255)	0.0407** (2.007)	-0.0160 (-0.690)	-0.0171 (-0.743)	0.00407 (0.200)	0.0305** (2.077)	0.0189 (0.999)
Current account surplus	-0.0518 (-0.529)	-0.0413 (-1.415)	-0.0545 (-0.847)	-0.0490 (-0.291)	-0.0553 (-0.857)	-0.351** (-2.348)	-0.394*** (-2.607)	0.0426 (1.069)	0.246*** (2.746)	0.0596 (0.887)
Inflation rate			0.338*** (3.027)	0.403** (2.001)	0.338*** (3.020)			0.566* (1.743)	0.634*** (3.035)	0.450*** (3.672)
Inflation volatility			-0.00173 (-0.802)	-0.00240 (-0.742)	-0.00195 (-0.906)			0.0221*** (5.959)	-0.0106 (-1.088)	0.0173*** (3.503)
IT	-0.0222** (-2.174)		-0.0160* (-1.881)			-0.0501** (-2.101)		0.00804 (0.658)		
IT*External debt		-0.00586** (-2.170)					-0.00947* (-1.956)			
Stable_IT				0.00611 (1.261)					-0.0461* (-1.838)	
Credible_IT					-0.0180** (-2.079)					0.00410 (0.565)
Constant	0.307*** (2.905)	0.306** (2.528)	0.184* (1.839)	0.212 (0.913)	0.181* (1.850)	-0.309 (-0.400)	-0.484 (-0.645)	0.669 (1.057)	1.465*** (2.711)	-0.320 (-0.683)
Observations	230	230	230	230	230	431	431	421	421	411
Number of country	18	18	18	18	18	22	22	22	22	22
Wald test	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Test for AR(1)	0.139	0.0967	0.109	0.284	0.111	0.00928	0.00912	0.000240	0.122	0.00960
Test for AR(2)	0.565	0.293	0.109	0.770	0.109	0.293	0.278	0.488	0.882	0.271
Hansen test for over-identification	0.248	0.623	0.504	0.255	0.503	0.138	0.169	0.680	0.963	0.251

System GMM estimates; fixed effects omitted; Wald test is a test for the null hypothesis that all the coefficients except the constant, are jointly equal to zero; test for AR(1) and AR(2) are tests for absence of autocorrelation of the error terms at first and second order respectively, ***, **, * indicate the statistical significance at 1, 5 and 10% respectively.

50. This is not surprising and is consistent with our discussion of results reported in Table 3. The coefficient associated with *credible IT* is negative and significant for emerging markets but not for high income economies. Note that the magnitude is larger as compared with Table 3 column 5. This finding is also consistent with our previous discussion and in line with other empirical research on inflation targeting which found that this monetary framework provides stronger effect among emerging countries.

51. To sum up, we find a strong effect of inflation targeting on country risk for emerging market economies in particular. Moreover, even controlling for some possible transmission channels of this monetary policy framework, the *IT* dummy remains significant and its impact increases with its credibility, suggesting the existence of an announcement effect. The results seem much less robust for high income countries, but this is consistent with previous empirical research on the comparative performances of inflation targeting among developed countries which tend to find relatively small differences with non-targeters.

V. CONCLUDING COMMENTS AND POLICY IMPLICATIONS

52. This study aimed at investigating the impact of inflation targeting on country risk premia. It is the first work which empirically tests the effect of this particular monetary policy framework on country risk premium. It contributes to the existing literature on country risk which has paid surprisingly little attention to the impact of monetary policy frameworks on risk premia.

53. Based on panel data analysis, our findings suggest that inflation targeting reduces the risk premium. Moreover, even after controlling for the inflation rate and inflation volatility, the effect of adoption of inflation targeting still holds. Our findings are consistent with an inflation targeting announcement effect, especially in emerging market economies. If the adoption of inflation targeting is accompanied by other reforms, as is often the case, then the effect may not be wholly attributable to the change in the monetary policy regime. However, if the timing of such reforms is not synchronous, then the IT announcement effect is likely to be genuine. Moreover, the analysis includes other variables, such as the fiscal and corruption variables, which may be more likely to pick up the effects of other reforms.

