UNIVERSITÉ DE FRIBOURG
UNIVERSITÄT FREIBURG

WORKING PAPERS SES

The Meaning of Monetary Stability

Amos Pesenti

N. 475
IX.2016

Faculté des sciences économiques et sociales
Wirtschafts- und sozialwissenschaftliche Fakultät

THE MEANING OF MONETARY STABILITY

Amos Pesenti

Chair of Macroeconomics and Monetary Economics
University of Fribourg, Switzerland

ABSTRACT: The conventional approach to monetary stability is not so much different from that related to price stability. As such, it simply supposes that the aggregation of prices in the marketplace is necessary and sufficient for determining the presence of inflation (or deflation) in the economy. However, investigating monetary stability according to this microeconomic approach leads to confusion since the aggregation of price data, as suggested in this paper, does not explain the source of inflationary (or deflationary) pressure on overall prices. Consequently, price instability does not necessarily imply the existence of monetary instability, and vice versa. Hence, this paper, besides presenting a new macroeconomic approach to monetary stability, explains the true source of upward (or downward) pressure on overall prices and then provides policy recommendations to prevent monetary instability.

KEYWORDS: Banking, consumer price index, deflation, inflation, monetary stability, money, payments, price stability.

JEL CODES: E10, E20, E31, E42, E51, E52.

1. Introduction

Over the last quarter of the twentieth century, monetary stability moved to the foreground, becoming one of the main monetary policy goals in developed countries. Thus, the analysis of monetary stability has not only had a long tradition in academic teaching, but is also a relevant policy topic. According to the conventional approach, monetary stability is not analysed from a macroeconomic perspective, but rather from a microeconomic one. Within this framework, monetary stability manifests as price level stability, to wit, the stability of an index number representing a weighted average of prices for a basket of goods and services sold in the marketplace. Monetary stability is therefore considered to be connected to price stability, meaning that money's value, namely its purchasing power, is holding steady, inflation (or deflation) is near zero, and the cost of living is stable. Conversely, monetary instability is mirrored in price-index fluctuation, meaning that an inflationary (or deflationary) pressure on the price level is at work. Investigating monetary stability in accordance with this microeconomic approach is, however, misleading since the aggregation of price data, which is supposed to be established through marketplace trading, does not necessarily reflect the purchasing power of money. Accordingly, if a price index is used as an indicator of variation in money's purchasing power (and not only of variation in the cost of living), its fluctuation does not show whether the purchasing power of money is actually changing in a period characterised by price instability.

The purpose of this paper is to investigate the meaning of monetary stability at the domestic level with the aim of explaining the distinction between price instability and inflationary increases (or deflationary decreases) in overall prices, so that the 'true' source of monetary instability can be detected. To achieve this purpose, this paper starts by explaining how the conventional approach to monetary stability is fundamentally flawed both theoretically and practically. Drawing on quantum macroeconomics, the third section then presents a new approach to monetary stability. This section explains that monetary stability can be understood only if it remains founded on macroeconomics, because money's nature is related to the working of the whole economy and its purchasing power depends on the way in which it is integrated into the economy. The fourth section explains why and to what extent monetary stability does not depend on the stability of a price index, but instead on the manner in which money is introduced into an economy at the instant when banking intermediation is required for the monetisation of production. Following these same analytical lines, the fifth section provides policy recommendations to prevent monetary instability and keep overall prices stable. The last section provides a brief conclusion summarising our original findings.

2. The conventional approach to monetary stability

Orthodox economists analyse overall economic performance from a microeconomic perspective, comparing it with the functioning of the market and

putting any form of economic agents' behaviour under scrutiny in an attempt to observe the trading process resulting from the interplay of supply and demand. Economic analysis is conventionally based on microeconomics, because all sorts of macroeconomic events are 'derived from micro foundations – that is, utility maximization by consumers-workers; [profits] maximization by firms; rational expectations; and a full specification of imperfections' (Blanchard, 2009, p. 223), from wrong information and nominal rigidities to imperfect competition (see Wickens, 2008). From this perspective, the analysis of the economy's overall performance is no longer carried out in compliance with its own logical laws, but rather in line with the performance of a specific market or distinct fields of inquiry composing the whole economy. This is so because 'all macro phenomena are the aggregate of many micro phenomena' (Mankiw, 1994, p. 332) in the sense that the analysis of the whole economy 'obeys the same laws' as the analysis of its parts (Hicks, 1939[1965], p. 245). In this conceptualisation, the outcomes of all production, exchange and consumption activities are identified with aggregates, namely, with microeconomic magnitudes synthesising agents' behaviour whose *raison d'être* is built on 'the law of the market', according to which, at equilibrium, every supply is a demand and every demand is a supply.

Within this framework, each (micro or macro) phenomena or each 'elementary event' is 'a transaction – an exchange in which one economic [agent] transfers goods or services or securities to another [agent] and receives a transfer of money in return' (Friedman, 1987[2004], p. 5). For instance, by assuming that each agent disposes of some initial endowments, workers trade labour services for wages in the factor market, entrepreneurs intermediate between the factor market and the product market (Walras, 1874[1954], pp. 224–5) and bankers intermediate between savers and investors (Graziani, 2003[2009], pp. 48–9). 'Money appears in the middle of the trading process' (Starr, 2012, p. 3) as soon as agents are confronted with imperfections, 'lubricating' the relevant transactions and thus rehabilitating the functioning of the relevant market. This perspective supposes that 'money is a *creature of the market*' (Bell and Nell, 2003, p. xi, emphasis in the original), to wit, an outcome of a spontaneous selection process carried out by agents to choose the 'best' object as a medium of exchange in the trading process (see Kiyotaki and Wright, 1989; Iwai, 1996). This means that money is no longer different from any other object except that it 'is not really wanted for its own sake but only for the ultimate exchanges it will make possible' (Samuelson, 1968, p. 8). Analysed more closely, the price of the object representing money is determined in the same manner as that of the other objects available in the marketplace: by attaching a 'pure' number to at least one object with the purpose of picturing the starting point for the trading process through which the price(s) of the other objects will be established (see Walras, 1874[1954]; Debreu, 1959[1987]). After its price is determined, money acquires the character of a 'universal equivalent' in the trading process since all other heterogeneous products can express their value by means of it (Marx, 1867[1954], p. 67). In so doing, money becomes the 'great social store' of all objects traded against it

(Schumpeter, 1954[1994], p. 289), such that it can exert its function as a medium of exchange, carrying value among transactions and across time.

It is important to note in this regard that, while the existence of money is due to the existence of a trading process carried out in the marketplace, its quantity is a multiple of the initial object chosen as money and as such is steered by the central bank (Lavoie and Seccareccia, 2016, pp. 100–2). This means that money is an exogenous magnitude and appears in the economy as a 'net' asset (from a bookkeeping perspective as we will see later on) and in an independent manner with respect to the real goods sold in the marketplace. This also means that the economy is divided into two sectors, implying that the quantity of real goods and their (relative) prices are established in the real sector, while the quantity of money and its (relative) price (the price level) are determined in the monetary sector. Under these circumstances, variations in the value of money, that is its purchasing power, 'can be assessed with a micro-statistical apparatus which aggregates "elementary transactions" into a so-called "equation of exchanges"' (Baranzini and Cencini, 2001, p. xxviii), which pictures a confrontation of the aggregate demand with the aggregate supply times the aggregate level of prices (Patinkin, 1956[1965], p. xxiii). The exchange equation represents the traditional version of the quantity theory of money (see Mastromatteo and Tedeschi, 2015) and is conventionally used as a standard reference to explain the price level (Woodford, 1998, p. 175; Meyer, 2001, pp. 1–4) – the ratio between the quantity of money and the quantity of real goods available in the marketplace at a determined period of time (see below for further details regarding the price-level measurement).

According to orthodox economists, the price level is directly affected by monetary impulses, such that any variation in the money supply provokes a proportional variation in the level of prices. This is so because an increase in the exogenous money supply, at market equilibrium, leads economic agents to increase their expenditures via the so-called real-balance effect (see Patinkin, 1956[1965]). Thus, when the quantity of money in the economy has doubled and the price level is initially stable, agents dispose of more buying power than before, increasing the number of transactions. Such expenditures lead to the greater quantity of money being transferred between agents without reducing the amount of it put into circulation. To get rid of money, agents then purchase real goods, whose quantity has not doubled in the meantime. In other words, the increase in aggregate demand is still not compensated for by a proportional increase in aggregate supply. However, the increased desire to purchase real goods increases their prices. This trading process continues until the price level doubles and a new equilibrium is established.

