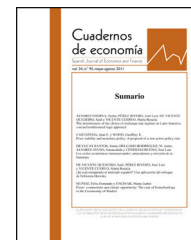




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ARTICLE

Quantum macroeconomics: A tribute to Bernard Schmitt



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Abstract Bernard Schmitt, the founder of quantum macroeconomics, died on 26 March 2014. His legacy concerns the discovery of the logical laws of monetary macroeconomics and extends to the explanation of the origin and nature of economic and financial crises. Starting from a novel conception of bank money, he was able to show that economics is founded on true macroeconomic laws, which take the form of logical identities. This paper is a brief and necessarily incomplete introduction to the main themes of Schmitt's macroeconomic analysis. It ranges from the distinction between money and income that lies at the hearth of his theory of the circuit, to the investigation of inflation and unemployment as pathological manifestations of a macroeconomic disorder, to the groundbreaking discovery of the mechanism of duplication leading to the formation of sovereign debt.

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Macroeconomía cuántica: un homenaje a Bernard Schmitt

Resumen Bernard Schmitt, fundador de la macroeconomía cuántica, falleció el 26 de marzo de 2014. Su legado concierne al descubrimiento de las leyes lógicas de la macroeconomía monetaria y se extiende a la explicación del origen y la naturaleza de las crisis económicas y financieras. Partiendo de una novedosa concepción del dinero bancario fue capaz de mostrar que la economía se basa en auténticas leyes macroeconómicas que toman la forma de identidades lógicas. El presente artículo es una breve y necesariamente incompleta introducción

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a los aspectos principales del análisis macroeconómico de Schmitt. Oscila entre la distinción entre dinero e ingresos, en la que recae el eje de su teoría del circuito, hasta el estudio de la inflación y del desempleo como manifestaciones patológicas de un trastorno macroeconómico, pasando por el revolucionador descubrimiento del mecanismo de duplicación, que llevó a la creación de la deuda soberana.

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1. Introduction

The death of Bernard Schmitt on 26 March 2014 was that of a great economist who devoted all his scientific life to groundbreaking research in the field of monetary macroeconomics. Deeply dissatisfied with the neoclassical approach based on relative prices – whose logical indeterminacy he rigorously demonstrated in different occasions (see [Schmitt, 1996a, 2012a,b](#); [Schmitt and De Gottardi, 2003](#)) – Schmitt switched emphasis from micro- to macroeconomics and showed that the latter is not based on the former. His analysis was macroeconomic and monetary from the outset. It was his original conception of bank money that enabled Schmitt to found macroeconomics on true macroeconomic laws. Replacing conditions of equilibrium with identities, and relative with absolute exchanges, he developed a theory capable of explaining the nature and origin of economic and financial crises independently of any microeconomic consideration.

Schmitt's methodology is essentially different from the one adopted by mainstream economists. While neoclassical and Keynesian economists embrace an axiomatic approach, Schmitt establishes all the laws of monetary macroeconomics on logical grounds, and starts from two unquestionable facts, the existence of bank money and the principle of double-entry bookkeeping. His message is clear: being founded on logical laws, macroeconomics is as rigorous as any other exact science. Yet, it is in no way a branch of mathematics. Economic and financial crises are unfortunately there to prove it: economic models based on mathematics do neither explain nor solve these crises.

Schmitt's approach is thoroughly scientific. All his claims are verified, often repeatedly so, albeit in different ways. Conceptual logic is his essential analytical tool – suffice it to read a few pages of any of his numerous writings to realize it. By what might be considered a synthesis between the classical and the neoclassical analyses, Schmitt elaborates a theory providing all the elements necessary to a clear understanding of the pathological nature of economic and financial crises. In this regard, Schmitt's approach is different from all other approaches (both orthodox and heterodox) to economic issues, which essentially consider agents' behaviour. As a matter of fact, rather than looking for their microeconomic origin, Schmitt shows that these crises are the inevitable result of a lack of conformity between the actual systems of national and international payments and the logical laws on which monetary macroeconomics rests. To be true, his analysis is not limited to

the causes of economic crises, but also provides a solution, essentially embodied in two monetary–structural reforms that can free the world from inflation, pathological unemployment, and sovereign debt once and for all.

The aim of this paper is to sketch some of the most important contributions of Bernard Schmitt to celebrate his memory and encourage young economists to follow his path and carry on his work.

The next section is devoted to Schmitt's analysis of money and its purchasing power. It emphasizes the numerical and vehicular nature of money, and the way it turns into income. Some implications of Schmitt's conception of income are also briefly introduced. Section 3 deals with inflation and unemployment. Schmitt's analysis of these two pathologies is paramount, and stands as one of the most relevant insights of quantum macroeconomics. Section 4 introduces the problem to which Schmitt devoted most of his last 15 years of research: the external debt crisis. His discovery of the double charge affecting indebted countries is crucial, and his solution revolutionary. The last section draws some conclusions from this groundbreaking analysis.

2. Schmitt's analysis of money and its purchasing power

The analysis of money and the formation of its purchasing power were central in Schmitt's earlier writings, especially in his PhD dissertation he published under the title *La formation du pouvoir d'achat* (1960), and in books he published later on in the 1960s and 1970s, among which *Monnaie, salaires et profits* (1966). This analysis, which he afterwards continued to develop, stands as the cornerstone of a fundamental revision of macroeconomic theory that culminates in the conception of quantum macroeconomics. When Schmitt began his research work in this field, the economics profession was trying to merge price theory with value theory, the former dealing with money and monetary magnitudes like the price level, whilst the latter was aiming at the explanation of real variables like production, employment and relative prices. This was epitomized by the (neo)classical dichotomy between the real and the monetary sector, a separation that the IS–LM model in fashion at that time entertained, even though it gave the impression to explain the interactions between the two sectors of the economy (see [Cencini, 2003](#) for a radical critique of that model).

