

CREDIT AND MONEY CREATION FROM THE INTEGRATED ACCOUNTS PERSPECTIVE

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In this paper we apply the analytical integrated accounts framework to conduct a conceptual analysis of essential macro-financial linkages. In particular, we analyse the macroeconomic mechanism of the creation of purchasing power through bank credit, explore the partial self-financing property of bank credit and the links between bank credit and money creation, and discuss the role of debt accumulation as a powerful demand-side driver of growth. We argue that creation of money and purchasing power is an indispensable corollary of bank credit issuance. Contrary to conventional wisdom, credit is not predicated on existing savings. It directly adds to domestic demand, which translates into some combination of stronger domestic economic activity, stronger foreign economic activity or higher prices, with particular configuration depending on the structural features of the economy. However, credit-driven growth may result in a systemic over-reliance on continuous debt accumulation and poses the risk of deep structural imbalances and balance sheet recessions.

Keywords: credit creation, money creation, national accounts, integrated accounts, macroeconomic and financial linkages.

Introduction

The recent global financial crisis caught mainstream economists completely by surprise, exposing serious gaps in the collective understanding of crucial elements of the interaction between the real economy and the financial system. It is only natural that the dominant rational agent-based new Keynesian paradigm, with only rudimentary financial set-ups and no clear role for money and bank credit, could not foresee endogenous financial crises. The mainstream of the profession has taken the dubious path of adding additional layers of complexity to a rather shaky foundation. In the new generation of macroeconomic models, crises can be generated by exogenous shocks in the context of market imperfections, conflicting interests, myopic expectations and other small tweaks to the intertemporal optimisation framework, which still seems rather unrealistic from the perspective of human abilities to foresee the future in an inherently uncertain world.

Moreover, standard models still retain major misconceptions about financial interactions and the role of bank credit. With only a handful of exceptions,* the mainstream macromodels regard bank credit as a means to redistribute existing real savings (or purchasing power), whereas in fact, by issuing loans, banks create new purchasing power. If investment spending is not actually predicated upon the consumption vs. saving choice of an optimising agent but can instead be supported by bank credit and the cost of the dilution of the existing purchasing power may be borne by unsuspecting agents and possibly even by future generations, the implications for the “optimising” behaviour of savers, investors and banks may be immense. It may well be the case that financial crises

*See, e.g., Jakab and Kumhof (2015) and Benes and Kumhof (2012).

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at the end of the debt “super cycle” are result of a Ponzi-type financing (how compatible with the optimising behaviour can it be?). It may also be the case that the observed economic growth relies much more on the continuous accumulation of debt than is recognised by economic theorists. However, there are signs of ongoing tectonic shifts in the right direction, with the world’s most authoritative financial institutions voicing concerns about the current “debt-fuelled growth model” (BIS 2016) and effectively calling for a paradigm shift in economic thinking and policy making.

In this paper we get back to the basics in the pursuit of understanding the fundamental linkages between the financial and real sides of an economic system. In particular, we look into a number of stylised cases of economic and financial transactions to analyse the macroeconomic mechanism of the creation of purchasing power through credit, the link between credit and money creation, the partial self-financing property of bank credit, as well as similarities and differences between bank credit and other sources of financing.

The remainder of this paper is structured as follows: in Section 1 we provide a short introduction to the analytical integrated accounts (IA) framework and present economic and accounting principles behind it. In Section 2, with the help of analytical IA tables we analyse economic and financial transactions resulting from a rise in an institutional sector’s spending by increasing its net financing and put financing with bank credit in this context. In Section 3 we argue that credit is a means to create purchasing power rather than redistribute it, as is conventionally maintained. Drivers behind monetary dynamics and its relationship with bank credit are discussed in Section 4. A general discussion on the significance of credit flows in a contemporary economy is provided in Section 5.

1. Setting the stage for the integrated accounts analysis

The analysis of linkages between financial and real sides of the economy can be grounded in the analytical IA framework. In this section we provide a short introduction to the basic principles of the analytical IA framework, which is based on national accounts, macroeconomic identities and sectoral budget constraints.