Understood this way, the level of prices is determined through the 'balancing' of two clearly separated magnitudes: the quantity of money and the quantity of real goods. In this picture, if an increase in the quantity of money is not supported by an increase in the quantity of real goods, the real-balance effect is usually

considered to 'provide an explanation of how the [economy] behaves in disequilibrium' (Archibald and Lipsey, 1958, p. 1), namely, a logical explanation for the impact of monetary instability on nominal magnitudes such as the price level. The notion of monetary stability essentially describes an economic situation in which the quantity of money is proportional to the quantity of real goods, such that the price level becomes measurable and can be kept stable during the examination period. In contrast, monetary instability indicates an economic situation in which the quantity of money is no longer proportional to the quantity of real goods, eliciting an inflationary increase (or deflationary decrease) in the price level. To complete the picture, since the quantity of money is considered to be the universal equivalent of all real goods sold in the marketplace and as such is endowed with the power to purchase those goods, the notion of monetary stability also indicates that the value of money, which is 'diluted' in its quantity, is necessary and sufficient to buy the total quantity of real goods involved in the trading process. When the quantity of money is greater than that of goods, 'too much money chases too few goods' (Bronfenbrenner and Holzman, 1963, p. 599) in the sense that agents dispose now of a greater amount of money to buy the same amount of real goods, eliciting an increase in the price level and thereby a decrease in money's purchasing power, and vice versa. As money's purchasing power is inversely proportional to the level of prices, at this juncture, we may infer that an analysis of the purchasing power of money is not different from an analysis of the price level (Fisher, 1911[1912], p. 14). Indeed, we observe that the notion of monetary stability, besides involving 'a stable value of money, [that is] the maintenance of purchasing power', usually 'means that the *average* of the millions of prices in an economy remains stable. In this case we talk of the stability of the price *level*', namely of price stability, which 'ensures that in the course of time we can generally buy the same quantity of goods for a given monetary unit' (Tietmeyer, 1988[1993], pp. 28–9, emphasis in the original). On this evidence, the notion of price stability has been conventionally used as a 'synonym' for monetary stability (Issing, 2003, p. 1) and as the starting point for the analysis of inflation dynamics.

Since monetary stability is considered to be connected to price stability, orthodox economists would claim that in a dichotomised economy price stability could be granted only through monetary stability – that is to say, 'only by a strict control over the growth of the money supply (determined by the [monetary] sector) relative to the growth of real output (determined by the real sector)' (Cencini, 1996, p. 20). Over the last quarter of the twentieth century, this way of thinking gave rise to a consensus on the importance of achieving price stability through monitoring either the growth of a specific monetary aggregate that is right-correlated with the price level or the policy rate of interest that influences the level of prices by means of the aggregate-demand stimulus (Rochon and Rossi, 2016, pp. 136–41). Indeed, many central bankers, being persuaded by the fact that money is a 'thing' that 'does not really matter', to wit, a sort of 'veil' (Pigou, 1941, p. 33) that especially impacts nominal magnitudes (and not necessarily real ones), design their programme for price stability as the primary long-run focus of

their monetary policy (see Mishkin, 2007[2015]), attributing to it two clear objectives: 'eliminat[ing] uncertainty about long-run changes in the price level' and 'reduc[ing] the expected rate of price inflation to zero' (Ireland, 1993, p. 25). Although these objectives have been convincingly improved upon to keep the price level controllable and stable over time, the first one seems doubtfully realisable since 'the future is fluctuating, vague and uncertain' (Keynes, 1937, p. 213). The second objective seems to be fully realisable, but central bankers, in their attempt to protect the economy from deflation, usually prefer to target an inflation rate close to two per cent instead of a zero inflation rate (Bernanke et al., 1999[2001], pp. 27–30). Needless to say, the implementation of such a monetary policy is possible only when it is conventionally considered that nominal and real magnitudes are two distinct things and that money appears in the trading process already endowed with value. As we will see in the next section, this view, however, goes against the logic concerning the nature of money. As the working of the modern economy shows, 'money and output are one and the same thing, that is to say, income' (Rossi, 2006[2014], p. 124), implying that monetary stability is granted only when the total amount of real goods sold in the product market is completely integrated into the total number of money units issued by banks at the instant when the latter have to record in their ledgers the payment of workers' wages on behalf of firms in the factor market.

3. A new approach to monetary stability

According to a number of economists, the conventional approach to monetary stability is not satisfactory as its scope does not go beyond all events happening at the microeconomic level and as such is limited to an analysis of agents' observed behaviour in the trading process. Within this framework, the economy is divided into two sectors, implying that money appears in the marketplace in an independent manner with respect to real magnitudes. This means that monetary instability has a direct impact on nominal magnitudes and not necessarily on the economy as a whole. Even though this interpretation seems logical from a microeconomic viewpoint, it is wrong from a macroeconomic one. As money's nature is related to the working of the whole economy and its value depends on the way in which it is integrated into the economy, a logical analysis of monetary stability can be provided only if it remains founded on macroeconomics.

Contrary to what orthodox economists advocate, money 'matters' in the sense that it is essential for the working of the whole economy. Instead of being an 'additional' component of the economy in the form of an exchangeable object, money renders all production, exchange and consumption activities distinguishable from each other. In particular, while 'production is a macroeconomic event increasing national income, consumption is […] a macroeconomic event decreasing it' (Cencini, 2005, p. 131). By contrast, an exchange or transfer of purchasing power between agents is a microeconomic event, since it modifies the distribution of (national) income among market

participants without affecting its actual volume (ibid., p. 131). In this regard, the outcome of all production, exchange and consumption activities is no longer identified with microeconomic magnitudes, but rather with macroeconomic laws representing the working of the whole economy or with the logical identities deriving from the peculiar nature of money whose *raison d'être* is found in the accounting principle of 'double-entry bookkeeping through which [(the set of all)] banks record all debts and credits for further reference and settlement' (Rossi, 2007[2015], p. i). Since the existence of debts and credits recorded in banks' ledgers stems from the payments carried out by banks between at least two non-bank agents (Hicks, 1967, p. 11), '[m]oney and payments are one and the same thing. No money, if correctly defined, exists either before or after a given payment' (Schmitt, 1996b, p. 88).

Being the numerical form of any payment, money is nothing but a bookkeeping device, namely, a double entry in banks' books that is simultaneously recorded as an asset and a liability at the instant when payments for whatever economic reason have to take place among non-bank agents and the resulting debt obligations have to be recorded for reference. In the guise of an 'asset–liability' (Schmitt, 1975, p. 13, our translation), money describes the instantaneous circular flow of payments through which it concurrently appears and disappears on (both sides of) banks' ledgers, thereby 'leaving behind a numerical information about the economic results of its instantaneous use' (Cencini, 2001[2014], p. 27) that affects both payers' and payees' positions in their bank accounts. Becoming the beneficiaries of payments, payees indeed are the owners of deposits that are recorded on the liabilities side of banks' ledgers. These bank deposits are perfectly balanced by entries on the assets side of the same ledgers that testify the payers' debt to banks. In such a framework, the remarkable thing is that, while 'money exists *within* payments', 'bank deposits exist *between* payments', so much so that 'money *carries out* payments' and 'bank deposits *finance*' them (Rossi, 2009, p. 40, emphasis in the original).

For instance, when (the set of all) firms start production from *tabula rasa* and thus need credit to 'cover the total cost of the planned amount of production' (Graziani, 2003[2009], p. 69), they ask banks for credit lines, possibly taking advantage of a low interest rate environment. Since labour is the unique factor of production (Keynes, 1936[2007], pp. 213–14), firms then activate their lines of credit, asking their banks to pay wages to (the set of all) workers in the factor market (note also that wages correspond in this sense to the 'original' income created in the whole economy). In so doing, banks issue money for the corresponding payment to be carried out in the factor market, thus affecting the positions of both firms and workers in their bank accounts. Entry (1.0) in Table 1 shows that, as a result, firms become indebted to banks up to the number of (x) money units (m.u.) paid to their workers, such that when paying wages 'they temporarily have at their disposal the goods which have been produced, but do not appropriate them in the sense that the goods are subject to a debt that will have to be repaid by selling the goods produced' (Gnos, 2007, p. 118). Further, banks

Table 1 The result of both the payment of wages in the factor market and their expenditure in the product market

		Banks		
Assets				**Liabilities**
(1.0) *	Credit on firms	*x* m.u.	Debt to workers	*x* m.u.
(2.0) *	Credit on workers	*x* m.u.	Debt to firms	*x* m.u.
(3.0) ***		0 m.u.		0 m.u.