In fact, Schmitt connected money and macroeconomics from the outset. In his PhD dissertation he showed, with reference to Keynes's definition of national income, that the starting point for macroeconomic research should be the distinction between the formation and spending of income. To elaborate on this distinction, he undertook to examine the monetary conditions of production. He concluded that the income of the society as a whole is formed in the payment of workers' wages. In this perspective, he was thus able to elaborate on Keynes's analysis regarding labour 'as the sole factor of production, operating in a given environment of technique, natural resources, capital equipment and effective demand' (Keynes, 1936/1973, pp. 213–14).

To make his point, Schmitt carried out an in-depth analysis of money, which has not yet been taken up by other authors, except his own scholars in the so-called Dijon school – which has largely ramified also at the Universities of Fribourg and Lugano, Switzerland since the early 1970s. Bank money, he stressed, is purely fiduciary: it is paper or book money with no intrinsic value. How is it possible then that it has the power to buy goods and assets? The widespread idea that the purchasing power of money is based on confidence begs the question: confidence has to be grounded in the actual purchasing power of money. The remarkable thing is that in creating money, banks merely recognize themselves to be their clients' debtors, while the clients simultaneously become the banks' debtors. Thus, banks and their clients simply exchange their acknowledgments of debt or IOUs with one another: 'Money creation is simply the exchange of IOU's between the bank and the rest of the economy' (Schmitt, 1972, p. 139). Obviously, no economic value can be produced in this way and banks do not hand out own resources or something that is accepted in exchange for valuable objects even though it has no value objectively. This contrasts with endogenous money theory developed by post-Keynesian authors (notably Davidson, 1972/1978; Moore, 1988, and their followers), who consider that money either is demanded because of agents' liquidity preference or is accepted because it enables to access 'the great social store of all goods [that are exchanged against it]' (Schumpeter, 1954/1994, p. 289). Contrary to these subjective-behavioural explanations, Schmitt has developed an objective-structural argument, explaining in logical terms how money and output get integrated.

The integration of money and output occurs in the conversion of money into income, which is an operation taking place when firms pay for the labour services they hire in any process of production. As Schmitt (1972, p. 141) argues, the payment of the wage bill is necessary and sufficient to generate the purchasing power of money. Notably, firms must sell the goods produced in order to recover the money paid out to workers and reimburse the banks that lend them the money. In fact, firms may also pay out wages from working capital they hold with banks. In that case they do not have to reimburse the banks. The Schmitt analysis, however, is not altered: firms have to sell the goods produced in order to replenish the working capital they spent on wage bills. In this way, the payment of wages forms the purchasing power that is spent in the purchase of the produced goods. This contrasts with the theory of the monetary circuit developed by authors such as Parguez (1975) and Graziani (1990), who suppose that bank money originates with a

purchasing power, which then circulates across the economy over time, until the bank loan associated to it is paid back. To be sure, both Parguez (1975) and Graziani (1990), in their early writings on monetary circuit theory, recognized that their work had been inspired by Schmitt's. Graziani (1990, p. 32) even acknowledged that 'Schmitt is the author who has gone more deeply into the analysis of banking activity'. Further, a largely ignored author, Le Bourva (1962) – who is often referred to as a forerunner of the post-Keynesian theory of endogenous money *à la* Kaldor–Moore (Lavoie, 1992, p. 436) – explicitly refers to Schmitt (1960) when he adopts the terminology introduced by the latter author to express the monetary circuit in a wage (or entrepreneur) economy, in Keynes's sense (Rossi, 2006).

It should be clear that when paying for wages (including indirect wages), firms do not spend pre-existent incomes or purchasing power: they simply forward banks' IOUs, that is, money with no economic value, which may be referred to as 'nominal money'. The payment of wages converts nominal money into 'real money', that is, money endowed with the power to buy the goods produced. Workers thus gain a purchasing power that firms do not lose, and that banks cannot originate alone logically: 'Income is therefore macroeconomic in the exact meaning of the term' (Schmitt, 1972, p. 144).

Of course, wages are not the only incomes accruing to society as a whole. Actually, firms earn profits they may redistribute, partially or in full, to their beneficiaries in the form of interests, dividends, and rents. A necessary and sufficient condition for profits to be formed is that firms apply a mark-up in sales, that is, sell the goods produced at prices exceeding their production costs. This means that when spending wages, workers and their families do not buy all the goods produced; they transfer to firms a part of the purchasing power they earned: 'Wages can buy the whole product, but wage owners cannot. With every purchase, part of the spent incomes may be transferred to the firms' benefit' (Schmitt, 1972, p. 148). In this way, part of the wages formed in production are finally spent in the purchase of goods by firms (on the labour market) and their owners (on the product market), so much so that in the final analysis we have confirmation that all the purchasing power formed in production is spent on current output (see Carrera, 2015 for analytical elaboration on this). This does not mean, however, that the circuit settles at full equilibrium in a repetitive sequence, such as claimed by Lavoie (1987, p. 87). In fact, the circular flow of income holds good also when firms experience sales deficits. In the latter case, firms suffer a loss in receipts that they have to offset by waiving an equivalent amount of their profits, which means that they buy the unsold goods on their own. In conclusion, macroeconomic demand and supply are necessarily equal, and this leads to an unexpected result: 'The Keynesian multiplier is necessarily equal to one' (Schmitt, 1972, p. 193). Indeed, contrary to what is currently assumed, there is no link between incomes of successive time periods. In each period, income is newly formed and is necessarily spent on the goods produced in the same period. Hence, no income formed in one period will fuel the formation of new incomes in another period and thus allow a multiplication process to take place. This is fundamentally different from the Keynes–Kalecki perspective, which explains both the

upward and downward phases of a business cycle referring to the so-called 'multiplier effect' elicited by an expansionary and restrictive fiscal policy respectively, through its impact on effective demand (see Keynes, 1936/1973; Kalecki, 1990).