1.1. Some general principles of the macroeconomic accounting framework

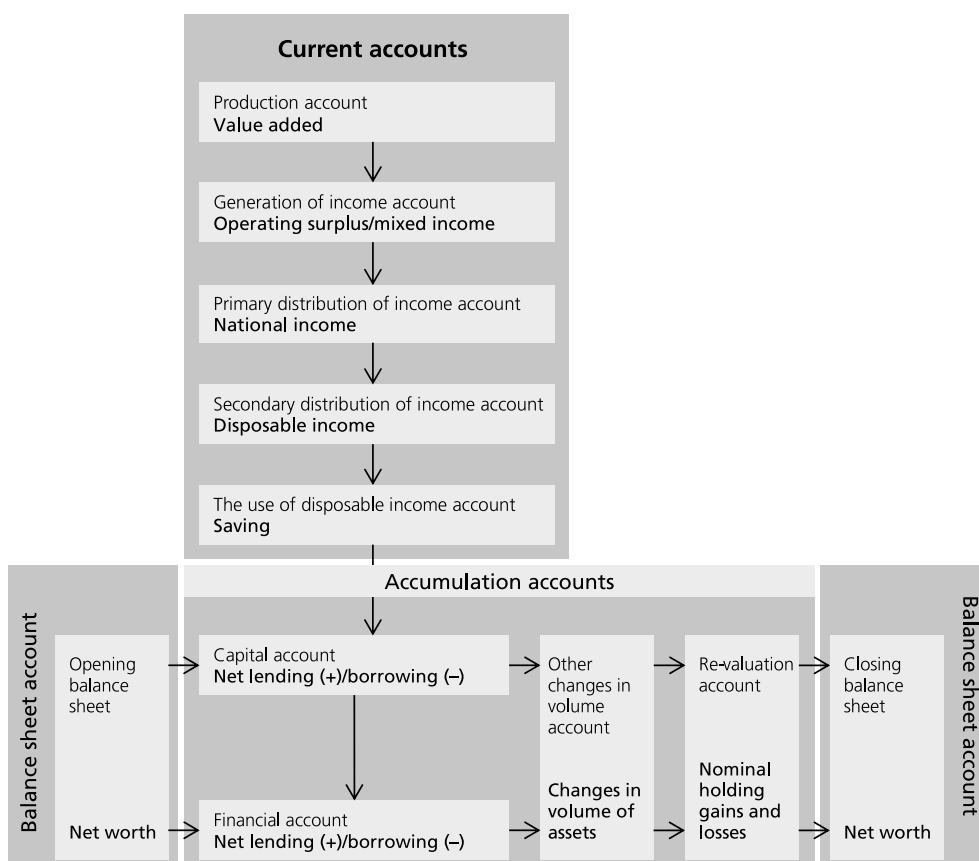
The origins of macroeconomic accounting systems can be traced back to the attempts to estimate national income in Britain and France in the late 17th century. Devising systems for the measurement of economic activity, aggregate income and outlays regained importance with the rise of the Keynesian doctrine of macroeconomic stabilisation policies, while a major conceptual and methodological breakthrough is associated with the works of Colin Clark and Simon Kuznets in the 1920s and 1930s (Bos 1992). Leontief (1936) formulated the model connecting sectoral economic input and output in his seminal paper, which provided a foundation for the national accounts’ input-output tables. The Stone memorandum, proposed by Richard Stone for the meeting of the League of Nations predecessor of the United Nations in 1945 and published in 1947, was the first document to propose a complete system of institutional accounts, which also opened the era of international guidelines on national accounting. The United Nations introduced the first version of the internationally standardised system of national accounts (SNA) in 1952. Over the years various analytical representations of the national accounts data were devised. A notable example is the social accounting matrix (SAM) methodology put forward by Stone and Brown (1962), whereby a square matrix format is used to analyse economic interactions between institutional sectors. Copeland (1949) pioneered the development of the flow-of-funds analysis, which concentrated on the financial side of economic transactions and tracked changes in the financial assets and liabilities of institutional sectors. The flow-of-funds analysis is the predecessor to the integrated economic and financial accounts analysis, which is concerned about both economic and financial transactions and tracks balance sheet positions in addition to financial transactions.*

*Notably, the terms “flow-of-funds analysis” and “integrated (economic and financial) accounts analysis” are still often used interchangeably.