54. The evidence also suggests that inflation targeting credibility is earned, not given. However, good performance in meeting inflation targets appears to be rewarded in terms of larger declines in risk premia than similar performance under alternative regimes. This points strongly to the benefits of adopting explicit inflation targets rather than “just doing it,” especially for emerging market economies where initial credibility may be very low.

REFERENCES

- Akitody, B., and T. Stratmann, 2006, "Fiscal policy and financial markets," IMF Working Paper 06/16.
- Arora, V., and M. Cerisola, 2001, "How does U.S. monetary policy influence sovereign spreads in emerging markets?" *IMF Staff Papers* 48(3).
- Baldacci, E., and M. Kumar, 2010, "Fiscal deficits, public debt, and sovereign bond yields," IMF Working Paper 10/184.
- Baldacci, E., S. Gupta, and A. Mati, 2011, "Political and fiscal determinants of sovereign spreads in emerging markets," *Review of Development Economics*, Vol. 15, pp. 251-263.
- Bellas, D., M. Papaioannou, and I. Petrova, 2010, "Determinants of emerging market sovereign bond spreads: fundamentals vs financial stress," IMF Working Paper 10/181.
- Berganza, J., and A. García-Herrero, 2004, "What makes balance sheet effects detrimental for the country risk premium?," Banco de España, documentos de trabajo No. 0423.
- Blundell, R., and S. Bond, 1998, "Initial conditions and moment restrictions in dynamic panel data models," *Journal of Econometrics*, Vol 87, pp. 115-143.
- Borio, C., and F. Packer, 2004, "Assessing new perspective on country risk," *BIS quarterly review*, December.
- Chang, R., and A. Velasco, 2001, "Monetary policy in dollarized economy where balance sheets matter," *Journal of Development Economics*, Vol. 66, pp. 445-464.
- Ciocchini, F., E. Durbin, and D. Ngc, 2003, "Does corruption increase emerging market bond spreads?," *Journal of Economics and Business*, Vol. 55, pp. 503-528.
- Cline, W. R., and K. Barnes, 1997, "Spreads and risk in emerging market lending," Institute of International Finance Research Paper 97/1.
- Crowe, C., 2010, "Testing the transparency benefits of inflation targeting: Evidence from private sector forecasts," *Journal of Monetary Economics*, Vol. 57(2), pp. 226-232.
- De Santis, G., and B. Gérard, 1998, "How big is the premium for currency risk?," *Journal of Financial Economics*, Vol. 49, pp. 375-412.
- Edwards, S., 1986, "The pricing of bonds and bank loans in international markets, an empirical analysis of developing countries' foreign borrowing," *European Economic Review*, Vol. 30, pp. 565-589.

- Eichengreen, B., and A. Moody, 1998, "What explains changing spreads on emerging market debt: fundamentals or market sentiment?," NBER Working Paper 6408.
- Elekdag, S., A. Justiniano, and I. Tchakarov, 2005, "An estimated small economy model of the financial accelerator," IMF Working Paper 05/44.
- Fisher, S., 1982, "Relative price variability and inflation in the United States and Germany," *European Economic Review*, Vol. 18, pp. 171-196.
- García-Herrero, A., 2005, "Emerging countries' sovereign risk: balance sheets, contagion and risk aversion," BBVA Working Paper No. 0501.
- Ghironi, F., and A. Rebucci, 2002, "Monetary rules for emerging market economies," IMF Working Paper 02/34.
- Gonçalves, C., and J. Salles, 2008, "Inflation targeting in emerging economies: what do the data say?," *Journal of Development Economics*, Vol. 85, No.1-2, pp. 312-318.
- Gürkaynak, R., A. Levin, and E. Swanson, 2006, "Does inflation targeting anchor long-run inflation expectations? Evidence from long-term bond yields in the U.S., U.K., and Sweden," Federal Reserve Bank of San Francisco Working Paper 06/09.
- Hatchondo, J., L. Martinez, and F. Roch, 2012, "Fiscal rules and the sovereign default premium," IMF Working Paper 12/30.
- Im, K., S., M. H. Pesaran, and Y. Shin, 2003, "Testing for unit roots in heterogenous panels," *Journal of Econometrics*, Vol. 115, pp. 53-74.
- Jahjah, S., and V. Yue, 2004, "Exchange rate policy and sovereign bonds spreads in developing countries," IMF Working Paper 04/210.
- Johnson, D., 2003, "The effect of inflation targeting on the level of expected inflation in five countries," *The Review of Economics and Statistics*, Vol. 85(4), pp. 1071-1081.
- Johnson, D., 2002, "The effect of inflation targeting on the behaviour of expected inflation: evidence from an 11 country panel," *Journal of Monetary Economics*, Vol.49, No. 8, pp. 1521-1538.
- Kamin, S., and K. Von Kleist, 1999, "The evolution and determinants of emerging market credit spreads," BIS Working Papers 68.
- Levin, A., F. Natalucci, and J. Piger, 2004, "The macroeconomic effects of inflation targeting," *Federal Reserve Bank of St. Louis Review* Vol. 86(4), pp. 51-80.
- Lin, S., and H. Ye, 2009, "Does inflation targeting make a difference in developing countries?," *Journal of Development Economics* Vol. 89(1), pp. 118-123.