To be sure, Schmitt developed his own analysis of money and income formation and distribution with close reference to the history of economic thought. Throughout his work he extensively referred to Keynes, Walras, and Ricardo. He also published, in 1976 and 1977, a series of two books examining Marx's thought, which he wrote in collaboration with Alvaro Cencini. With respect to post-Keynesian (and, in general, heterodox) economists, Schmitt considered that his analysis of money's nature and purchasing power is better equipped on macroeconomic grounds to explain both the working and the pathologies of modern economic systems (Cencini and Rossi, 2015 provide some evidence and elaborate on this point analytically). Unfortunately, to the best of our knowledge, post-Keynesian (and other heterodox) authors never levelled a critique against Schmitt's arguments, with a 'cross-fertilization' perspective that might provide a relevant advance in economics and particularly in monetary macroeconomics.

Nevertheless, as mentioned earlier, Schmitt continued to develop his analysis of money throughout his work. This means that although he did not dismiss his former approach to money as summarized above, he was able to bring renewed insights on that topic in his further works, especially in his seminal book *Inflation, chômage et malformations du capital*, published in 1984. The main development in this respect is tied in with the focus Schmitt put on the numerical dimension of money. He namely highlighted that when banks issue IOUs to any of their clients, they do nothing more than committing themselves to debit and credit accounts held in their books with money units, that is, pure numbers. 'Banks issue numbers, nothing else' (Schmitt, 2012b, p. 73). Schmitt also emphasized that double-entry bookkeeping entails that when carrying out payments ordered by their clients, banks do not simply credit the recipients' accounts. They simultaneously credit and debit them: 'every person who is credited by a bank is, in the same moment or circular flow, debited by the same bank for exactly the same amount' (Schmitt, 2012b, p. 79).

It should be clear that the notion of circular flow mentioned here is at odds with the conception of the monetary circuit propounded by the so-called 'circuit school' that to some extent Schmitt in his earlier writings contributed to develop (see Schmitt, 1975). The circular flow (or 'circuit') of money does not occupy a positive span of time as 'circuitists' are used to argue. In fact, that circuit is instantaneous.

The latter analysis casts new light on the formation and spending of income. Workers' accounts are simultaneously credited and debited with money wages. This literally means that workers ever hold a zero sum of money wages. In fact, they get a bank deposit, which is a financial asset: 'Money wages disappear on their formation, but they leave an equivalent "mark", a bank deposit which shows that they have been replaced by financial assets' (Schmitt, 2012b, p. 79).

Bank deposits are two-dimensional. On the one hand, they are drawing rights on banks: depositors may ask banks to perform payments on their behalf. To that end, banks

issue nominal money, that is, mere money units that will be instantaneously re-deposited with them. On the other hand, they are financial assets: the deposits obtained by workers are matched with equal credits that banks grant to firms that pay workers' wages or with a working capital firms have to replenish. What is the object of these financial assets and liabilities? To answer this question, we have to consider the real side of the transaction. Firms pay money wages and to that end become indebted to banks (or to themselves, in so far as they have to replenish the working capital they spend on wages), because they employ workers to produce goods they hold until they sell them on markets. Workers, for their part, become and remain creditors of banks until they buy the goods produced. All in all, we observe that workers are paid in real goods that they do not immediately obtain in kind but in the form of bank deposits that match firms' liabilities. Strictly speaking, when workers are paid in money units they obtain the goods they produced and immediately lend these goods to firms. These goods are, as Schmitt put it, the real 'content' of money wages. Nominal money and the goods produced form together, in the same flow, the income (real money) or purchasing power granted to workers who, literally, spend it on the purchase of bank deposits, thereby lending the goods produced to firms through the intermediation of banks. In a second step, later on, workers draw on their deposits in order to buy goods and services on product markets. In that step, banks issue again a number of nominal money units and thereby re-create workers' income to finance the purchase of current output. In the interval of time between the formation of income and its final expenditure on real goods and services, income is transformed into financial assets or, in other words, into capital that Schmitt (1984, pp. 154–65) labelled 'time-capital'.

This analysis also brings about new insights with regard to the measurement of output. In opposition to a long tradition in the history of economic thought, there is no question of defining any economic value, whether labour value or utility, attached to the goods produced and to money units that supposedly would exchange for each other. Actually, there is no relative exchange between goods and money as both orthodox and heterodox economists maintain. In the payment of wages, money units and output are merged into one and the same thing, a form and its content. In Schmitt's words, it is an 'absolute exchange' that takes place, in which the physical output is transformed into workers' income. Workers produce the output and obtain, in the payment of wages, the same output contained in those money wages. Output is thus 'exchanged against itself via an absolute exchange defining its deposit into money' (Schmitt, 2012a, p. 37). This absolute exchange also means that '[t]he formation of incomes defines, at once, an already fully accomplished demand, to the value of the whole national product' (Schmitt, 1996b, p. 86). As a consequence, Schmitt's analysis confirms Keynes's identity of total supply and demand, which is not inconsistent with the existence of unemployment (see below). By the same token, output is measured in money units: 'the entire operation [...] is the transformation of national output from a heap of heterogeneous physical objects into a perfectly homogeneous set of real money units' (Schmitt, 2012b, p. 84).