The system of national accounts is an internationally compatible accounting framework providing a detailed description of national economies, their real and financial components and the economic relationships between institutional sectors.* One of the main sets of tables in the SNA framework is the institutional sector accounts. In this accounting representation, a national economy is comprised of institutional sectors, namely, nonfinancial corporations, financial corporations, general government, households and non-profit institutions serving households (NPISH). There is also “the rest of the world” (ROW) sector, which enables recording economic interactions between the national economy and non-residents. Some of the institutional sectors are divided into subsectors, so the appropriate level of data aggregation can be chosen depending on the focus and purposes of economic analysis.

The institutional sector accounts are organised around the sequence of accounts, which records each sector’s economic and financial activities in a compatible way. More specifically, the sequence of accounts provides a comprehensive sequential description of the cycle of sector’s economic activity by linking its resources (revenue), uses (expenditure), accumulation of financial and nonfinancial assets and the associated changes in the sectoral balance sheet positions. The use of similar classifications and accounting rules allows symmetrical reporting of transactions or changes in asset positions for interacting institutional sectors.** The unified accounting framework also ensures the aggregation of sectoral accounts data into economy-wide aggregates, which are at the heart of the macroeconomic analysis.

Fig. 1. A simplified diagram of the sequence of accounts and the resulting balancing items



Source: European System of Accounts (2010).

A simplified diagram (see Fig. 1) illustrates the basic structure of the sequence of accounts and their respective balancing items (shown in Bold). The sequence of accounts contains three categories of accounts: current, accumulation and balance sheet accounts. Current accounts cover the production of goods and services and the associated

*The latest version of national accounts framework is laid out in the 2008 SNA and ESA 2010 (The European System of National and Regional Accounts) documentation. Lequiller and Blades (2014) provide a good introduction to the SNA framework for nonspecialists.

**The SNA records transactions between two units using the “horizontal” double entry. In addition to that, each transaction is recorded twice in an institutional sector’s accounts — as a resource (or a change in liabilities) and as a use (or a change in assets) — which constitutes the “vertical” double entry. This results in the quadruple entry principle, though it is typically fully utilised only when the financial accounts are compiled (Eurostat 2016) and certain “vertical discrepancies” are possible.

generation, distribution and redistribution of income and its use for final consumption. Accumulation accounts comprise capital and financial accounts, as well as accounts recording other changes in assets and liabilities (namely, revaluation of assets and liabilities, and other changes in volumes, such as loan write-offs). Accumulation accounts record changes in assets and liabilities and the resulting changes in the net worth of institutional units and sectors. Current and accumulation accounts are flow accounts, as they record transactions and other changes in assets that take place within a given period of time. In contrast, sectoral balance sheets show asset and liability positions at a given point in time (at the beginning and at the end of the accounting period). Balance sheets complete the sequence of accounts showing the ultimate effect of current and accumulation accounts on the stock of wealth of a sector or the total economy.

What makes institutional sector accounts sequential is the fact that each account typically generates a balancing item and then passes it on to the next account in the sequence (see Fig. 2). The balancing item is obtained by subtracting the total value of entries on one side of the account (i.e. uses of resources or changes in assets) from the total value of entries on the other side of the account (i.e. resources or changes in liabilities). So, for example, the production account records output as a resource and intermediate consumption as a use, whereas the difference between these items results in value added, which is the balancing item on the “uses” side of the production account. The value added is passed on as a resource to the generation of income account. In this account it is further broken down between compensation of employees, taxes and another balancing item — an operating surplus/mixed income, which is brought forward to the allocation of the primary income account, and so forth. Thus the sequence of accounts not only generates a number of key macroeconomic aggregates, such as gross domestic product (GDP), disposable income, consumption, investment, saving and net lending, but also embodies a number of accounting identities describing relationships between these economic aggregates.

Fig. 2. Simplified current accounts in a T-account format

RESOURCES (+)	USES (-)
...	
PRODUCTION ACCOUNT	
Output	Intermediate consumption
Taxes on products less subsidies	
= Gross domestic product	
GENERATION OF INCOME ACCOUNT	
Gross domestic product	Compensation of employees
	Taxes on production and imports
	Subsidies
= Operating surplus, gross/mixed income, gross	
ALLOCATION OF PRIMARY INCOME ACCOUNT	
Operating surplus, gross/mixed income, gross	Property income
Compensation of employees	
Taxes on production and imports	
Subsidies	
Property income	
= National income, gross	
...	