- Mishkin, F, and K. Schmidt-Hebbel, 2007, “Does inflation targeting make a difference?,” NBER Working Paper 12876.
- Morón, E., and D. Winkelried, 2005, “Monetary policy rules for financially vulnerable economies,” *Journal of Development Economics*, Vol. 76, pp. 23-52.
- Palomino, F., 2012, “Bond risk premium and optimal monetary policy,” *Review of Economic Dynamics*, Vol. 15, pp. 19-40.
- Powell, A., and F. Sturzenegger, F., 2000, “Dollarization: the link between devaluation and default risk,” Working Paper, Universidad Torcuato di Tella.
- Reinhart, C., and K. Rogoff, 2011, “From financial crash to debt crisis,” *American Economic Review*, Vol.101(5), pp. 1676–1706.
- Roger, S., 2009, “Inflation targeting at 20: Achievements and challenges,” IMF Working Paper 09/236.
- Vega, M., and D. Winkelried, 2005, “Inflation targeting and inflation behavior: A successful story?,” *International Journal of Central Banking*, Vol. 1(3), pp. 153-175.

APPENDIX

Table 1: Sample Countries

Emerging market economies		High income economies	
ITers	non-ITers	ITers	non-ITers
Brazil (1999)	Argentina	Australia (1993)	Austria
Chile (1999)	Bulgaria	Canada (1991)	Belgium
Colombia (1999)	China	Finland (1993)	Denmark
Hungary (2001)	Malaysia	Iceland (2001)	France
Mexico (2001)	Morocco	New Zealand (1990)	Germany
Peru (2002)	Venezuela	Norway (2001)	Greece
Philippines (2002)	Honduras	Spain (1995)	Ireland
Poland (1998)	Singapore	Sweden (1993)	Italy
South Africa (2000)		United Kingdom (1992)	Japan
Thailand (2000)			Netherlands
			Portugal
			Switzerland
			United States

Note: Adoption date for ITers in parenthesis (Source: Roger (2009))
 Finland and Spain abandoned the IT framework in 1999.

Table 2: Unit root test

	Level	First difference
External debt	1	0.00
Exchange reserves	1	0.00
Exchange rate volatility	0.00	0.00
Political stability	0.00	0.00
Corruption	0.00	0.00
Fiscal deficit	0.00	0.00
Current account balance	0.0079	0.00
Inflation rate	0.00	0.00
Inflation volatility	0.00	0.00
Federal funds rate	0.00	0.00

Im, Pesaran and Shin (2003) panel unit roots test allowing serial correlation of error terms. Null hypothesis: all panels have a unit root; P-value reported in the table.