Note: (*) is the accounting entry corresponding to the newly produced real goods.
(***) is the balance of banks' ledgers at the end of the day.
Source: Cencini and Rossi (2015, pp. 22–37, our elaboration).

become indebted to workers since the latter have gained wages from production that are immediately deposited with the former. At this stage, as soon as workers spend their wages to buy real goods in the product market, firms can earn the respective turnover with which they can reimburse their debt to banks and in turn banks can reduce their debt to workers (see entry (3.0)). Obviously, banks once again have to issue money for the reciprocal payments to be carried out in the product market, affecting the positions of both firms and workers in their accounts (see entry (2.0)). Having said that, the power of workers to purchase real goods is not generated by banks via a simple emission of money, but rather stems from the 'association' between money and output that occurs in production at the instant when wages are paid out through banking intermediation.

To better understand this point, money has to be considered as a flow whose instantaneous circulation gives rise to a stock of income representing its object (Cencini, 2001[2014], p. 3). Consequently, income exists in the form of bank deposits and has a positive duration in time (Rossi, 2007[2015], p. 39). This implies that banks issue the flow, but do not create its object since the latter is strictly related to production (Cencini, 2001[2014], p. 3). By analogy, when banks open credit lines to firms and then prepare to carry out the required payments, they declare their availability to provide a bookkeeping device without it being endowed with value, which may be referred to 'nominal money' (Cencini and Rossi, 2015, pp. 18–20). The corresponding banking intermediation required for the monetisation of production (the payment of wages) converts nominal money into 'real money' – money endowed with value, to wit, the power to buy the output produced in the same examination period (Schmitt, 2012a, pp. 75–9; Cencini et al., 2016, p. 67). To be sure, when production actually takes place, banks provide firms with nominal money, whose object is given by '*absolute exchange*' through which the produced output (that is not arbitrarily given in agents' initial endowments) is 'exchanged against itself, albeit in a different form', as 'it is transformed into income and deposited with' banks (Cencini and Rossi, 2015, p. 26, emphasis in the original). In this sense, production is nothing but an instantaneous event that 'quantises time' (Schmitt, 1984, p. 54, our translation) since it refers to the very instant when the production cost (labour or

workers' productive effort) is paid for. The payment of wages, besides being a banking practice that captures instantaneously a portion of continuous time through which workers transform 'matter' and 'energy' into a homogeneous output, is also a banking intermediation that integrates the same produced output into nominal money, so much so that the latter is converted into real money, that is to say, income (Cencini, 2005, pp. 119–25). As a result, the newly produced output is finally defined through the newly issued real money units composing the newly paid wages. By defining output through wages, the 'final' holders of output (consumers–workers) are also the holders of wages, which are immediately deposited into bank accounts. Since the holders of wages are now the holders of output, workers obtain not just bank deposits from firms, but also a 'drawing right' over the newly produced output, meaning a power to purchase the real goods produced during a given period of time (Cencini, 1995[1997], pp. 22–3). In this regard, the payment of wages is an emission that gives value (purchasing power) to money, which in turn allows workers (the holders of the income expressed in real money units) to obtain the results of their productive efforts (Schmitt, 1984, p. 347), to wit, the produced output sold in the marketplace, such that firms can recover the reciprocal bank deposits and reimburse their debt to banks.

Within such a framework, prices, instead of being determined in the trading process, are established in production. Prices indeed appear in the economy in the guise of money units at the instant when output is produced and simultaneously income is created in the factor market (see Schmitt, 1984, 1996a, 2012b). Being expressed in money units, the chronological existence of prices is dependent on income transfer and its destruction in the product market. This means that the prices established in the factor market constitute the starting point for the setting of prices in the product market – the essence of these prices, however, is strictly dependent on the behaviour of economic agents (see below for further explanation). As such, the notion of 'price' denotes a certain number of money units that must be paid to obtain a certain amount of real goods sold in the product market, whereas the notion of 'overall (the set of all) price(s)' indicates the total number of money units issued in the economy that must be paid to obtain the total amount of real goods produced in it. Obviously, it is in this conceptualisation that the notion of monetary stability emerges. Indeed, monetary stability indicates an economic situation in which the produced output is totally integrated into money as its real content. On the one hand, this means that the total number of money units issued by banks to pay workers' wages on behalf of firms in the factor market is endowed with value, so that the corresponding bank deposits have the necessary and sufficient power to purchase the total amount of output sold in the product market. On the other hand, the total number of nominal ('empty') money units has been completely converted into the total number of real ('full') money units via banking intermediation, so much so that there is no empty money inflating (or deflating) overall prices during the examination period. This economic situation also demonstrates the existence of an identity between total demand and total supply, since in this case the total amount of bank deposits

expressed in real money units is identical to the total amount of produced output. Things turn different, however, when for instance total demand also comprises nominal money units. In this case, the identity between total supply and total demand still holds, but the composition of at least one of the two terms of the identity changes (Cencini, 2012, pp. 61–4; Cencini and Rossi, 2015, ch. 6) since the presence of nominal money introduces a numerical difference affecting monetary stability negatively.

Having investigated the meaning of monetary stability, we shall now define the notion of monetary instability, which generally means that an inflationary (or deflationary) pressure on overall prices is at work. In this regard, it is of fundamental importance to note that monetary instability does not depict an economic situation in which the price level changes over time causing a variation in the purchasing power of money, but rather is a macroeconomic event reflecting a loss (or gain) in the value of money, which then exerts an upward (or downward) pressure on overall prices. By virtue of this, money does not lose (or gain) value as prices vary over time, but rather when the content of money units that make up overall prices is not completely filled up with the total amount of real goods produced in the economy. Stated slightly differently, if overall prices remain stable over time, the related prices can nevertheless vary in the marketplace, but only on condition that the total number of money units that compose their whole does not become greater than the amount of income paid in the factor market for the production of the same real goods (Schmitt, 1984, pp. 379–80; Bailly, 2003, pp. 371–4, 2012, p. 126). Under that condition, if workers spend the total amount of income at their disposal in the product market, it is possible that they would purchase a smaller amount of real goods than that corresponding to the total number of money units they received in the form of wages in the factor market (Bailly, 2012, p. 126). If this happens, it logically means that firms have imposed a mark-up on the prices of the real goods sold in the product market in an attempt to pursue a specific managerial strategy. By so doing, they implicitly determine ‘the distribution of income between wages and profits’ (Graziani, 2003[2009], p. 26), benefiting from the transfer of purchasing power over a fraction of produced output from wage earners. Hence, what firms obtain from wage earners in the product market is not only a drawing right over the unsold stock of real goods, but also a number of money units corresponding to them (Bailly, 2012, p. 126). If the next day firms decide to redistribute their profits as interest and dividends to their shareholders or even to pay a State tax obligation, the final holders of that income (re-)gain the necessary power to purchase the stock of real goods, which has not yet been consumed, and no discrepancy between total supply and total demand occurs (Rossi, 2001, p. 150). What is now true for the redistribution of profit in the product market is also true for the investment of profit in the financial market. Indeed, if firms decide to transform their retained profits into financial assets such as bonds or securities transferrable on the financial market, no gap between total supply and total demand appears in the economy since the bank deposits corresponding to invested profits are simply lent to other agents, who finally spend them on the unsold stock

of real goods (ibid., p. 149). If, however, firms decide to invest their retained profits in the production of investment (capital) goods or in that of consumption goods, an inflationary (or deflationary) gap between total supply and total demand will emerge. Let us advance a step further and analyse what happens in both cases.

Before analysing the first case, it is important to note that retained profits are 'extracted' from income (see Gnos, 1998), so that their amount – say *y* (out of *x*) m.u. – corresponds to a stock of real goods still available in the marketplace, as shown by entry (1.1) in Table 2. In this sense, when firms invest their profits in

Table 2 The result of the investment of profits in the factor market

		Banks			
Assets					**Liabilities**
(1.1)	***	Credit on firms	*y* m.u.	Debt to firms	*y* m.u.
(1.2)	**	Credit on firms	*y* m.u.	Debt to workers	*y* m.u.
(2.0)	***	Credit on firms	*y* m.u.	Debt to workers	*y* m.u.

Note: (**) is the accounting entry corresponding to the newly produced investment goods. (***) is the balance of banks' ledgers at the end of the day and corresponds to the stock of real goods still unsold in the marketplace.
Source: Cencini (2005, pp. 163–8, our elaboration).

the production of capital goods, this gives rise to fixed capital for which an increasing amount of income must be 'sacrificed' to achieve its growth, eliciting a 'forced' saving (Rossi, 2009, p. 49). From such production, workers certainly receive a remuneration, but its amount corresponds to that of invested profits. As entry (1.2) shows, when banks have to carry out the relevant payment of workers' remuneration, they cancel the deposits related to invested profits from firms' accounts to make them reappear in the accounts of wage earners in the form of wages. In so doing, what workers obtain as a reward for their productive efforts is of course an income, which is immediately deposited into their bank accounts (see entry (2.0)), but unfortunately the related money units are defined in nominal terms only and as such do not confer on wage earners a drawing right over the newly produced output – the power to purchase the newly produced capital goods. By defining the newly produced output through wages that stem from invested profits, the final holders of output are indeed the original holders of profits (firms). Consequently, firms, besides becoming the holders of the drawing right over the newly produced output, appropriate these capital goods from the instant of their production and then accumulate them in the form of fixed capital (which would not be the case if they produced these goods by becoming indebted to banks). As a result, the banking intermediation required for the monetisation of production 'fails' to convert nominal money into real money, provoking a numerical discrepancy between total demand and total supply, which would become more obvious if the amortisation of the fixed capital and the nature of the

interest rate were considered (see Cencini and Rossi, 2015, chs 7 and 8, for analytical elaboration on these points).