Source: Lequiller, Blades (2014).

The sequence of accounts provides detailed information about a given sector's or the total economy's cycle of economic activity. Alternatively, institutional sector accounts can be shown in the form of integrated economic accounts, which portray the accounts of the total economy, institutional sectors and the ROW side-by-side in one table.* This format is more convenient for the purposes of economic analysis, as it is more compact and highlights three important data constraints. First, a vertical balancing constraint requires that each sector must be in balance, implying that the part of the sector's expenditure exceeding its revenue must be financed by running down net financial assets, i.e. by decreasing financial assets or increasing financial liabilities. Second, the horizontal adding-up constraint requires that sectoral data add up to the total economy so, for example, national disposable income equals the sum of disposable incomes of all institutional sectors. Finally, the stock-flow consistency requirement implies that the opening and closing balance sheets must be linked by transactions recorded in accumulation accounts (i.e. transactions in assets and liabilities, revaluation and other changes in volumes).

1.2. Compilation of analytical integrated accounts tables

Analytical IA tables and the associated sectoral balance sheet position tables prove very useful for diagnosing the short-term state of an economy and are routinely applied by organisations like the International Monetary Fund (IMF) in country assessment programs (IMF 2013). They allow monitoring and assessment of economic imbalances (Be Duc, Le Breton 2009; Barwell, Burrows 2011) and transmission of economic shocks (Castren, Kavonius 2015), facilitate the analysis of macro-financial linkages (Crowe *et al.* 2010), real and financial network formation (Castren, Kavonius 2013; Castren, Rancan 2013), as well as help to better understand the role of money and credit in the economy. The IA tables and the associated sectoral balance sheet position tables serve as an operational accounting framework in the stock-flow consistent (SFC) economic models.**

An analytical IA table offers a quick and straightforward way to portray an economy as a closed system consisting of interacting institutional sectors, whose economic and financial transactions are shown side-by-side in columns, which obey the above-mentioned vertical balancing and horizontal adding-up constraints (see Table 1). An IA table shows revenue, expenditure and financing transactions of each sector and the national economy, as well as the interactions with the rest of the world. The economic variables (entries in the analytical table) typically are highly aggregated, there is no breakdown into uses and resources unlike in the "T-account" representation, and changes in assets and liabilities are often reported on the net change basis. For example, one might read from an analytical IA table that the household sector finances a rise in consumption by increasing nonmonetary financing from the nonfinancial corporate sector. It might not be immediately clear though, whether this decline in net assets of the household sector is associated with a decline in household sector's holdings of financial instruments issued by the nonfinancial corporate sector or, conversely, with an increase of the household sector borrowing from the nonfinancial corporate sector. Thus, to obtain more detailed information it might be necessary to refer to detailed integrated economic accounts or other related sources of statistical information. The main advantage of the succinct analytical IA representation is that it makes immediately clear which sectors have deficits, why they have them, from which sectors they finance excess spending and by which financial instruments. The system is closed in the sense that in the absence of statistical errors there should be no unaccounted sources of financing, thus such accounting framework can be very helpful in ensuring internal consistency of the macroeconomic analysis.

In Table 1 we present a simple analytical IA table. It is compiled along the guidelines of the IMF methodology (IMF 2013) but uses a slightly expanded format to better suit the analytical purposes of the present paper. Columns in the IA table represent broad economic sectors. In Table 1, household and NPISH sector data are merged into one economic sector, while the financial sector is broken into subsectors — monetary financial institutions (MFIs) sector (comprised of the central bank and deposit-taking

*Columns in the integrated economic accounts table relate to specific sectors.

**See Caverzasi and Godin (2013) for a review of SFC models. Many examples of simulated SFC models are presented in the influential book by Godley and Lavoie (2012). Zezza (2011) and Kinsella and Tiou-Tagba Aliti (2012) are some examples of the few applied empirical SFC models.

financial corporations) and other financial institutions sector. Rows in the IA table contain transaction data and in theory should add up to total economy aggregates, though in practice that could be precluded by statistical discrepancies owing to the use of different statistical data sources and analytical simplifications.