Table 3: Determinants of country risk (fixed effect estimates)

	Dependent variable: bond yields spread				
	(1)	(2)	(3)	(4)	(5)
External debt	0.00906** (2.212)	0.0132*** (3.032)	0.0123*** (2.853)	0.00850** (1.982)	
Exchange reserves	-0.00687** (-2.578)	-0.00509* (-1.860)	-0.00648** (-2.434)	-0.00827*** (-3.054)	-0.00976*** (-3.852)
Exchange rate volatility	0.0106*** (4.234)	0.0107*** (4.288)	0.0101*** (4.044)	0.0115*** (4.602)	0.0112*** (4.482)
Inflation volatility	0.0191*** (8.111)	0.0194*** (8.287)	0.0187*** (7.951)	0.0202*** (8.608)	0.0220*** (9.567)
Political stability	-0.181*** (-6.403)	-0.181*** (-6.453)	-0.160*** (-5.405)	-0.163*** (-5.762)	-0.118*** (-4.257)
Corruption	0.0676*** (8.740)	0.0638*** (8.150)	0.0646*** (8.274)	0.0680*** (8.849)	0.0536*** (6.114)
Fiscal deficit	0.0228*** (4.984)	0.0230*** (5.062)	0.0231*** (5.060)	0.0263*** (5.674)	0.0250*** (5.596)
Current account surplus	-0.0290 (-0.763)	-0.0181 (-0.476)	-0.0170 (-0.446)	-0.0110 (-0.287)	-0.0478 (-1.302)
Federal funds rate		0.00485*** (2.658)			
Contagion of debt crisis			0.0105** (2.334)		
Change in external debt				0.0227** (1.997)	
Private external debt					-0.00353** (-2.190)
Constant	0.617*** (5.161)	0.597*** (5.002)	0.511*** (4.009)	0.531*** (4.424)	0.408*** (3.418)
Observations	689	689	689	669	670
R-squared	0.340	0.347	0.345	0.373	0.350
Number of country	40	40	40	40	39
F statistics	41.20	37.75	37.48	40.90	42.01

T-statistics in parentheses, ***, **, * indicate the statistical significance at 1, 5 and 10% respectively

Table 4: The impact of IT on country risk (fixed effects estimates)

	Dependent variable: bond yields spread				
	(1)	(2)	(3)	(4)	(5)
External debt	0.0203*** (5.038)	0.0215*** (5.194)	0.0106*** (2.885)	0.0105*** (2.857)	0.0108*** (2.930)
Exchange reserves	-0.00521* (-1.861)	-0.00497* (-1.752)	-0.00204 (-0.830)	-0.00209 (-0.840)	-0.00205 (-0.834)
Exchange rate volatility	0.0154*** (6.067)	0.0155*** (6.096)	0.00709*** (3.157)	0.00703*** (3.151)	0.00698*** (3.069)
Political stability	-0.195*** (-6.688)	-0.197*** (-6.793)	-0.161*** (-6.412)	-0.161*** (-6.401)	-0.159*** (-6.234)
Corruption	0.0732*** (9.059)	0.0743*** (9.330)	0.0381*** (5.212)	0.0383*** (5.252)	0.0383*** (5.153)
Fiscal deficit	0.0226*** (4.938)	0.0225*** (4.916)	0.0160*** (3.912)	0.0159*** (3.903)	0.0157*** (3.791)
Current account surplus	0.0377 (0.970)	0.0365 (0.939)	-0.0217 (-0.643)	-0.0225 (-0.670)	-0.0212 (-0.621)
Inflation rate			0.442*** (13.55)	0.442*** (13.60)	0.440*** (13.37)
Inflation volatility			0.00656*** (2.883)	0.00660*** (2.904)	0.00667*** (2.891)
IT	-0.0121** (-2.138)		-0.00135 (-0.279)		
IT*External debt		-0.00288** (-2.134)			
Stable IT				-0.000733 (-0.154)	
Credible IT					-0.00236 (-0.459)
Constant	0.609*** (4.883)	0.612*** (4.917)	0.555*** (5.216)	0.556*** (5.210)	0.545*** (5.063)
Observations	700	700	689	689	679
R-squared	0.271	0.271	0.488	0.488	0.488
Number of country	40	40	40	40	40
F statistics	30.31	30.31	60.91	60.90	59.95

T-statistics in parentheses, ***, **, * indicate the statistical significance at 1, 5 and 10% respectively