To make the point, it must be noted that, once the income in the form of invested profits is spent in the factor market, it reappears in the form of wages whose holders spend it again in the product market. Since now the same income is spent a second time, total demand numerically increases without a parallel increase in total supply (Rossi, 2007[2015], p. 124). Expressed another way, invested profits, instead of being fixed within firms as happens with matching capital goods, are spent in the payment of wages in the factor market, 'feeding' an equivalent demand in the product market. The corresponding supply does not increase analogously as the newly produced capital goods are appropriated by firms and as such are not available in the marketplace. As a consequence, the production of capital goods, which is 'nourished' by invested profits, gives rise to an emission of empty money, which in turn 'introduces a numerical difference between demand and supply on the [product market]. Total demand increases but only in nominal terms, as wage earners in the [factor market] are paid with empty money' (Cencini et al., 2016, p. 70). It follows that the total amount of real goods sold in the marketplace is now diluted in a greater number of money units (ibid., p. 69), eliciting a decrease in money's purchasing power and simultaneously an inflationary increase in overall prices.

After having explained the effects underlying the investment of profits in the production of capital goods, we now explain what happens when firms invest their profits in the production of consumption goods. To be exact, when firms realise that their (fixed) capital is over-accumulated, they decide to stop the production of capital goods to produce consumption goods (Schmitt, 1984, ch. 11). In this (second) case, when retained profits are invested by firms in the production of consumption goods, the resulting workers' wages are not endowed with value since the relevant goods have already been appropriated by firms from the instant of their production (exactly as observed for capital goods). In this regard, once the newly produced consumption goods are appropriated by firms in the factor market, they can then be supplied in the product market. If now the same consumption goods are actually sold in the product market, they (re-)appear in the marketplace for a second time, eliciting a numerical increase in total supply without a parallel increase in total demand (Cencini and Rossi, 2015, pp. 182–3). Thus, the newly produced consumption goods, instead of being fixed within firms like capital goods, are sold in the product market, feeding an equivalent supply. The corresponding demand does not analogously increase as the newly produced consumption goods are already appropriated by firms, and thus the sale of these goods in the product market is not balanced by an income that should be generated *ad hoc* in the factor market for the purchase of these goods. As a consequence, a numerical discrepancy between total demand and total supply will emerge. Notably, total supply increases but only in nominal terms since consumption goods (re-)appear in the marketplace for a second time. It follows that the total amount of real goods sold in the marketplace is now diluted in a

smaller number of money units, eliciting an increase in money's purchasing power and concurrently a deflationary decrease in overall prices.

On the whole, monetary instability manifests as inflation or deflation. As we have observed, it does not derive from any form of agents' behaviour, but rather stems from the way that banks record in their ledgers the payment of workers' wages on behalf of firms when the latter decide to invest their retained profits in production. Having a structural origin, monetary instability therefore should be fought at the level of banks' bookkeeping, by separating the accounting entries concerning the remuneration of workers from those related to the transfer of pre-existing income (in the form of bank deposits) among agents as well as the formation of (fixed) capital within firms. As we will see in the next section, if banking practices do not make a necessary distinction in bookkeeping terms between monetary intermediation (income creation), financial intermediation (income transfer) and capitalisation of profits (fixed-capital formation), it is not possible to address the reasons underlying monetary instability. Accordingly, central bankers can run the risk of implementing monetary policy strategies with the purpose of fighting against inflation (or deflation) but unfortunately without achieving satisfactory results, since these strategies aim at influencing microeconomic magnitudes that are not the source of monetary instability *per se*.

4. Monetary stability can occur alongside price instability

Price stability is conventionally defined as an economic situation where '[the] "real" and "nominal" [magnitudes of the exchange equation] are substantially the same over the planning horizon' (Volcker, 1983, p. 5), meaning that the rate of inflation is low (near zero) and stable, such that the price level also remains stable over time. In line with a number of orthodox economists, this kind of economic situation is dependent on monetary stability and is considered to prevail when the (percentage) rate of inflation – measured by changes in the consumer price index (CPI) – remains below two per cent, to wit, just above zero per cent during the examination period (see Bernanke et al., 1999[2001]). For convenience, orthodox economists measure inflation through the CPI, associating the latter with a pool of aggregated data with the aim of considering the (percentage) rate of CPI change as a 'proxy' for the inflation rate (Frisch, 1980[1983], ch. 1; Rossi, 2015, p. 251). In so doing, they refer to a (representative) basket of goods and services sold in the marketplace to offer a statistical measure of variation in the weighted average of the prices of all goods and services taken into account (see ILO et al., 2004), namely, a 'suitable' unit of measure for the level of prices (see Fisher, 1911[1912]). Obviously, the weighted average of prices is nothing but an index number representing the (aggregate) price that (representative) consumers–workers have to pay if they want to purchase the content of the basket in a given time span (ILO et al., 2004, p. 1; Rossi, 2015, p. 251). When in the same time span the price index changes, the inflation rate changes too, indicating that an upward (or downward) pressure on the price level is at work. In this framework,

when the price index increases, money's purchasing power or consumers–workers' buying power (the power of economic agents to buy goods and services with what they dispose of in terms of income to maintain a stable living standard) decreases, and vice versa (see ILO et al., 2004).

By considering the CPI as a proxy of the price level and analysing the reasons for its fluctuation, orthodox economists have developed an analysis of inflation dynamics. As we will observe below, this way of analysing monetary instability is, however, misleading for two main reasons (see Rossi, 2001, ch. 2, for a survey on other technical and analytical reasons). The first concerns the fact that, according to orthodox economists, an inflationary (or deflationary) pressure on the price level observed through the CPI appears within the (dichotomised) economy only when the growth of the money supply does not correspond to the growth of produced output. If this occurs, the cause of the CPI fluctuation is ascribed to agents' forms of behaviour, as both demand-pull and cost-push views of inflation advocate (see Vernengo, 2006[2014]). In fact, contrary to these views, the causes of monetary instability are to be found in the way that banks record the payments on behalf of non-bank agents in their ledgers (as noted above). The second reason is linked to the fact that orthodox economists consider prices as if they were simply established in the trading process instead of explaining the monetary origin of prices. In this regard, the CPI takes into account the numerical essence of prices in the marketplace, but does not reveal whether the matching money units actually integrate a certain amount of goods and services or represent only a nominal fraction of them (as explained above). As a consequence, if the price index is also used as an indicator of variation in money's purchasing power (and not only of variation in consumers–workers' buying power), the CPI leads to confusion as its fluctuation does not necessarily indicate whether money's purchasing power is changing during a period characterised by price instability.

In light of these considerations, the CPI is not really useful for the investigation of monetary (in)stability. Hence, to determine the true causes of inflation (or deflation), it is necessary to know the reason for CPI fluctuation and determine whether it is actually of an inflationary (or deflationary) character. Fundamentally, we must distinguish the notion of monetary stability from that of price stability. In so doing, we must emphasise that monetary stability reflects an economic situation where money's purchasing power is stable and therefore does not exert any upward (or downward) pressure on overall prices, while price stability indicates an economic situation in which consumers–workers' buying power is stable (on the assumption that their compensation does not vary) and therefore does not have any impact on the cost of living – the amount of income that consumers–workers have to spend to preserve a given standard of living (ILO et al., 2004, p. 1). Monetary stability depends exclusively on the banking intermediation required for the conversion of nominal money into real money. By contrast, price stability is strictly connected to agents' forms of behaviour and as such can be affected either by policies such as firms' pricing policies and States' tax policies or by technological progress. In this sense, the pricing policies of

firms, the tax policies of States and technological progress impact only the distribution of income 'among economic agents, so that some of them earn what is lost by others; on the whole the available purchasing power remains unchanged' (Cencini, 1995[1997], p. 51). They thus are not sources of monetary instability.