Table 1

Basic analytical IA table

Transactions	Sectors	Domestic economy					Rest of the world	
		Aggregate economy	Government sector (g)	Households and NPISH (h)	Nonfinancial corporations (c)	Financial sector		
						Monetary financial institutions (m)		Other financial corporations (o)
Gross national disposable income		GNDI	GNDI _g	GNDI _h	GNDI _c			
Consumption		-C	-C _g	-C _h				
Gross fixed capital formation		-GFCF	-GFCF _g	-GFCF _h	-GFCF _c			
Change in stocks		-CIS			-CIS _c			
Exports of goods and services							-X	
Imports of goods and services							M	
Primary income							-PI	
Secondary income							-SI	
Capital account		KA	KA _g		KA _c		-KA	
Statistical errors and omissions		SEO	SEO _g	SEO _h	SEO _c		SEO _r	
Net lending		NL	NL_g	NL_h	NL_c	NL_m	NL_o	-NL
Net financing		NF	NF_g	NF_h	NF_c	NF_m	NF_o	-NF
Foreign financing		FF	FF _g	FF _h	FF _c	FF _m	FF _o	-FF
Nonmonetary financing		FNMF	FNMF _g	FNMF _h	FNMF _c		FNMF _o	-FNMF
Direct investment		FDI			FDI _c			-FDI
Net foreign borrowing		NFB	NFB _g	NFB _h	NFB _c		NFB _o	-NFB
Monetary financing		FMF				FMF _m		-FMF
Change in net foreign assets of commercial banks						NFA _b		-NFA _b
Change in net foreign assets of central bank						NFA _{cb}		-NFA _{cb}
Domestic financing		0	DF _g	DF _h	DF _c	DF _m	DF _o	
Nonmonetary financing		0	NMF _g	NMF _h	NMF _c	NMF _m	NMF _o	
From government		0		NMF _{hg}	NMF _{cg}	NMF _{mg}	NMF _{og}	
From households		0	NMF _{gh}		NMF _{ch}	NMF _{mh}	NMF _{oh}	
From non financial corporations		0	NMF _{gc}	NMF _{hc}		NMF _{mc}	NMF _{oc}	
From monetary financial institutions		0	NMF _{gm}	NMF _{hm}	NMF _{cm}		NMF _{om}	
From other financial corporations		0	NMF _{go}	NMF _{ho}	NMF _{co}	NMF _{mo}		
Monetary financing		0	MF _g	MF _h	MF _c	MF _m	MF _o	
Domestic credit		0	CRED _g	CRED _h	CRED _c	CRED _m	CRED _o	
Broad money		0	MON _g	MON _h	MON _c	MON _m	MON _o	
Cash		0		CASH _h	CASH _c	CASH _m	CASH _o	
Deposits		0	DEP _g	DEP _h	DEP _c	DEP _m	DEP _o	

Source: formed by the authors based on IMF (2013).

The table is divided into two blocks by a solid horizontal line separating nonfinancial and financial transactions. The upper block of the IA table portrays transactions recorded in current and capital accounts. In this part of the table, the revenue-increasing transactions (resources) are shown as positive entries, while transactions related to expenditure (uses) are entered with the negative sign. So, for example, transactions that increase households' disposable income are recorded as positive entries, whereas an increase

in household consumption is shown with a minus sign. The difference* between each sector's economic revenue and expenditure results in a nonfinancial balance. If a sector, or the total economy, has a positive (negative) nonfinancial balance, it is a net lender (borrower).

Since nonfinancial transactions of the financial sector are typically insignificant, for the sake of simplicity they can be omitted from the table or, say, included in the nonfinancial sectors' transactions (IMF 2013). The ROW sector is portrayed from the non-residents' perspective, therefore the country's exports to the ROW and other flows that generate income for the domestic economy are shown with a minus sign in the ROW column, while country imports from the ROW is a positive entry.