It should be emphasized that although the physical process of production takes time, the transformation of output

from physical objects into real money units is instantaneous. This means that from an economic viewpoint, production itself is instantaneous: it is the process through which the physical output is changed into income and thus becomes a homogeneous economic magnitude. This also means that the time period during which matter and energy are made into physical goods is instantaneously transformed into a quantum of time, that is, an indivisible interval of time. Hence the notion of 'quantum macroeconomics' Schmitt opposed to the traditional approach by which production is considered as a function of continuous or discontinuous time.

3. Schmitt's analysis of inflation and unemployment

Schmitt's analysis of inflation and unemployment is both novel and far-reaching. In his seminal book entitled *Inflation, chômage et malformations du capital*, Schmitt (1984) is able to show that both pathologies are not the result of agents' forms of behaviour, as is argued by orthodox and heterodox economists alike, but of a precisely defined monetary disorder at structural level, which exists independently of agents' behaviour. To date, as a matter of fact, the structure of banks' bookkeeping does not (yet) allow distinguishing money and credit operations, both of which are the banks' 'core business'. Blurring this essential distinction, banks are thus at the origin of a pathology that leads, first, to the emission of 'empty money', that is to say, a gap in the money-to-output relation, which induces an inflationary pressure within the economy as a whole. This, then, leads also to (involuntary) unemployment, once firms' capital accumulation becomes excessive and capital can no longer be remunerated, that is to say, once the rate of profit falls beneath the market rate of interest. Inflation and involuntary unemployment stem therefore from the same monetary-structural disorder, which calls for a monetary-structural reform of the domestic payment system rather than trying to modify economic agents' behaviour. Once again, Schmitt is thereby in a position to answer an issue whose existence neither orthodox nor heterodox authors were able to imagine in the history of economic thought as well as in actual policy making.

Schmitt begins his analysis with a rigorous definition of inflation, which is a loss in money's purchasing power rather than an increase in the general price level as measured by any of its proxies such as the consumer price index (see Rossi, 2001). In defining inflation as a loss in the purchasing power of money, Schmitt (1984) provides a crucial missing element in the analysis of inflation: he disposes of a superficial understanding of this phenomenon, based on a simple-minded observation of price level changes. In fact, there might be different reasons – apart from inflation – that originate an increase in the relevant price level, such as an increase in firms' mark-up or in value-added tax rates. If prices increase owing to a higher mark-up, for instance, then one cannot infer an inflationary pressure, because money's purchasing power is not affected in that case, which indeed concerns a change in income distribution between firms and consumers. A similar conclusion holds when the State increases its value-added tax rates, as a result of

which there may be an increase in a variety of consumer price indices: in this case also, money's purchasing power is unchanged, as this change in fiscal policy affects income distribution between the public sector and the private sector but leaves the relationship between money and output unchanged across the whole economy. Unfortunately, apart from scholars within the Dijon school, this crucial point has not been taken up by other economists, although it is relevant to understand and to address inflationary pressures properly, thereby avoiding a tightening of monetary policies that may damage the economy eventually (see Cencini, 2015; Rossi, 2015).

To be sure, there might be inflation even when the general price level and its proxies, as the consumer price index, decrease over time. Owing to technological progress, as a matter of fact, production costs are lower for a given unit of output. Hence, if the mark-up does not change, firms' profits are unaffected when, as a result of new technologies, retail prices (hence their index) diminish along with a reduction of production costs. In this case, if the relevant price level decreases less than it should in light of a reduction in production costs, it is because an inflationary pressure exists and has to be explained in a logically consistent way as regards the nature of money and its issuance mechanism.

Schmitt's analysis of inflation starts from these premises, and focuses on the workings of banks' bookkeeping. In particular, inflation enters a monetary production economy whenever firms invest their profits in the production process, for banks, in that case, do not distinguish in their books between the emission of money for the payment of wages and the investment of profits for the accumulation of fixed capital goods within the set of firms (Schmitt, 1984, pp. 192–209). This amounts to saying that the profit-financed payment of wages in the investment-goods sector gives rise to empty money (that is, a bank deposit originally devoid of any real content), because the firms' expenditure of their profits on the labour market provides them with the very output that is produced thereby. The newly formed bank deposits are therefore void of this output, hence the inflationary pressure that occurs in the form of a dilution of total saleable output in an increased number of money units. As Schmitt (1984, p. 208, our translation) explains it, '[t]he product withdrawn from money and households is *definitively appropriated by a "non-person", the disembodied set of a country's firms*'. This means that the income of wage earners in the investment-goods sector is in reality made up of empty money, and that the corresponding newly produced capital goods are instantaneously 'fixed' within firms independently of their owners. If so, then these goods will never become the real content of any income, because they are appropriated by disembodied firms in the same instant of time of their production. A macroeconomic gap between the total sum of bank deposits (demand) and output to be sold on the marketplace (supply) exists, therefore, as a result of this monetary disorder in banks' bookkeeping.