For example, the (free) choice of firms to impose a mark-up on their goods sold in the marketplace (with the aim of increasing their profits and then financing investments) elicits an increase not only in the prices of the corresponding goods, but also in the CPI as these goods enter the basket that provides the relevant index number. Since banking intermediation in the trading process concerns a transfer of pre-existing income between non-bank agents that does not hinder the conversion of nominal money into real money, the increase in the CPI is not inflationary properly speaking (ibid., pp. 52–3). In particular, the increase in the CPI (due to the implementation of firms' pricing policy) modifies the distribution of income between economic agents, leading to a rise in the cost of living only for consumers–workers (ibid., pp. 52–3). On the one hand, this means that wage earners lose a fraction of their buying power even during an economic situation characterised by monetary stability. On the other hand, firms obtain a fraction of the income spent by workers when the latter buy the relevant goods sold in the marketplace. In other words, because in the product market the prices of goods and services can vary over time (provided that the overall prices remain equal to the income paid in the production of the same goods as explained above), a fraction of income in the form of profits is 'transferred from the pockets' of workers 'into the pockets' of firms (Gnos, 1998, p. 44), increasing the buying power of the latter or their opportunity to make investments without borrowing from banks.

The (democratic) decision of the State to impose an increase in value added tax (VAT) to cope with a public deficit and a high public debt provides another example leading to the same conclusion. Since in this case all goods and services sold in the marketplace are affected in the same fashion by the VAT, the CPI also rises, but its variation is not inflationary *per se* (Cencini, 1995[1997], p. 52). This is because banking intermediation in the trading process involves a transfer of pre-existing income among non-bank agents that does not hamper the conversion of nominal money into real money. Again, the increase in the CPI (due to the implementation of the State's tax policy) modifies the distribution of income between economic agents, leading to a rise in the cost of living for the administered population (ibid., p. 52). On the one hand, this means that the administered population (workers) loses a fraction of its buying power even if money's purchasing power remains stable. On the other hand, the State gets a fraction of income spent by the administered population when the latter buys the goods and services sold in the marketplace and pays the VAT. In other words, as in the product market the VAT raises the prices of all goods and services (that can vary as time goes by in the same manner as explained above), a fraction of income in the form of VAT is transferred from the 'wallet' of the administered population to the 'treasure chest' of the State, increasing the spending power of the latter or

its opportunity to contain the public deficit and debt without resorting to the issuance of government bonds.

As these examples make it clear, monetary stability can occur alongside price instability. To make this demonstration even more persuasive, it can also be shown that monetary instability can occur alongside price (in)stability. In this sense, if we assume that over a given time span firms do not change their pricing policy despite technical progress, we logically point out that the prices of their goods and services sold in the marketplace should decrease in correspondence with the reduction in production costs. If the decrease in prices concerns those goods entering the basket used as a reference for the price-level measurement, the CPI should decrease, too. If, however, these prices do not decrease and the CPI remains stable during the same time span, this can be due to inflation (Rossi, 2015, pp. 252–3), which is elicited by a reduction in money's purchasing power according to the banking practice explained above. Against this backdrop, a CPI fluctuation can also partially 'hide' the existence of inflation. Indeed, if an inflationary pressure on overall prices is at work, a decrease in the price index can be smaller than expected (ibid., pp. 252–3).

Now, it should be clear that any variation in the price level observed through the CPI does not necessarily show that an inflationary (or deflationary) pressure on overall prices is at work during the period under scrutiny. This stems in particular from the fact that the CPI does not take into account the distinction between money's purchasing power and consumers–workers' buying power. Given this, if central bankers base their analysis of inflation dynamics solely on observed CPI fluctuation, they could be misguided and intervene to fight monetary instability. For instance, when the CPI indicates an increase in the price level, central bankers could review their policy-controlled interest rate with the aim of re-achieving price stability (Rochon and Rossi, 2016, p. 139). However, if central bankers followed this monetary policy strategy, on the one hand, they could run the risk of varying the policy rate of interest even when this was not necessary because monetary stability still prevailed in the economy. On the other hand, they could influence the behaviour of agents during a period characterised by monetary instability (for example, through an indirect increase in the debt-service cost), but such a monetary policy strategy would not efficiently fight against inflation (or deflation), since the latter would always persist until the moment when the banks' bookkeeping is reformed to separate monetary intermediation from both financial intermediation and the capitalisation of profits, as we will briefly explain in the next section.

5. Policy recommendations to prevent monetary instability

Monetary and price stability are two notions with two different meanings. While monetary stability stands for the stability of money's purchasing power, price stability refers to the stability of consumers–workers' buying power. As noted

above, consumers–workers' buying power can be influenced by any form of agents' behaviour. In contrast, money's purchasing power derives exclusively from the integration of output into money at the instant when workers' wages are paid out by banks on behalf of firms in the factor market. Having said that, monetary (in)stability stems from the way that banks carry out payments for non-bank agents and record the results of these banking intermediations in their ledgers. Yet, if this is really so, any effort by central bankers to achieve monetary stability through controlling the growth of the money supply with respect to the growth of produced output could be vain, as it would only impact agents' behaviour and not the structural origin of inflation (or deflation). To prevent monetary instability, let us suggest policy recommendations in the spirit of the structural monetary reforms put forward by the proponents of quantum macroeconomics (see Cencini et al., 2016), who ask for a structural reform in banks' bookkeeping to eradicate from the whole economy any form of inflationary (or deflationary) pressure on overall prices. Since the origin of both inflation and deflation resides in the way in which banking intermediation is carried out in the (over-)accumulation of capital, the suggested reform precisely aims at improving the required banking practice at the instant when firms invest their retained profits in the production of capital goods, and banks have to record in their ledgers the corresponding payment of workers' wages. In particular, the source of inspiration of this reform is the Bank Act implemented in England in 1844 (see Bradley, 2015). Although the purpose of the Bank Act was to split the Bank of England's accounting practice into an issue department and a financial department to control the volume of notes in circulation and thereby the targeted price-index fluctuation, the reform we suggest considers such a twofold distinction, but also puts more emphasis on the need to distinguish in bookkeeping terms the creation of income from the formation of (fixed) capital by introducing a third department in the bookkeeping of (commercial) banks. The reason for implementing this reform is the fact that, at the time of writing, the accounting entries concerning both monetary and financial intermediations, as well as those related to the capitalisation of profits, are recorded in the same banking department (Cencini and Rossi, 2016, pp. 188–9), impeding banks from distinguishing in bookkeeping terms between income creation and its capitalisation. To state it clearly, the problem with the actual banks' bookkeeping 'is that the formation of fixed capital does not lead to the capitalisation of profits' (Cencini, 1996, p. 59) since banks, instead of 'immobilising' the reciprocal deposits in firms' accounts, 'mobilise' them, so that they can be spent in the payment of workers' wages arising from the investment of firms' retained profits in the production of capital goods (as entry (1.2) in Table 2 showed). By acting in this way, banks cancel the deposits mirroring retained profits from firms' accounts to make them reappear in the accounts of wage earners without making any distinction between income creation and (fixed-)capital formation, thereby boosting monetary instability.

Drawing on the idea of considering the endogenous nature of money as a double entry in banks' books (rather than regarding it as an exogenous magnitude), the

proposed reform is intended to restructure the actual banks' bookkeeping in such a manner that pre-existing income is no longer spent in the payment of wages at the instant when firms invest their retained profits in the production of capital goods. In other words, this reform aims at separating banks' ledgers into three departments to avoid any confusion between monetary and financial intermediations and the capitalisation of profits – among money, income, and capital (Schmitt, 1984, chs 15 and 16; Cencini and Rossi, 2015, ch. 10). Specifically, banks would have to record their accounting entries over three distinct departments (rather than in one department as the current banking practice requires). First, the issue department would record the result of any money emission carried out by banks. Second, the financial department would record the amount of credit that banks can lend on the basis of the pre-existing income deposited on the liabilities side of their ledgers. Third, the fixed-capital department would record the capitalisation of profits that defines 'macroeconomic savings' – the fraction of income that will never be spent in the factor market because it remains definitively fixed in capital goods within firms. In this way, banks could finally distinguish in their ledgers all accounting entries concerning money, income and capital, so that the transformation of pre-existing income (in the form of invested profits) into fixed capital could no longer be confused in bookkeeping terms with the creation of income, which could otherwise feed 'another' expenditure in the product market, giving rise to excess demand and becoming the source of an inflationary increase in overall prices.

