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Does the accumulation of international reserves spur inflation? A reappraisal



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ABSTRACT

Central banks' international reserves have increased significantly in the recent past. While this accumulation has been widely perceived as precautionary savings to prevent financial crises, rising reserves might be incompatible with the goals of monetary policy. This paper assesses the consequences for monetary policy on theoretical and empirical grounds.

According to the quantity theory of money, the accumulation of reserves might result in inflationary pressures if the resulting monetary expansion is not fully sterilized and exceeds the growth of money demand. Our estimation results show that the degree of sterilization has varied considerably over time. The empirical analysis of monetary and non-monetary determinants of inflation provides evidence that the accumulation of reserves raises the inflation rate, both on the global and the individual-country level.

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1. Introduction

Central banks have significantly increased their stocks of international reserves in the recent past, especially during the first decade of the 2000s. The literature provides three main explanations for this behaviour (see [Aizenman & Lee, 2007](#)): First, the stocks of reserves might be regarded as precautionary savings intended to prevent and manage future economic crises and to mitigate output volatility ([Aizenman & Ito, 2012](#)). Second, the accumulation might be driven by a mercantilist motive: Reserve accumulation allows maintaining an undervalued exchange rate, which, in turn, promotes exports. Finally, reserve accumulation might be part of a catching-up strategy in an economy with underdeveloped financial markets where central banks assume the role of financial intermediary ([Cheng, 2015](#)).

These approaches coincide in emphasizing the benefits that are associated with reserves. The costs of reserve holdings and the risks embodied in their accumulation are only marginally addressed. Whereas some studies note that reserve holdings have an opportunity cost¹, the risks of reserve accumulation for price stability are generally neglected.

This article aims at filling this gap. It empirically examines the inflationary consequences of reserve accumulation. Its contribution to the literature is threefold: First, our VAR analysis at the global level over the period 1970–2012 shows that global

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¹ For a discussion of various estimates of the opportunity cost of international reserves see [Hauner \(2006\)](#), [IMF \(2010a\)](#), [Levy Yeyati \(2008\)](#) and [Rodrik \(2006\)](#).

reserve growth Granger-causes world inflation. Besides the focus on the more recent time period, this is a major methodological innovation compared to [Heller \(1976\)](#) and [Khan \(1979\)](#), who use simple OLS. Second, on the level of individual countries, our fixed effects panel data regressions of up to 120 countries provide a more general picture than existing studies that focus on small groups of countries. We demonstrate that reserve changes have been the major source of changes in the monetary base since the 1980s. The growth of central bank assets, in turn, is significantly correlated with inflation. Finally, we show that the degree of sterilization has varied considerably over time. In sum, these findings provide evidence for the view that reserve accumulation has inflationary consequences. To the best of our knowledge, this variety of approaches adds a more general perspective to the existing literature.

Reserve accumulation might cause inflation through the following transmission channel: A rise in reserves increases the monetary base as long as it is not fully sterilized. The increased monetary base, in turn, leads through the functioning of the money multiplier to an expansion in the total amount of money. Finally, according to the quantity theory of money, the growth of money causes prices to rise after some delay. This argument is due to [Heller \(1976\)](#) and was empirically confirmed by [Khan \(1979\)](#).

Since these seminal papers, a reconsideration of the relationship between reserves and inflation is overdue. Even though the risks of reserve accumulation for monetary policy have been recognized (see for example [ECB, 2006](#))², a theoretical and empirical study on the topic is missing. Since the studies of Heller and Khan have been published, the international financial system has changed fundamentally and their conclusions of the Bretton Woods period might not be valid in a financial system with flexible exchange rates and a high degree of capital mobility. It is therefore warranted to reconsider whether the current accumulation of reserves creates inflationary pressures.

The global financial crisis has revived the debate on central banks' objective. Their role in stabilizing the domestic and global financial system has been emphasised and their narrow focus on inflation criticised (see, among others, [Eichengreen et al., 2011](#); [Leeper & Nason, 2014](#); [Smets, 2014](#)). Given that central banks are equipped with one instrument only, there might be situations where the goals of low inflation and financial stability cannot be achieved jointly. This paper highlights such a dilemma of central banking: While the recent reserve accumulation is partly due to concerns for financial stability in a financially globalised world (see [Obstfeld, Shambaugh, & Taylor, 2010](#)), this policy might run counter to price stability.

The uncertainty with respect to the inflationary consequences of the ongoing reserve accumulation is amplified by the fact that recent empirical studies disagree in the assessment of the extent of de facto sterilization (see the literature review in the next section). If the accumulation of reserves is not fully sterilized, it is expected to produce inflation. This might require a change in central banks' sterilization policy since their goals of maintaining price stability and preventing currency crises via reserve accumulation can only be attained simultaneously if the effects on the monetary base are sterilized. Moreover, this policy is costly because high and variable inflation rates are found to be detrimental for growth (see [Barro, 1997](#); [Ghosh & Philips, 1998](#)) and consumption ([Assibey-Yeboah & Mohsin, 2014](#)). Given that inflation rates might react with a significant time lag (see [Batini & Nelson, 2001](#)), there exists the risk that the negative effects of reserve accumulation are not sufficiently accounted for.

This article is organized as follows: The next section summarises the existing empirical findings on the relationship between reserve accumulation, global liquidity and inflation. Section 3 reviews the theoretical links between reserves, the monetary base and inflation. Section 4 investigates this relationship empirically: First, we present a VAR analysis for world variables and, second, examine the relationship at the country level in a cross-country panel data set. The final section concludes.

2. Literature review

The seminal paper exploring the links between changes in international reserves and inflation is due to [Heller \(1976\)](#). According to his hypothesis of global monetarism, the world price level is affected by world reserves if currencies are linked through fixed exchange rates. A regression analysis covering the period 1958–1975 ([Heller, 1979](#)) shows that world prices react with a mean lag of three years to changes in international reserves. This lag tends to be much shorter in developing than in industrial countries. A one per cent increase in reserves is estimated to result in a cumulative price increase of about 0.4 per cent. This effect is larger in developing than in industrial countries.

[Khan \(1979\)](#) challenges these results arguing that reversed causality might be present, namely that nominal international reserves respond to inflation. However, Khan's causality tests confirm Heller's results for the entire period (1957–77). Conversely, tests for the floating rate period (1973–77) show that the two series are independent and that the relationship between them is rather contemporaneous than causal. [Rabin and Pratt \(1981\)](#) question the generality of Heller's results. They argue that his results are driven by a short episode of reserve accumulation and rising inflation in the 1970s.

According to global monetarism, inflation is a global monetary phenomenon under fixed exchange rates. Under floating exchange rates, however, the central bank can pursue an independent monetary policy such that the inflation rate is

² The authors point out that the accumulation of reserves might challenge monetary policy: "Particularly in the presence of continuous net capital inflows, intervention on currency markets [...] may lead to an excessive easing of domestic monetary conditions which could then threaten price stability" ([ECB, 2006](#), p.36).

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