This inflationary gap between money and output, however, is 'neutralized' as soon as it is formed on the labour market, because in fact firms' profits are both real and monetary (contrary to what Marxian economists think): the real content of firms' profits is indeed an output produced in the period when these profits were formed, and that is available to be sold on the goods market when wage earners in

the investment-goods sector dispose of their bank deposits in order for them to buy consumption goods eventually.

As Schmitt (1984, pp. 210–33) explains, things get worse when firms amortize the fixed capital they have accumulated over time. Indeed, fixed capital amortization implies that a new production (of amortization goods) occurs, whose goal is to maintain unaltered the efficiency of the fixed capital pathologically accumulated and appropriated by ‘disembodied firms’. As a result, the production of amortization goods replaces the pathological fixed capital accumulated through the investment of firms’ profits. Now, as Schmitt shows, because of the pathological nature of fixed capital, the production of amortization goods leads to an equivalent new production of fixed-capital goods. This new production takes place through the investment of the profit formed as a result of the amortization of fixed capital. Emptied of their real content, wages paid for the production of the new profit goods cannot be ‘filled’ with any other product: contrary to what happens when fixed capital goods are initially produced, in the case of the new production induced by fixed capital amortization no wage goods are left over from previous periods, so that the wages paid for the production of new fixed-capital goods are not only ‘empty with respect to newly produced output, but they are also empty with respect to any previous output (wage goods); they merely allow income holders to pay for amortization goods’ (Schmitt, 1984, p. 223, our translation).

What Schmitt (1984, p. 223) calls ‘dual production’ is the phenomenon through which capital accumulation elicits its over-accumulation. The value lost by fixed capital because of wear and tear is thus compensated twice: once by amortization and once by a new investment of profit of the same amount. This prompts Schmitt (1984, p. 223, our translation) to conclude that ‘[t]o the extent of dual production, workers do not produce for income holders; they do not produce for people: *they are enslaved to Capital*’. Schmitt refers here to pathological capital formed as a result of the investment of profit and which gives rise to inflation as well as to (involuntary) unemployment. This line of inquiry has not been taken up by any economists outside the Dijon school, although it is likely to enhance the explanatory power of Marxian economic thought owing notably to the concepts of ‘disembodied firm’ and ‘dual production’, disposing also of the logical inconsistencies in Marx’s thinking as regards the definition of labour-power and the so-called ‘realization problem’ with respect to profit (Cencini and Schmitt, 1976, 1977).

As Schmitt (1984) explained, the investment of profit elicits empty money as it introduces a numerical difference between demand and supply on the market for produced goods and services. Total demand increases but only in nominal terms, as wage earners in the investment-goods sector are paid with empty money. The inflationary gap that exists as a result of this pathology is eventually confirmed when fixed capital goods are amortized. Now, once the accumulation of fixed capital has reached such an extent that the rate of profit is lesser than the market rate of interest, the dual production of fixed-capital goods has to be converted into a new production of profit goods in the form of consumption goods. As a result, a purely nominal gap appears also between supply and demand on the product market: although firms have already bought the new profit

goods since their production, these goods are supplied again on the product market in the form of extra wage goods, thereby increasing total supply without a parallel increase in available income in the whole economic system. Sooner or later, confronted with excess supply, firms will reduce production, hence dismiss an array of workers, thus increasing unemployment. This explanation of the unemployment issue, based on monetary–structural factors independently of agents’ behaviour, differs from both orthodox and heterodox arguments in this regard. This difference should induce economists of any pedigree to rethink their policy proposals designed to reduce unemployment, considering the monetary–structural factors in their behavioural analysis with a perspective to design the appropriate policy interventions.

The Schmitt solution to eradicate the monetary–structural factors of inflation as well as unemployment consists in splitting banks’ bookkeeping into three functionally distinct accounting departments. The first department will be in charge of recording the result of any money emission, the second department will record all financial intermediations the banks operate between lenders and borrowers, whilst the third department will enter all profits that firms invest for the accumulation of fixed capital. Named issue department, financial department, and fixed-capital department respectively, these departments in the banks’ books will be instrumental in avoiding both inflation and unemployment. As far as the first two departments are concerned, they avoid that banks continue to exploit the actual confusion between money and credit, which to date enables them to provide a loan starting from scratch for non-income-producing activities (like those they carry out on financial markets). The operational distinction between money and credit will be the key to avert inflating credit bubbles, whose explosion could have a number of negative, systemic consequences as the global financial crisis burst in 2008 has shown clearly. It should be considered by endogenous-money theorists in the post-Keynesian camp who usually refer to Minsky (1982) ‘financial instability hypothesis’ to explain – in purely behavioural terms – the occurrence of credit bubbles and financial crises (see Toporowski, 2015). A separation between the first two departments and the third department in banks’ books is indeed required in order to withdraw from the amount of ‘loanable funds’ the sum total of firms’ retained profits, as these profits are invested in a new production process and thereby transformed into fixed capital. This implies that the corresponding bank deposits should not be available to be spent again, on either financial or product markets, because their expenditure generates (as it occurs to date) an inflationary gap that leads eventually to involuntary unemployment as explained above. This means, therefore, that when a firm pays the wage bill for the production of fixed-capital goods, this payment will be entered into the first two bank departments – in order to separate explicitly the emission of money necessary to carry out that payment and the generation of a new bank deposit, giving a purchasing power to wage earners because it provides them with the income that corresponds to the newly-produced goods (independently of the physical characteristics of the latter). This will be crucial and enough to dispose of ‘disembodied firms’ and the ensuing pathological over-accumulation of capital, which give rise to inflation and

unemployment generated by a monetary–structural disorder in banks’ bookkeeping as regards the working of domestic payment systems.