If the upper block of the analytical IA table reveals which sectors have surpluses and which have deficits, the lower part of the table details institutional sectors' net acquisition of financial assets of institutional sectors. In other words, it relies on the financial accounts data to detail by which instruments and from which sectors the deficits are financed. By another sign convention, positive entries in the lower block of the IA table show a decrease in sector's net assets, i.e. a sale of assets or incurrence of liabilities.

Categorization by instrument offers one way to detail sectoral net lending and expand columns in an analytical IA table. The current version of the European System of Accounts (ESA 2010) distinguishes the following broad categories of financial assets and liabilities: *i*) monetary gold and special drawing rights, *ii*) currency and deposits, *iii*) debt securities, *iv*) loans, *v*) equity and investment fund shares or units, *vi*) insurance, pension and standardized guarantee schemes, *vii*) financial derivatives and employee stock options, and *viii*) other accounts receivable/payable. However, it does not convey important information about capital flows *between* sectors. The recent global financial crisis, which was characterised, among other things, by disrupted capital flows among key economic sectors (Goldstein *et al.* 2000; Aslund 2010), highlighted the need to understand the financial interconnectedness between sectors but such analysis was hampered by the lack of adequate data (Mink *et al.* 2012). Therefore, in recent years more and more countries are starting to compile and publish financial accounts data on the so-called from-whom-to-whom basis. This representation is also known as financial accounts by debtor/creditor or the flow of funds matrix. It is a compilation of three-dimensional tables showing financial transactions from the debtor and creditor perspective for each financial instrument. The from-whom-to-whom representation contains large amounts of data and are difficult to compile for economies with advanced financial markets, thus the progress in this field is rather slow IMF, FSB. However, the economic importance of such data is immense because it ensures internal consistency of the financial part of integrated economic accounts framework. In practical terms, if the financial account breakdown by instruments ensures vertical consistency of the lower block of the IA table, the from-whom-to-whom decomposition adds horizontal constraints and ensures that the analytical framework is a closed system (which is one of its main virtues).

1.3. Some macroeconomic identities and accounting constraints embedded in IA tables

It is easy to see that data constraints in the IA table stem from some principal macroeconomic accounting identities. First, recall that private institutional sector's disposable income equals the primary income (operating surplus, mixed income, compensation of employees and net property income) net of taxes plus net social benefits and other current transfers. In contrast to the private sector, the major part of general government's disposable income comes from taxes. In national disposable income calculations, the income that constitutes other domestic institutional sectors' outlays (for example, taxes) is netted out. Thus, gross national disposable income (*GNDI*) is the sum of GDP, external primary income (*PI*)** and external secondary income (*SI****). It can be written as follows:

*More precisely, the sum of appropriately signed revenue and expenditure transactions.

**The difference between investment or labour incomes earned by domestic residents abroad and those earned by foreign residents in the domestic economy.

***I.e. net current transfers from abroad.

$$GNDI = GDP + PI + SI. \quad (1)$$

At the same time, gross national disposable income is the sum of disposable incomes of all domestic institutional sectors. National saving S is defined as the difference between gross national disposable income and final consumption expenditure C (and again, national saving is the sum of public and private sector saving):

$$S = GNDI - C. \quad (2)$$

By substituting equation (1) into (2), using the GDP decomposition by expenditure approach ($GDP = C + G + I + X - M$) and applying the balance-of-payments (BOP) definition of the current account balance ($CA = X - M + PI + SI$), one gets another well-known macroeconomic identity, which states that the saving-investment balance of the national economy must equal the external current account balance:

$$S - I = CA. \quad (3)$$

The balance-of-payments identity states that, abstracting from statistical errors, the sum of current account balance (CA) and capital account balances (KA) equals the financial account balance (FA). Thus, by adding KA to both sides of equation (3) and using the definition of net lending (NL) we get the following relationship:

$$GNDI - C - I + KA = NL = FA = CA + KA. \quad (4)$$

This equation states that net lending of the national economy is the financial account balance and it also equals net borrowing of the ROW sector.