To illustrate this reform from a bookkeeping perspective, let us suppose that on any day banks have to carry out the payment of workers' wages on behalf of firms since the latter have started the production of consumption goods from scratch, as depicted in Table 3. In this framework, the payment of wages is an emission of a number of (x) money units whose result corresponds to two accounting entries ((1.1) and (1.2)) that are simultaneously recorded on both sides of the issue and financial departments. Explicitly, the assets side of the issue department testifies to the existence of credit lines whose agreed amount is used by banks to pay workers' wages on behalf of firms, and the liabilities side of the financial department indicates the amount of deposits that workers receive as remuneration in the factor market. By getting indebted, firms can therefore cope with their production costs and pay workers' wages, which in turn are immediately deposited with banks and as such remain at the disposal of wage earners until the moment that they are spent on buying the goods and services (but also financial assets) available in the marketplace. To expand on this point, if we assume that by the end of the same day firms are not in a position to reimburse their monetary debt to banks, entry (2.1) records the amount of debt that will have to be repaid subsequently. The possibility of reimbursing the firms' debt in a set period of time indeed allows banks to transform the monetary debt of firms into a financial debt (entry (2.2)) on which interest will accrue periodically (Cencini and Rossi, 2015, p. 229). In this regard, entries (3.1) and (3.2), which represent the balances of the respective departments recorded at the daily closing of bank accounts, confirm

Table 3 The result of both the payment of wages in the factor market and their expenditure in the product market in a reformed banks' bookkeeping

		Banks			
Assets					**Liabilities**
Issue department (I)					
(1.1)	*	Credit on firms	+*x* m.u.	Department II	+*x* m.u.
(2.1)	*	Credit on firms	–*x* m.u.	Department II	–*x* m.u.
(3.1)	***		0 m.u.		0 m.u.
(4.1)	*	Credit on workers	+*x* m.u.	Department II	+*x* m.u.
(5.1)	*	Department II	–*x* m.u.	Debt to workers	–*x* m.u.
(6.1)	***		0 m.u.		0 m.u.
(9.1)	**	Credit on firms	+*y* m.u.	Department II	+*y* m.u.
(10.1)	**	Department II	–*y* m.u.	Debt to firms	–*y* m.u.
(11.1)	***		0 m.u.		0 m.u.
(12.1)	*	Credit on workers	+*y* m.u.	Department II	+*y* m.u.
(13.1)	*	Department II	–*y* m.u.	Debt to workers	–*y* m.u.
(14.1)	***		0 m.u.		0 m.u.
Financial department (II)					
(1.2)	*	Department I	+*x* m.u.	Debt to workers	+*x* m.u.
(2.2)	*	Credit on firms	+*x* m.u.	Department I	+*x* m.u.
(3.2)	***	Credit on firms	*x* m.u.	Debt to workers	*x* m.u.
(4.2)	*	Department I	*x* m.u.	Debt to firms	*x* m.u.
(5.2)	*	Credit on workers	*x* m.u.	Department I	*x* m.u.
(6.2)	***	Credit on workers	*x* m.u.	Debt to firms	*x* m.u.
(7.0)	***	Credit on firms	*y* m.u.	Debt to firms	*y* m.u.
(8.1)	*	Credit on firms	*y* m.u.	Department III	*y* m.u.
(9.2)	**	Department I	*y* m.u.	Debt to workers	*y* m.u.
(10.2)	**	Credit on firms	*y* m.u.	Department I	*y* m.u.
(11.2)	***	Credit on firms	*y* m.u.	Debt to workers	*y* m.u.
(8.3)	***	Credit on firms	*y* m.u.	Department III	*y* m.u.
(12.2)	*	Department I	*y* m.u.	Debt to firms	*y* m.u.
(13.2)	*	Credit on workers	*y* m.u.	Department I	*y* m.u.
(14.2)	***	Credit on workers	*y* m.u.	Debt to firms	*y* m.u.
(8.4)	***	Credit on firms	*y* m.u.	Department III	*y* m.u.
Fixed-capital department (III)					
(8.2)	*	Department II	*y* m.u.	Debt to firms	*y* m.u.
(8.5)	***	Department II	*y* m.u.	Debt to firms	*y* m.u.

Note: (*) is the accounting entry corresponding to consumption goods.
(**) is the accounting entry corresponding to investment goods.
(***) is the balance of the relevant department at the end of the day.
Source: Cencini and Rossi (2015, pp. 227–38, our elaboration).

that money's emissions and payments 'coexist' in the same instant, while income has a positive duration in chronological time.

The first merit of this reform is a separation between the issue and financial departments allowing banks to record all monetary and financial intermediations separately in their ledgers. In light of this, banks can know at any time the exact amount of credit that they can lend on the basis of the pre-existing income deposited on the liabilities side of their financial department without the need to grant a fraction of it through an emission of empty money, which could otherwise negatively affect monetary stability. Nonetheless, the fact of knowing the exact amount of income that banks can actually lend is not interesting for our investigation (see Cencini, 2005, pp. 309–12, for analytical elaboration on this point). This is because we are interested in knowing only what happens, in bookkeeping terms, when banks pay workers' wages at the instant when firms invest their profits in production to accumulate capital goods in the form of (fixed) capital.

To illustrate the second merit of the reform in preventing monetary instability, let us consider the following stylised case. If, given the economic situation illustrated in Table 3, we suppose that on the next day wage earners spend the total amount of bank deposits – say x m.u. – at their disposal to buy the consumption goods sold in the marketplace, the matching entries (4.1), (4.2), (5.1), (5.2), (6.1) and (6.2) show that banks have to issue a number of money units for payments to be carried out. It follows that the corresponding deposits, after being cancelled from workers' accounts, appear on firms' accounts in the financial department. At this moment, however, firms may have imposed a mark-up on the prices of their products sold in the marketplace in an attempt to pursue a specific managerial strategy. If so, at the end of the same day what firms obtain from wage earners in the product market is not only an amount of bank deposits coinciding with profits – say y (out of x) m.u. –, but also the power to buy the stock of consumption goods still available in the marketplace (as the debt obligation elicited by entry (7.0) testifies). Notably, firms can on the third day redistribute these profits to their shareholders (in the product market) or lend them to other agents (on the financial market) in the hope that the latter all spend the relevant amount in the marketplace, so that the stock of unsold consumption goods will be purchased. (Note in this regard that the required banking intermediation elicits similar accounting entries as (4.1), (4.2), (5.1), (5.2), (6.1) and (6.2), but this time these entries concern an amount of y m.u.) If their expectations are confirmed, firms again earn an amount of bank deposits corresponding to the turnover in the product market with which they can totally repay the bank debt originating from the production of the same goods.

If, despite the previous conclusion, we also suppose that firms, instead of distributing their entire profits to their shareholders or lending them to other agents, decide to invest them in the production of capital goods, the banking practice will benefit from the second merit of the suggested structural reform.

Indeed, because in accordance with this reform firms can invest their profits anywhere and accumulate (fixed) capital without observing any constraint on the way in which they pursue their managerial goals, it is especially interesting to observe the manner in which banks have to record the resulting payment of workers' wages in their ledgers. To clarify, if firms decide to invest their profits in the factor market to form (fixed) capital, banks have to take into account the fixed-capital department in which they record the relevant deposits, in order to fix definitely these deposits in capital goods within firms. To be sure, the necessity of immobilising the deposits matching invested profits within the accounts of firms obliges banks to establish a link between the financial and fixed-capital departments to separate the accounting entry concerning the transformation of profits into fixed capital from that concerning the creation of income (see entries (8.1) and (8.2)). Entry (8.1) particularly shows that invested profits have been withdrawn from the total amount of the pre-existing income recorded in the financial department, because otherwise they could be spent in the payment of wages in the factor market, creating an inflationary pressure on overall prices when the newly created income is spent (again) by wage earners in the product market, numerically increasing total demand without an equivalent increase in total supply.

After recording the bank deposits mirroring the invested profits in the fixed-capital department, entries (9.1), (9.2), (10.1), (10.2), (11.1) and (11.2) show what happens when banks have to carry out the payment of workers' wages for the production of capital goods. In this regard, the newly produced output is no longer defined through wages deriving from invested profits, but rather from an emission of money as if this payment were stemming from *tabula rasa* (as illustrated by entries (1.1), (1.2), (2.1), (2.2), (3.1) and (3.2)). Hence, what workers obtain as compensation from firms is not just an income expressed in real money units (that is immediately deposited into bank accounts), but also a drawing right over the newly produced capital goods – a purchasing power defining the value of the newly produced output. As entries (8.3) and (8.5) show, the existence of a debt obligation related to the newly produced capital goods means that the latter are no longer appropriated by firms, but rather by wage earners. Nonetheless, as capital goods are fixed within firms and as such are not available in the marketplace, 'workers give up their financial right over fixed capital goods in exchange of equivalent rights over the [consumption] goods still stocked with firms' (Cencini and Rossi, 2015, p. 172). By exchanging drawing rights over a fraction of newly produced output with firms' shareholders, workers can on the fourth day finally purchase the stock of consumption goods still unsold in the product market (see entries (12.1), (12.2), (13.1), (13.2), (14.1) and (14.2)), which is the counterpart of the forced saving elicited by entry (8.1). It follows that the newly produced capital goods are no longer appropriated by firms 'as such', but rather by their shareholders, as the debt obligation elicited by entries (8.4) and (8.5) legitimates it. Needless to say, this is the result of banks no longer confusing, in bookkeeping terms, income creation with its capitalisation since invested profits remain immobilised within the bank accounts of firms and thus are not spent in the

payment of wages anymore – the essence of these wages is related to an emission of money as if their payment started from credit lines that banks opened to firms aiming at capitalising (a fraction of) their profits (Rossi, 2007[2015], p. 132). By respecting the threefold distinction between money, income and capital, the purchasing power of the total number of money units issued in an economy would remain sufficient to buy the total amount of output produced in it. This means that monetary stability prevails in the economy, since the banking intermediation required for the monetisation of production has converted the total number of nominal money units into real ones, so that there is no empty money inflating (or deflating) overall prices. If, despite monetary stability, the CPI continues to fluctuate, this can be ascribed to the transfer of income among economic agents whose forms of behaviour influence income distribution in the economy and thereby impact the cost of living according to the market dynamics sketched above.

