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Hedging inflation risk in a developing economy: The case of Brazil

Marie Brière^{a,b,c,*}, Ombretta Signori^d

^a Amundi, 90 bd Pasteur, 75015 Paris, France

^b Paris Dauphine University, Place du Maréchal de Lattre de Tassigny, 75116 Paris, France

^c Université Libre de Bruxelles, Solvay Brussels School of Economics and Management, Centre Emile Bernheim, Av. F.D. Roosevelt, 50, CP 145/1, 1050 Brussels, Belgium

^d AXA Investment Managers, 100 esplanade du Général de Gaulle, 92932 Paris la Défense, France

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ABSTRACT

Inflation shocks are one of the pitfalls of developing economies and are usually difficult to hedge. This paper examines the optimal strategic asset allocation for a Brazilian investor seeking to hedge inflation risk at different horizons, ranging from one to 30 years. Using a vector-autoregressive specification to model intertemporal dependency across variables, we measure the inflation hedging properties of domestic and foreign investments and carry out a portfolio optimisation. Our results show that foreign currencies complement traditional assets very efficiently when hedging a portfolio against inflation: around 70% of the portfolio should be dedicated to domestic assets (equities, inflation-linked (IL) bonds and nominal bonds), whereas 30% should be invested in foreign currencies, especially the US dollar and the euro.

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1. Introduction

Inflation is a serious risk in emerging economies, which are likelier than developed countries to experience major inflationary shocks, both sporadic and persistent. This is significant insofar as many investors are highly sensitive to inflation risk, not only long-term institutional investors (especially pension funds and insurers, which operate under inflation-related liability constraints) but also retail

* Corresponding author at: Amundi, 90 bd Pasteur, 75015 Paris, France. Tel.: +33 1 76 33 91 61.

E-mail addresses: marie.briere@amundi.com (M. Brière), ombretta.signori@axa-im.com (O. Signori).

investors, for whom consumption and capital protection is a key concern. Accordingly, finding the best asset allocation for hedging inflation risk is crucially important.

The issue has been studied in the case of developed countries (Attíe and Roache, 2009; Amenc et al., 2009), but not for emerging economies. This is important because emerging countries have special characteristics that distort comparisons with their developed counterparts. They are subject to much sharper bouts of inflation, often caused by a crisis affecting their currency (a devaluation is passed through to domestic inflation) or their government debt. What is more, emerging country investors generally have a narrower range of domestic assets to choose from than do investors in developed countries.

Many institutional investors in emerging economies, notably pension funds, are invested chiefly in domestic government bonds and cash instruments. This is due to three main factors: equity markets are usually small and often undiversified, government debt burdens are substantial, and there is a widely held belief that govies and cash are the safest investments. But for long-term investors, cash is risky because it is exposed to the risks of reinvestment and short-term inflation surprises. Bond investments expose investors to a principal risk if interest rates rise and also to a long-term inflation risk, since coupon payments and principal redemption are nominally fixed. The only asset class providing protection from uncertainty about real interest rates and inflation is inflation-linked (IL) bonds, but not all developing countries issued IL bonds and these markets tend to be narrow and less liquid than their nominal-bond counterparts.

An alternative way for investors to hedge inflation risk is through foreign investments. Campbell et al. (2003b) show that holding short-term bonds denominated in foreign currencies with stable inflation and real interest rates is a way to protect investments against inflation. Moreover, reserve or “safe haven” currencies have the compelling property of being negatively correlated to risky assets: they tend to appreciate when equity markets fall (Campbell et al., 2010). This is particularly interesting from a portfolio construction perspective, because it offers diversification and protection when investors crucially need it. Safe haven currencies help to make a portfolio “crisis-robust” (Brière and Szafarz, 2008). The benefits of foreign currencies have been shown by Campbell et al. (2003b) from a developed country perspective. But for an emerging country investor, safe haven currencies have other valuable properties. Since many inflation shocks in emerging countries are caused by currency crises, holding currencies is a direct way to gain protection against these shocks.

We consider the case of a Brazilian investor investing in nominal assets but facing inflation risk and having a target real return. She can invest either in domestic assets (nominal bonds and equities) or in foreign investments (dollar, yen and euro cash). Two questions need to be answered. (1) What is the inflation hedging potential of domestic and foreign investment? (2) What is the optimal diversified allocation for hedging inflation risk on a given investment horizon? As far as we know, these questions have not been addressed from the perspective of an emerging market investor.

Among developing countries, Brazil is interesting in many ways. It is a big country with highly developed financial markets (its domestic government bond market is the largest in Latin America) and a thriving financial industry. Institutional investors such as mutual funds, pension funds and insurance companies are particularly prominent. Despite implementing large-scale macroeconomic stabilisation policies, including government debt reduction and inflation targeting (for which the central bank introduced an annual range), the country has been subject to strong macroeconomic instability caused by two financial crises, in 1999 and 2002, which triggered major inflation shocks.

Protecting a portfolio against inflation is one of the seminal questions in finance. Solnik (1978) and Manaster (1979) derived analytically, in a static one-period framework, the set of efficient frontiers and market equilibrium conditions of an investor maximising his real wealth. Introducing a multi-period setting, Merton (1971) studied the intertemporal portfolio choice problem with time-varying investment opportunities and introduced the concept of intertemporal hedging demand for financial assets. Theoretically, the optimal portfolio composition for hedging inflation risk can be decomposed into three parts: (1) a mean variance tangency portfolio, (2) a portfolio that best correlates with inflation, (3) an additional investment hedge against changes in the investment opportunity set. Campbell and Viceira (2002) developed an approximation technique in a discretised framework and showed that when assets follow an autoregressive process with partial predictability, the term structure effects modify the assets' correlations with inflation and the demand for risky assets in the long run.

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