Net lending of the total economy can then be expressed as the sum of sectoral net lending balances. From the financial perspective, sector's net lending is a net change in a financial position, or net acquisition of financial assets minus net incurrence of financial liabilities.* When financial accounts data are available in both instrument and from-whom-to-whom decomposition, the IA table can be easily tailored to specific analytical needs. Following IMF (2013), in Table 1 we combine elements of both decompositions and break sectoral net financing NF (the negative of net lending) into two broad sources of funding, namely, foreign financing (FF) and domestic financing (DF). For example, in the case of the nonfinancial corporations sector, this gives:

$$NF_c = -NL_c = FF_c + DF_c. \quad (5)$$

So if the nonfinancial corporations sector has a negative net lending ($NL_c < 0$), this implies that the sector has a positive net financing need ($NF_c = -NL_c > 0$) and it funds its excess spending** by acquiring financing either from abroad or from other domestic sectors ($FF_c + DF_c > 0$ by the abovementioned sign convention). It is also noteworthy that at the aggregate economy level the flows of financing among domestic sectors are netted out ($DF = 0$; see Table 1) making net financing of the total economy equal net foreign financing:

$$NF = -NL = FF. \quad (6)$$

Comparing equations (5) and (6) we see that while excess spending of an institutional sector can be funded by attracting financial resources from other sectors or from abroad, a rise in the national excess spending can only be associated with financing from abroad (from the ROW sector). It is tempting to make the conclusion that domestic financing, for example in the form of bank credit, cannot stimulate spending. But it would be mistaken because, as will be argued in later sections, under certain circumstances domestic financing — and bank credit in particular — can stimulate both national spending and income resulting in a small or even no financing gap for the national economy.

Foreign financing categories in the IA table are further divided into nonmonetary and monetary financing. Foreign nonmonetary financing is comprised of net foreign investment and net foreign borrowing. Facing data limitations, in Table 1 we distinguish

*In this context, a change in net assets is brought about financial transactions rather than nominal holding gains and losses or changes in volume of assets. In simple terms, a sector cannot finance its deficits by unrealised gains of a financial asset — a sale of the asset is necessary.

**By excess spending, here we mean expenditure in excess of income resulting in a negative nonfinancial balance.

foreign direct investment (as opposed to all foreign investment) and make a simplifying assumption that foreign direct investment transactions are only applicable for the nonfinancial corporations. Foreign monetary financing reflects a change in net foreign assets of the MFI sector or, alternatively, incurrence of foreign liabilities by the MFI sector (again, subject to the sign convention that an increase in sector's net assets is recorded as a negative entry in the table). Thus, if the national economy is a net borrower ($NL < 0$), it means that it has a combined current and capital account deficit, which must be financed by some combination of net foreign investment, net borrowing from abroad and by running down external assets (e.g., official reserves).

Domestic financing can also be either monetary or nonmonetary. Unlike foreign financing, domestic financing transactions are netted out at the national economy level and have no corresponding entries in the ROW column.

The breakdown of domestic nonmonetary financing takes a skew-symmetric matrix form, as one sector's net lending to another sector equals net borrowing of the latter from the former. If financial accounts are sufficiently detailed and provide the necessary breakdown, it is possible to specify financial instruments used in financing transactions. Finally, domestic monetary financing, i.e. financing from MFIs and changes in broad money balances (deposits and cash), exhausts possible sources of financing. So, for example, household sector's net financing (NF_h) is a combination of foreign nonmonetary financing ($FNMF_h$), funds raised from domestic non-MFI sectors (NMF_h), borrowing from MFIs ($CRED_h$) and the use of its money holdings MON_h (which include cash and deposits):

$$NF_h = FNMF_h + NMF_h + CRED_h + MON_h. \quad (7)$$

The sign convention should again be borne in mind: when a sector finances its spending by borrowing from a bank (i.e. by increasing financial liabilities) or by reducing its money balances (reducing assets), such financial transactions will be shown as positive entries in the column representing the sector under consideration. Also note the special role of money as the medium of exchange. Most nonfinancial and financial transactions involve a change in money holdings of transacting institutional units or sectors.

2. A stylised IA analysis of expenditure financing with bank credit and by other means

Even the simplest analytical exercises with the IA tables prove very useful in enhancing our understanding of macro-financial linkages and help shed more light on the age-old questions about the role of bank credit in the economy. With the help of some stylised examples it can be shown that the stimulating macroeconomic impact of sectoral excess spending crucially depends on the sources of financing. If some sector has to curtail its spending and save more so that another sector could increase its spending, the immediate stimulating macroeconomic impact will be small or there will be no effect at all. In contrast, sectoral spending can be financed by running down some sectors' net financial assets without inducing a need for any sector to constrain its current spending (i.e. financing ultimately comes from the financial block of the IA table, or from "below the line"), and in this case the total economy immediately experiences a strong positive demand-side shock. As we discuss below, bank credit is one of the "below-the-line" financing options that allows an institutional sector to increase its current expenditure by running down net financial assets.