4. Schmitt’s analysis of countries’ external debts

Schmitt’s analysis of international payments developed quickly as a logical implication of his analysis of the way a national economic system of monetary production works. As early as 1973 he had already published a small book titled *New Proposals for World Monetary Reform* in which he proposes some of the principles that were to guide his investigation of the (non-)system of international payments for the next four decades. The most significant work to establish the strong ties between Schmitt’s analysis of the system of national payments and his analysis of international payments is his volume *Théorie unitaire de la monnaie, nationale et internationale*, published only 2 years later. In this book he shows that the nature of both national and international money, as well as the laws governing the logical working of the national and international systems of payments, are explained with the help of one and the same theory. But it is in 1984 that Schmitt publishes two of his most important books, namely, *Inflation, chômage et malformations du capital*, which represents the cornerstone of quantum macroeconomic analysis, and *Les pays au régime du FMI*, in which he investigates for the first time the problem of the payment of interest on external debts – a problem that nobody noticed in fact before Schmitt. From 1984 to 2012 the latter problem is going to be his preferred subject of investigation, in a continuous research for a crystal clear proof of his long-standing intuition that, in the present non-system of international payments, indebted countries pay twice their net interests on external debts. Let us briefly explain the nature of this anomaly and show how Schmitt was able to point to its existence, which remains fully ignored by the economics profession and therefore totally unaddressed by a variety of institutions like the International Monetary Fund (IMF) and the World Bank. What is missing in this regard is first of all an essential understanding of the nature of money as well as the definition of any country as the set of its residents, thereby separating clearly the State (a country’s resident among others) and the country itself – whose existence is important to grasp when it comes to the settlement of international transactions.

Intuitively, once the nature of money has been fully understood, the existence of a problem specific to the settlement of international transactions is not difficult to explain. Specifically, it is essential to grasp that money is a numerical vehicle and that, as such, it can never itself be the object of a payment. Indeed, payments are carried out through the circular use of money, but their final or ‘liberating’ character is determined by what money ‘carries’ or conveys in its flow. It is the task of banks to issue this numerical vehicle any time a payment has to be carried out. When they do so, banks act as monetary intermediaries: they provide for free the numerical means required to convey payments from the payer to the payee. What banks themselves do not create or provide for free is the real content

of payments, namely, the income or the purchasing power ‘vehiculated’ or conveyed by money. When transposed at the international level, this means that countries’ payments can be conveyed in an orderly, as opposed to a pathological, way only if a system of international payments exists, which allows countries to benefit from the free emission of a vehicular unit, a purely numerical means of payment. If this is not the case, the payment of net interest between countries has necessarily a double cost: the domestic income paid by countries’ indebted residents to foreign creditors, and the purchase of the foreign currency required to convey the payment between the debtor and the creditor countries. The terms of the problem are clear: either international payments are carried out within a system that provides its member countries with a costless means of payment, or paying countries have to purchase, at a cost, the foreign currency used to carry out payments between countries. In the first case, the cost of international payments is singular, equal to the domestic real goods and services whose property is transferred to creditor countries. In the second case, the cost is double, because a monetary cost (the purchase of the foreign currency necessary to convey the payment) and the real cost add up. This crucial point has not been considered, so far, in the literature on reforming the international monetary system, including authors working in the (post-Keynesian) tradition elaborating on the so-called ‘Keynes Plan’ presented at the Bretton Woods conference in 1944 (see Rossi, 2007 and the literature cited therein).

The double payment described above occurs every time a country pays the rest of the world. However, when countries’ international transactions are of the same amount, the second charges accompanying the payment between countries balance, and the duplication involved by the actual non-system of international payments has no effect (apart from the domestic inflation generated within each country involved, as shown by Schmitt in his 1984 book on international payments). There is only one case in which the payments do not balance, that is, the payment of net interest. Being one-sided or, following the terminology used by the IMF, an ‘unrequited transfer’, the payment of net interest is a unilateral transaction that does not involve any compensation of its second charge. As a result, indebted countries have to cover both the real and the monetary cost of this payment, which thus amounts to twice the value of net interest. Once again: it is because indebted countries have to purchase the foreign currency required to convey their real payment that the total cost of the transaction is twice as high.

In his attempts to provide the clearest and simplest proof of the duplication actually affecting the payment of net interest, Schmitt wrote a whole series of papers, most of them published as *Quaderni di ricerca* by the Research Laboratory in Monetary Economics at the Centre for Banking Studies in Lugano, Switzerland. Among the many arguments made by the founder of quantum macroeconomics, the following play a central role.

1. Interest on external debt is a unilateral or unrequited transfer, because it has to be paid by the indebted countries by transferring part of their domestic resources abroad.

This requirement is inherent in the very nature of interest, which defines but that part of the yields of the capital initially lent to the debtor country that are due to the creditor countries since the very moment of their formation. Let us call A the debtor country and R (the rest of the world) the creditor countries. A's external debt forms when it benefits from a foreign capital lent by R. The investment of this capital in A leads to the formation of a domestic income in A, part of which is from the outset owned by R. When A pays the net interest it owes to R, it transfers abroad that part of its domestic output that is already owned by R. Now, this explains why the payment of interest is entered in the current account of the indebted country's balance of payments. Schmitt's first argument states, in conformity with the principle of the balance of payments, that net interest is paid through a transfer of domestic resources entered in the indebted country's current account.