6. Conclusion

The conventional approach to monetary stability is considered to be similar to that related to price stability. As such, it simply assumes that the aggregation of prices in the marketplace is necessary and sufficient for determining the presence of inflation (or deflation) in the economy. However, investigating monetary stability in accordance with this microeconomic approach leads to confusion since the aggregation of price data neither provides information about money's value nor explains the source of inflationary (or deflationary) pressure on overall prices. Accordingly, price instability does not necessarily imply the existence of monetary instability, and vice versa. Based on quantum macroeconomics, this paper has shown that the stability of money's value, to wit its purchasing power, does not depend on the stability of prices in the marketplace, but rather stems from the way in which money is introduced into the economy. Specifically, monetary stability occurs at the instant when firms ask their banks to monetise production, and banks have to carry out the corresponding payment of workers' wages and record the result of this banking intermediation in their ledgers. Monetary instability occurs when firms invest their retained profits (pre-existing income) in production with the aim of forming fixed capital and again banks have to carry out the payment corresponding to workers' remuneration. Yet, the source of monetary instability is not the managerial strategy of firms related to the expenditure of profits and the accumulation of capital, but rather the manner in which banks record the matching payments in their ledgers. Indeed, since at the time of writing the accounting entries concerning monetary and financial intermediations and the capitalisation of profits are recorded by banks in the same department, the banking intermediation required for the monetisation of production does not make any distinction between income creation and (fixed-)capital formation and thereby does not convert nominal money into real money, giving rise to an emission of money without it being endowed with purchasing power. Such emission of empty money then elicits a loss (or gain) in money's

purchasing power and concurrently an increase (or decrease) in overall prices. To prevent the economy from monetary instability and keep overall prices stable once and for all, a reform of banks' bookkeeping is imperative. This paper has explained that the banks' bookkeeping should be divided in three distinct bookkeeping departments – the issue, financial and fixed-capital departments – for banking intermediation to ensure that the different natures of money, income and capital will be respected. By acting in this way, banks would no longer confuse, in bookkeeping terms, income creation with its capitalisation since invested profits would no longer be reproduced in the form of bank deposits as a result of the payment of wages – the essence of which is to be found, first, in the issue department and then eventually in the financial and fixed-capital departments. It follows that workers' wages, instead of being composed of nominal money, would be made up of real money with stable purchasing power. This also would mean that monetary stability prevails since the banking intermediation required for the monetisation of production would have converted the total number of nominal money units into real ones, and no empty money would be inflating (or deflating) overall prices.

Acknowledgments

We are grateful to Sergio Rossi for his helpful comments and Carryl Oberson for his valuable suggestions on an earlier draft of this paper. The usual disclaimer applies.

References

Archibald, G.C. and R.G. Lipsey (1958), 'Monetary and value theory: a critique of Lange and Patinkin', *Review of Economic Studies*, 26 (1), 1–22.

Bailly, J.-L. (2003), 'On the macroeconomic foundations of the wage–price relationship', in L.-P. Rochon and S. Rossi (eds), *Modern Theories of Money: The Nature and Role of Money in Capitalist Economies*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 360–83.

Bailly, J.-L. (2012), 'Labour, wages, and non-wage incomes', in C. Gnos and S. Rossi (eds), *Modern Monetary Macroeconomics: A New Paradigm for Economic Policy*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 100–33.

Baranzini, M. and A. Cencini (2001), 'Foreword', in S. Rossi, *Money and Inflation: A New Macroeconomic Analysis*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. viii–xli.

Bell, S.A. and E.J. Nell (2003), 'Preface', in S.A. Bell and E.J. Nell (eds), *The State, the Market, and the Euro: Chartalism versus Metallism in the Theory of Money*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. x–xiv.

Bernanke, B.S., T. Laubach, F.S. Mishkin and A.S. Posen (1999[2001]), *Inflation Targeting: Lessons from the International Experience*, Princeton and Woodstock: Princeton University Press.

Blanchard, O. (2009), 'The state of macro', *Annual Review of Economics*, 1 (1), 209–28.

Bradley, X. (2015), 'Bank Act of 1844', in L.-P. Rochon and S. Rossi (eds), *The Encyclopedia of Central Banking*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 21–2.

Bronfenbrenner, M. and F.D. Holzman (1963), 'Survey of inflation theory', *American Economic Review*, 53 (4), 593–661.

Cencini, A. (1995[1997]), *Monetary Theory: National and International*, London and New York: Routledge.

Cencini, A. (1996), 'Inflation and deflation: the two faces of the same reality', in M. Baranzini and A. Cencini (eds), *Inflation and Unemployment: Contributions to a New Macroeconomic Approach*, London and New York: Routledge, pp. 17–60.

Cencini, A. (2001[2014]), *Monetary Macroeconomics: A New Approach*, London and New York: Routledge.

Cencini, A. (2005), *Macroeconomic Foundations of Macroeconomics*, London and New York: Routledge.

Cencini, A. (2012), 'Towards a macroeconomic approach to macroeconomics', in C. Gnos and S. Rossi (eds), *Modern Monetary Macroeconomics: A New Paradigm for Economic Policy*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 39–68.

Cencini, A. and S. Rossi (2015), *Economic and Financial Crises: A New Macroeconomic Analysis*, Basingstoke and New York: Palgrave Macmillan.

Cencini, A. and S. Rossi (2016), 'Inflation and unemployment', in L.-P. Rochon and S. Rossi (eds), *An Introduction to Macroeconomics: A Heterodox Approach to Economic Analysis*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 172–92.

Cencini, A., C. Gnos and S. Rossi (2016), 'Quantum macroeconomics: a tribute to Bernard Schmitt', *Cuadernos de Economía – Spanish Journal of Economics and Finance*, 39 (110), 65–75.

Debreu, G. (1959[1987]), *Theory of Value: An Axiomatic Analysis of Economic Equilibrium*, London and New Haven: Yale University Press.

Fisher, I. (1911[1912]), *The Purchasing Power of Money: Its Determination and Relation to Credit, Interest and Crises*, New York: Macmillan.

Friedman, M. (1987[2004]), 'Quantity theory of money', in J. Eatwell, M. Milgate and P. Newman (eds), *The New Palgrave: A Dictionary of Economics*, Vol. IV, Basingstoke and New York: Palgrave, pp. 3–20.

Frisch, H. (1980[1983]), *Theories of Inflation*, Cambridge, UK, Melbourne and New York: Cambridge University Press.

Gnos, C. (1998), 'The Keynesian identity of income and output', in P. Fontaine and A. Jolink (eds), *Historical Perspectives on Macroeconomics: Sixty Years After the General Theory*, London and New York: Routledge, pp. 40–8.

Gnos, C. (2007), 'Monetary policy from a circuitist perspective', in P. Arestis, E. Hein and E. Le Heron (eds), *Aspects of Modern Monetary and Macroeconomic Policies*, Basingstoke and New York: Palgrave Macmillan, pp. 106–22.

Graziani, A. (2003[2009]), *The Monetary Theory of Production*, Cambridge, UK and New York: Cambridge University Press.

Hicks, J.R. (1939[1965]), *Value and Capital: An Inquiry into some Fundamental Principles of Economic Theory*, Oxford: Clarendon Press.

Hicks, J.R. (1967), *Critical Essays in Monetary Theory*, Oxford: Clarendon Press.

International Labour Office (ILO), International Monetary Fund, Organisation for Economic Co-operation and Development, Statistical Office of the European Communities, United Nations and The World Bank (2004), *Consumer Price Index Manual: Theory and Practice*, Geneva: International Labour Office.

Ireland, P.N. (1993), 'Price stability under long-run monetary targeting', *Federal Reserve Bank of Richmond Economic Quarterly*, 79 (1), 25–45.

