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# Journal of International Money and Finance

journal homepage: [www.elsevier.com/locate/jimf](http://www.elsevier.com/locate/jimf)

## Monetary facts revisited<sup>☆</sup>

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### ARTICLE INFO

#### Article history:

Available online 24 April 2018

#### JEL classification:

E31  
E42  
E51  
E52

#### Keywords:

Money growth  
Inflation  
Credit growth  
Financial crises

### ABSTRACT

This paper uses data from 46 economies over the post-war period to revisit two key monetary facts: (i) the link between money growth and inflation and (ii) the link between credit growth and financial crises. The analysis reveals that the former has weakened over time, while the latter has become stronger. This suggests that there is an inverse relationship between the two monetary facts. The money-inflation link is weak and the credit-crisis nexus is strong when inflation is low and financial systems are liberalised, while the reverse holds true in environments of high inflation and less liberalised financial systems.

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## 1. Introduction

In the decades leading up to the Great Financial Crisis, money and credit aggregates played an increasingly peripheral role in monetary theory and policy. In mainstream macro models, money and credit did not matter for macroeconomic outcomes.<sup>1</sup> And in monetary policy frameworks, money and credit were generally not amongst the key indicators considered.<sup>2</sup> This marginalisation of money and credit has been a subject of debate, both before and, more intensely, after the crisis. This paper aims to contribute to this debate by revisiting the two key monetary facts established in the literature, the link between money

<sup>☆</sup> The views expressed in this paper do not necessarily reflect the views of the National Bank of Slovakia, the Eurosystem or the Bank for International Settlements. We would like to thank Andy Filardo, Marco Lombardi and Gianni Lombardo and seminar participants at the Bank for International Settlements, the European Central Bank and the National Bank of Slovakia, as well as two anonymous referees, for helpful comments and discussions.

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<sup>1</sup> The key feature of pre-crisis mainstream New Keynesian models was pricing frictions, while financial factors were essentially absent with the exception of a short-term interest rate controlled by the central bank. In its simplest form, the baseline New Keynesian model could be boiled down to a three-equation system featuring inflation, the output gap and the short-term interest rate (see [Woodford, 2008](#)).

<sup>2</sup> That said, over much of the post-war period, money and credit aggregates figured prominently in many countries' monetary policy frameworks. In the 1950s and 1960s, credit played an important role when many central banks had put in place restrictions on interest rates and balance sheet quantities through which they implemented credit allocation and demand management policies. The 1970s then saw the emergence and spread of monetary targeting and of an increasing focus on money at the expense of credit in policymaking. This shift was driven by the ascent of the monetarist paradigm, which emphasised the implications of the quantity theory of money for macroeconomic outcomes, in particular the long-run association between money growth and inflation. Since the mid-1980s, there was a gradual move away from monetary targets and towards more directly inflation-centred regimes, with the Bundesbank and the European Central Bank in its early years as notable exceptions. See [Borio and Lowe \(2004\)](#) and [BIS \(2007\)](#) for a more detailed discussion of the evolution of the role of credit and money in monetary policy frameworks over the post-war period.

growth and inflation on the one hand, and the more recently established link between credit growth and financial crisis risk on the other.

Before the Great Financial Crisis, the debate had focused on the role of money in monetary theory and policy. Specifically, monetary policy frameworks and monetary macro models were criticised by some for disregarding the long-run one-to-one link between money growth and inflation that is predicted by the quantity theory of money. This long-run link has been a core monetary fact of the post-war period, strongly supported by the empirical evidence. Specifically, numerous empirical studies have shown that the long-run averages of money growth and inflation are proportionally correlated across countries (e.g. McCandless and Weber, 1995; Lucas, 1996; Vogel, 1974; Lothian, 1985; Dwyer and Hafer, 1988, 1999).<sup>3</sup> Indeed, Fig. 1 (left-hand panel) shows that this evidence can also be reproduced from up-to-date data. The averages of money growth (in excess of real GDP growth) and inflation in a group of 46 economies are correlated on a one-to-one basis over the post-war period.