2. The second argument is a direct consequence of the first: being an unrequited transfer of domestic resources, the real payment of net interest is part of A's real exports.

In fact, it is through its exports that A gives R part of its domestic output. Part of the real goods exported by A are thus transferred to R as the real payment of the interest due by A.

3. The third argument introduces into the picture the monetary aspect of the payment of interest, the first observation being that the payment of interest is an expenditure that adds up to that of A's total imports, IM.

If we represent by in the amount of net interest, A's expenditures rise from IM to $IM + in$. EX being A's total exports, the payment of in introduces a gap, equal to in , between A's total expenditures, $IM + in$, and its total receipts, EX. In other words, the monetary payment of in has an impact on the balance-of-payments identity between EX and IM, which can be re-established only through a foreign loan, equal to in , granted by R to A. Following the IMF terminology, let us call it 'loan disbursement' in , LD_{in} . If LD_{in} were the only consequence of the payment of net interest by A, nothing would be wrong: the new debt incurred by A would be the logical result of the necessity to finance its net expenditure in favour of R and the payment of in would be simple and not double.

4. Another argument enters the scene and modifies the previous conclusion: the real payment of in reduces the monetary payment of A's exports by R.

Indeed, since part of A's total exports are owned by R from the outset, their unrequited transfer does not give rise to a positive payment of R in favour of A. A part equal to ex_{in} of country A's total exports is not paid by R, which reduces A's receipts from EX to $EX - ex_{in}$. Bearing that in mind we can now go back to the balance-of-payments identity between A's total expenditures and its total receipts and see that from $IM + in = EX + LD_{in}$, we pass to $IM + in > EX - ex_{in} + LD_{in}$. The difference between A's total expenditures and its total receipts has to be covered and the balance-of-payments identity complied with, which is obtained through a reduction in A's official reserves. Finally, A's total expenditures, $IM + in$, are financed by its total exports effectively paid by R, $EX - ex_{in}$, plus a

new external loan, LD_{in} , plus a decrease in its official reserves, $DRis_{in}$:

$$IM + in = EX - ex_{in} + LD_{in} + DRis_{in}$$

Whereas the increase in A's external debt seems justified by the payment of its net interest, the decrease in its official reserves is a second, pathological cost that brings the charge of the payment to twice the amount of in .

Schmitt's discovery of the double charge of the payment of net interest on external debts is all-important, for it shows that the actual non-system of international payments is a source of a significant loss of domestic resources for indebted countries, which give up a part of their national output equal to the amount they pay as net interest to the rest of the world without any counterpart whatsoever. Furthermore, as shown by the French economist, the loss suffered by indebted countries does not define a gain of creditor countries. Instead, foreign creditors are only paid their due once, the second payment – the loss of A's official reserves – being addressed to what has been called the financial bubble, that is, a pathological, stateless financial capital that feeds speculation and is a main source of financial crises (see Cencini and Rossi, 2015). The absence of a sound system of international payments, respectful of the logical nature of money and capable of providing countries with the numerical means required to convey their external payments free of cost, is fatal both for debtor and creditor countries. Even though a higher price is paid by indebted countries in the form of one real and one monetary payment of net interest, creditor countries do not benefit from it and find themselves in the uncomfortable situation of having to trade with constantly impoverished partners, beside being exposed to the negative consequences of financial crises.

The analysis of the payment of net interest led Schmitt to formulate a theorem, which he called 'The Theorem of Interest', and to propose a plan of reform that, if implemented, would allow any single indebted country to avoid the pathological double charge imposed today by the non-system of international payments. It also led him to investigate, since 2009, the very formation of countries' external debts. If indebted countries pay twice the amount of their net interest, this implies that their external debt is, *de facto*, twice as high as it should be. Starting from that observation, Schmitt went to work to prove his intuition. Let us present here the main tenets of his analysis.

Schmitt's starting point is the very concept of external debt, and the relevant question in this respect concerns the legitimacy of countries' indebtedness, which no other author in the relevant literature has ever raised. Apparently, this question does not give rise to any significant difficulty: any given country, A, gets indebted to the rest of the world, R, to the extent that it finances its net expenditures by a foreign loan. However, countries are not autonomous economic agents and cannot either purchase or borrow abroad. Only countries' residents do, which means that the expression 'a country's external debt' should be read as synonymous of the net external debt incurred by its residents. In other words, a country *per se*, as the set of its residents, should never be charged an external debt on top of that incurred by

its residents. This is obviously not what happens today, and this calls for analytically discerning the reason why countries themselves are *de facto* indebted to the rest of the world.

A topic closely linked to that of countries' external debt is the sovereign debt crisis, which is widely considered as one major cause of the actual economic and financial disorders. Indeed, if countries' sovereign debt is correctly conceived, the two topics become one and the same, a country's sovereign debt being nothing but its external debt. If this is still not recognized as it should be, it is because the sovereign debt is often erroneously identified with the debt incurred by the State, that is, the country's public debt. As surprising as this might appear, the clear-cut distinction between State and country has not yet been fully grasped and assimilated by everybody, and the two terms are frequently considered as interchangeable. In reality, the State is but another resident, albeit a very important one, whereas a country is the set of *all* its residents. Hence, a country's public debt is the debt incurred by one of its residents, the State. To identify it with the country's sovereign debt is doubly mistaken: first, because the debt of the State is not that of the country taken as a whole, and second, because a country's sovereign debt derives from the net foreign debt incurred by all its residents. To put it clearly, this means that a country's sovereign debt is related to the sum of the net private and public debt incurred to the rest of the world by all its residents, State included.