Issing, O. (2003), 'Monetary and financial stability: is there a trade-off?', speech at the conference on "Monetary Stability, Financial Stability and the Business Cycle", Bank for International Settlements, Basel, 28-29 March.

Iwai, K. (1996), 'The bootstrap theory of money: a search-theoretic foundation of monetary economics', *Structural Change and Economic Dynamics*, 7 (4), 451–77.

Keynes, J.M. (1936[2007]), *The General Theory of Employment, Interest and Money*, Basingstoke and New York: Palgrave Macmillan.

Keynes, J.M. (1937), 'The general theory of employment', *Quarterly Journal of Economics*, 51 (2), 209–23.

Kiyotaki, N. and R. Wright (1989), 'On money as a medium of exchange', *Journal of Political Economy*, 97 (4), 927–54.

Lavoie, M. and M. Seccareccia (2016), 'Money and banking', in L.-P. Rochon and S. Rossi (eds), *An Introduction to Macroeconomics: A Heterodox Approach to Economic Analysis*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 97–116.

Mankiw, N.G. (1994), 'Interview with Gregory Mankiw', in B. Snowdon, H. Vane and P. Wynarczyk, *A Modern Guide to Macroeconomics: An Introduction to Competing Schools of Thought*, Aldershot, UK and Brookfield, VT, USA: Edward Elgar Publishing, pp. 331–40.

Marx, K. (1867[1954]), *Capital, Volume I*, Moscow: Foreign Languages Publishing House.

Mastromatteo, G. and A. Tedeschi (2015), 'Quantity theory of money', in L.-P. Rochon and S. Rossi (eds), *The Encyclopedia of Central Banking*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 419–22.

Meyer, L.H. (2001), 'Does money matter?', *Federal Reserve Bank of St. Louis Review*, 83 (5), 1–16.

Mishkin, F.S. (2007[2015]), 'How did we get here', in F.S. Mishkin (ed.), *Monetary Policy Strategy*, New Delhi: PHI Learning Private Limited, pp. 1–27.

Patinkin, D. (1956[1965]), *Money, Interest, and Prices: An Integration of Monetary and Value Theory*, New York: Harper & Row, Publishers.

Pigou, A.C. (1941), 'Money, a veil?', reprinted in R.W. Clower (ed.) (1969[1973]), *Monetary Theory: Selected Readings*, Harmondsworth: Penguin Education, pp. 30–6.

Rochon, L.-P. and S. Rossi (2016), 'The central bank and monetary policy', in L.-P. Rochon and S. Rossi (eds), *An Introduction to Macroeconomics: A*

Heterodox Approach to Economic Analysis, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 134–48.

Rossi, S. (2001), *Money and Inflation: A New Macroeconomic Analysis*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing.

Rossi, S. (2006[2014]), 'The theory of money emissions', in P. Arestis and M. Sawyer (eds), *A Handbook of Alternative Monetary Economics*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 121–38.

Rossi, S. (2007[2015]), *Money and Payments in Theory and Practice*, London and New York: Routledge.

Rossi, S. (2009), 'Monetary circuit theory and money emissions', in J.-F. Ponsot and S. Rossi (eds), *The Political Economy of Monetary Circuits: Tradition and Change in Post-Keynesian Economics*, Basingstoke and New York: Palgrave Macmillan, pp. 36–55.

Rossi, S. (2015), 'Inflation measurement', in L.-P. Rochon and S. Rossi (eds), *The Encyclopedia of Central Banking*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 251–3.

Samuelson, P.A. (1968), 'What classical and neoclassical monetary theory really was', *Canadian Journal of Economics – Revue canadienne d'Economique*, 1 (1), 1–15.

Schmitt, B. (1975), *Théorie unitaire de la monnaie, nationale et internationale*, Albeuve, CH: Castella.

Schmitt, B. (1984), *Inflation, chômage et malformations du capital*, Albeuve, CH and Paris: Castella and Economica.

Schmitt, B. (1996a), 'A new paradigm for the determination of money prices', in G. Deleplace and E.J. Nell (eds), *Money in Motion: The Post Keynesian and Circulation Approaches*, London and New York: Macmillan and St. Martin's Press, pp. 104–38.

Schmitt, B. (1996b), 'Unemployment: is there a principal cause?', in M. Baranzini and A. Cencini (eds), *Inflation and Unemployment: Contributions to a New Macroeconomic Approach*, London and New York: Routledge, pp. 75–106.

Schmitt, B. (2012a), 'Money, effective demand, and profits', in C. Gnos and S. Rossi (eds), *Modern Monetary Macroeconomics: A New Paradigm for Economic Policy*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 71–99.

Schmitt, B. (2012b), 'Relative prices are undermined by a mathematical error', in C. Gnos and S. Rossi (eds), *Modern Monetary Macroeconomics: A New Paradigm for Economic Policy*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 19–38.

Schumpeter, J.A. (1954[1994]), *History of Economic Analysis*, New York: Oxford University Press.

Starr, R.M. (2012), *Why Is there Money? Walrasian General Equilibrium Foundations of Monetary Theory*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing.

Tietmeyer, H. (1988[1993]), 'The value of monetary stability in the world today', in P. Arestis (ed.), *Money and Banking: Issues for the Twenty-First Century. Essays in Honour of Stephen Frowen*, London and New York: Macmillan and St. Martin's Press, pp. 25–40.

Vernengo, M. (2006[2014]), 'Money and inflation', in P. Arestis and M. Sawyer (eds), *Handbook of Alternative Monetary Economics*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing, pp. 471–89.

Volcker, P. (1983), 'We can survive prosperity', remarks at the joint meeting of the American Economic Association and the American Finance Association, San Francisco, 28 December.

Walras, L. (1874[1954]), *Elements of Pure Economics or the Theory of Social Wealth*, Homewood: Richard D. Irwin.

Wickens, M. (2008), *Macroeconomic Theory: A Dynamic General Equilibrium Approach*, Princeton and Woodstock: Princeton University Press.

Woodford, M. (1998), 'Doing without money: controlling inflation in a post-monetary world', *Review of Economic Dynamics*, 1 (1), 173–219.

Working Paper 475 september 2016

Author
Amos PESENTI
Chair of Macroeconomics and Monetary Economics, Department of Economics, University of Fribourg (Switzerland), Bd de Pérolles 90, CH - 1700 Fribourg
Phone: +41 26 300 82 44 E-mail: amos.pesenti(at)unifr.ch URL: http://www.unifr.ch/mapom

Abstract
The conventional approach to monetary stability is not so much different from that related to price stability. As such, it simply supposes that the aggregation of prices in the marketplace is necessary and sufficient for determining the presence of inflation (or deflation) in the economy. However, investigating monetary stability according to this microeconomic approach leads to confusion since the aggregation of price data, as suggested in this paper, does not explain the source of inflationary (or deflationary) pressure on overall prices. Consequently, price instability does not necessarily imply the existence of monetary instability, and vice versa. Hence, this paper, besides presenting a new macroeconomic approach to monetary stability, explains the true source of upward (or downward) pressure on overall prices and then provides policy recommendations to prevent monetary instability.

Citation proposal
Amos Pesenti. 2016. «The Meaning of Monetary Stability». Working Papers SES 475, Faculty of Economics and Social Sciences, University of Fribourg (Switzerland)

Jel Classification
E10, E20, E31, E42, E51, E52

Keywords
Banking, consumer price index, deflation, inflation, monetary stability, money, payments, price stability

Working Papers SES collection

Last published
470 Bodory H., Camponovo L., Huber M., Lechner M.: A Wild Bootstrap Algorithm for Propensity Score Matching Estimators; 2016
471 Mueller G. P.: On the Use of Interview Data for the Microsimulation of Ideological Conflicts: An Analysis of the Political Cleavages of the European Left; 2016
472 Huber M., Tyahlo S.: How war affects political attitudes: Evidence from eastern Ukraine; 2016
473 Deuchert E., Huber M., Schelker M.: Direct and indirect effects based on difference-in-differences with an application to political preferences following the Vietnam draft lottery; 2016
474 Grossmann V., Schäfer A., Steger T., Fuchs B.: Reversal of Migration Flows: A Fresh Look at the German Reunification: 2016

Catalogue and download links
http://www.unifr.ch/ses/wp
http://doc.rero.ch/collection/WORKING_PAPERS_SES

Publisher
Université de Fribourg, Suisse, Faculté des sciences économiques et sociales
Universität Freiburg, Schweiz, Wirtschafts- und sozialwissenschaftliche Fakultät
University of Fribourg, Switzerland, Faculty of Economics and Social Sciences

Bd de Pérolles 90, CH-1700 Fribourg
Tél.: +41 (0) 26 300 82 00
decanat-ses@unifr.ch www.unifr.ch/ses