The Great Financial Crisis has lent new impetus to the debate about the role of quantitative aggregates in monetary analysis and modelling, but with a shift in focus. The financial crisis was preceded by a credit boom, which turned into a bust when the crisis broke out, a pattern that has held more generally over the post-war period (Fig. 1, right-hand panel). This observation has reinforced calls that credit aggregates ought to be given greater attention in monetary analysis in order to better identify risks to financial stability. Borio and Lowe (2002a,b, 2004) were the first to emphasise and provide formal evidence on the link between credit and financial instability. They show, based on cross-country empirical evidence, that persistent growth of credit above its long-term trend indicates a growing risk of a systemic financial crisis.<sup>4</sup> In a similar vein, Eichengreen and Mitchener (2003) characterise the Great Depression as a credit boom gone bust. Schularick and Taylor (2012) document the significant predictive ability of real credit growth for future financial crises for a panel of advanced economies over the period 1870–2008. Similarly, Borio and Drehmann (2009), Gourinchas and Obstfeld (2012) and Drehmann and Juselius (2013) show that domestic credit-based indicators have been reliable leading indicators of financial crises in both advanced and emerging market economies over the post-Bretton Woods period.<sup>5</sup>

Monetary facts might change over time due to changes in the monetary and financial regimes. Two regime changes that stand out over the post-war period are the significant global disinflation and financial liberalisation trends since the mid-1980s (Fig. 2).<sup>6</sup> The global median inflation rate dropped from 13% to 7% in the mid-1980s, and then below 5% in the mid-1990s (left-hand panel). Financial liberalisation, measured by the quantitative indicator of Abiad et al. (2010),<sup>7</sup> accelerated globally in the 1980s (right-hand panel).

Financial liberalisation may weaken the empirical link between money growth and inflation, while it may strengthen that between credit growth and crisis risk. Financial innovations, such as new financial services or products introduced in the wake of financial liberalisation, were identified as important shifters of the demand for money balances since the 1970s (see e.g. Ireland, 1995 and the references therein). The associated shifts in money velocity have likely driven a wedge between money growth and inflation, weakening the empirical link between the two variables. At the same time, greater financial liberalisation has come along with greater financial instability. Bordo et al. (2001) show that the frequency of financial crises has increased considerably in the post-Bretton Woods period. The coincidence with the trend towards more liberal financial systems over the same period suggests that there might be a link between financial liberalisation, credit boom-bust cycles and financial crises. Indeed, the link between financial liberalisations and subsequent credit booms and busts is well documented in the literature (e.g. Goodhart et al., 2004).

Financial liberalisation has also affected the composition of financial institutions' assets and liabilities in a way that has probably contributed to a weaker money growth-inflation link and a stronger credit growth-financial crisis nexus. On the liability side, there has been a growing reliance of banks on non-monetary sources of funds, such as wholesale funding. This trend is reflected in a growing divergence over time between the expansion of credit and money aggregates, as documented in Schularick and Taylor (2012) for a group of core advanced economies, and in Section 2 of this paper for a larger group of advanced and emerging market economies. This development has likely also affected the monetary facts. The increasing divergence between credit and money means that money has over time become a less accurate gauge of financial conditions in the economy, and hence of inflation pressures. At the same time, non-monetary sources of funding are less stable than their monetary peers, which might have increased the likelihood that credit booms usher in financial distress.

<sup>3</sup> Another strand of the literature demonstrated the existence of a long-run link between money growth and inflation based on long runs of time series data for individual countries (see e.g. Lucas, 1980; Assenmacher-Wesche and Gerlach, 2007).

<sup>4</sup> The early literature on the leading indicators of banking crises had identified credit growth as one important leading indicator amongst others (e.g. Demirgüç-Kunt and Detragiache, 1998; Kaminsky and Reinhart, 1999).

<sup>5</sup> Borio and Drehmann (2009) and Drehmann and Juselius (2013) suggest that the credit gap, the deviation of credit from a long-run trend, is a reliable indicator of financial distress. Gourinchas and Obstfeld (2012) find that, in addition to credit growth, real currency appreciation is also an important indicator. Another strand of literature has established a significant empirical link between money and credit growth and asset price dynamics (e.g. Borio et al., 1994; Detken and Smets, 2004; Adalid and Detken, 2007; Goodhart and Hofmann, 2008; Alessi and Detken, 2009).

<sup>6</sup> The two trends are probably not entirely unrelated to each other. Their coincidence may reflect the retreat of policies using a combination of high inflation and financial repression to liquidate government debt (Reinhart and Sbrancia, 2011). It may also reflect that financial deregulation driven strengthening of the monetary policy transmission was in many countries an important element of disinflation strategies (Pagoulatos, 2003).

<sup>7</sup> The indicator of Abiad et al. (2010), which ranges between 0 (full repression) and 1 (full liberalisation), is based on a grading of seven dimensions of financial sector policy for every year between 1973 and 2005. A higher value of the indicator thus reflects a more liberal financial system.

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