In his last paper, [Schmitt \(2014\)](#) argues that, in the present non-system of international payments, countries' external debts are twice as high as they should be, because sovereign debts are added on top of those incurred by their residents. The very existence of a sovereign debt is thus inherently pathological, because it introduces a debt that should not exist. Schmitt shows that every time a country finances its deficit, that is, the difference between its total expenditures or imports (both commercial and financial) and its total receipts or exports (commercial and financial), through a foreign loan, it incurs a pathological, sovereign debt. This problem is a macroeconomic one and concerns the balance-of-payments identity between each country's total imports, IM, and exports, EX. Given this logical identity, how is it to be respected, in the actual non-system of international payments, when a country's residents import more, commercially and financially, than they export?

Let us consider one of Schmitt's numerical examples. Suppose that country A's residents purchase abroad more than they sell, the difference being equal to 1-dollar value. Is country A itself concerned with the payment of the deficit incurred by its residents? The answer is yes, because the creditors, residents in the rest of the world, have to be paid in foreign currency, dollars in our example, while the debtors, residents in A, pay their deficit using their own national currency, to wit, money A. The microeconomic payment of the deficit incurred by A's residents is carried out by them through the expenditure of a domestic income expressed in terms of money A. The macroeconomic payment of the deficit rests with the country itself, which has to convert into a foreign currency the payment of its residents. The whole question is therefore to determine whether the currency conversion is guaranteed, free of cost, by the system of international payments or has to be carried

out, at a cost, through a purchase of the foreign currency required by R's residents.

What Schmitt's analysis tells us is that, up to now, the respect of the balance-of-payments identity is obtained at the cost of a foreign debt that accrues on A's economy, and which would be justified only if A did not pay its deficit at all. Since A's residents pay the entirety of their foreign purchases, no external debt should form as a consequence of the international transactions between A and R. If this is not the case, it is because country A is forced to borrow abroad the foreign currency, dollar, it needs to pay the creditors of its domestic economy. To the extent that A's foreign purchases or imports are equal to its foreign sales or exports, country A's needs for a foreign currency are covered by R's payments, and no monetary problem arises. However, when A's total imports exceed its total exports, a further payment is required in addition to the one carried out by A's residents. It is this additional macroeconomic payment of country A on top of the microeconomic payment by its residents that explains the pathological duplication of countries' external debts denounced by Schmitt. In his 2014 paper, he provides numerous proofs of the presence of such duplication, and the interested reader will find in it the answers to the queries our short presentation is likely to arise. By way of conclusion, let us spend a few words on the solution advocated by Schmitt as developed in the second part of his 2014 paper (see [Schmitt, 2016](#) for some analytical elaboration on this point).

5. Conclusion

Even though an all-encompassing solution to the disorder of the actual non-system of international payments would require the implementation of a reform concerning the entire system inherited from Bretton Woods, every single country could easily protect itself against the double charge of external debts by implementing a reform of its own method of payment of its foreign transactions. In a few words, the aim of Schmitt's reform is to allow for the single payment of a country's deficit, thus reducing to zero the charge of the second payment actually imposed on it. Let it be clear that the solution to the double charge of the payment of external debts cannot consist in abolishing either the payment, in money A, of the indebted residents or the payment, in dollars, to the benefit of foreign creditors. Country A's indebted residents will still have to pay their due and R must obtain, through a payment in dollars, a part of A's domestic resources equivalent to its net exports to A. What has to be avoided is not the payment of A's indebted residents, but the loss for A's economy of the sum of domestic income spent by them. In the actual non-system, the amount of domestic income spent by A's indebted residents is no longer available in A's economy and can only be recovered by incurring a new foreign debt: a foreign loan having A's domestic income as its object is necessary to bring A's national income back to its original level. One of the two charges country A has to face in the present non-system is precisely that concerning the loan required to recover the income lost by its residents. Schmitt's reform avoids this loss by introducing in A a Bureau charged to pay A's exporters and to which the payment of A's importers

is addressed. The difference between the sum paid to the Bureau and that paid by the Bureau, which corresponds to the difference between A's total imports and its total exports, will define a net gain for the Bureau and will be invested within country A to reduce unemployment.

But the gain in domestic income is not the only benefit country A will derive from the implementation of Schmitt's reform. Indeed, if country A's external debt were still to increase because of its deficit, the gain in money A obtained by A's Bureau would still be the property of R and nothing would be radically changed with respect to the actual situation. For the orderly system to function properly, the reform must avoid the formation of A's external or sovereign debt, a goal that Schmitt achieves by imposing to A's Bureau to lend to R an amount of foreign currency equal to the one it borrows from it. The mechanism by which A's Bureau avoids the formation of an external debt of country A is easy to miss, unless it is understood that the loan made in dollars by A to R is what allows for the real payment of R's net exports and, by the same token, makes it possible to respect the balance-of-payments identity between A's and R's total exports and total imports. The real goods exported in surplus by R are in fact balanced by the real domestic resources transferred by A: the loan to A of R's national resources is matched by the loan to R of A's domestic resources.

Schmitt's discovery of the double charge of countries' external debt and his proposal for a reform enabling any single country to avoid it are really a momentous breakthrough in economic theory and the core achievement of his quantum macroeconomic analysis. Let us hope that many young economists will soon follow his path and thereby contribute to the development and the diffusion of a new way of thinking about macroeconomics.

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