In this section we analyse the economic and financial transactions resulting from a rise in an institutional sector's spending by increasing its net financing. We work with nominal variables, concentrate on immediate changes in the system and abstract from many real-world complications, as our main aim here is to show that sources of financing change the nature of borrowing and have nontrivial economic effects.

2.1. Funding sectoral expenditure by limiting other spending

Let us start with the case in which one sector's increase in spending is offset by a commensurate decrease in other sectors' spending. In the particular example detailed in Table 2, the household sector spends additional 100 euros on the acquisition of new housing and finances this transaction by selling (or, more precisely, not refinancing) government debt securities.* In this example the government does not refinance this debt and consequently has to reduce its expenditure, say, on capital formation, by exactly the same amount. Assuming that all capital goods, including housing, are produced entirely by the domestic nonfinancial corporate sector, the economic activity and revenue of this sector remain unchanged as it faces an increase in the household sector's demand for housing and an exactly offsetting decline in government demand for capital goods. In this case the immediate impact on the overall economic activity, even allowing for all real-world complications, would likely be small. Of course, the long-term macroeconomic impact of investment activity depends on whether investment has actually succeeded in achieving productivity gains.

Table 2
Funding sectoral expenditure by limiting other spending

Transactions	Sectors						Rest of the world
	Domestic economy						
	Aggregate economy	Government sector (g)	Households and NPISH (h)	Nonfinancial corporations (c)	Financial sector		
					Monetary financial institutions (m)	Other financial corporations (o)	
Gross national disposable income	0			-100 + 100			
Consumption	100		100				
Gross fixed capital formation	-100	-100					
Change in stocks							
Exports of goods and services							
Imports of goods and services							
Primary income							
Secondary income							
Capital account							
Statistical errors and omissions							
Net lending	0	-100	100	0			
Net financing	0	100	-100	0			
Foreign financing							
Nonmonetary financing							
Monetary financing							
Domestic financing							
Nonmonetary financing	0	100	-100				
Monetary financing							
Domestic credit							
Broad money							

Source: formed by the authors.

The above-discussed case is conceptually similar to the situation where some households constrain their spending and channel their savings, e.g. via peer-to-peer lending platforms, to households that want to purchase new housing. At the sectoral level, the household sector reduces its current consumption to increase investment expenditure, with little immediate impact on the overall economic activity.

This financing case reflects a still persisting textbook understanding of physical capital accumulation processes: some economic agents have to wilfully save so that freed real resources can be transformed into real capital in the process of investing. In standard macroeconomic and growth models, accumulation of capital is conditioned upon

*Recall sign conventions in the analytical IA table, whereby an increase in spending by a domestic institutional sector is shown as a negative entry in the upper block of the IA table and a decrease of net financial assets is shown as a positive entry in the lower part of the IA table.

the endogenous saving rate, which is determined by consumers optimally choosing real consumption levels (see, e.g., Romer 2012; Barro, Sala-i-Martin 2004). In the macroeconomic and growth literature financial intermediation plays only a minor role or is omitted from the analysis altogether. In the financial literature banks are essentially assigned the role to intermediate loanable funds between savers and borrowers and help solve asymmetric information problems by assessing investment project risks. This “intermediation of loanable funds” (ILF) paradigm is at the heart of the standard banking theory (see, e.g., Freixas, Rochet 2008). All in all, the standard view is that banks are functionally rather passive intermediaries that redistribute purchasing power from savers who withhold spending to borrowers enabling them to spend more. The IA analysis, however, suggests that relying on redistributed current savings of some sectors is not the only one way to fund investment expenditure. Also, as we discuss below, bank credit in fact falls in the fundamentally different financing category, and capital accumulation processes are much more reliant on bank financing decisions (as opposed to, say, household saving decisions) than is traditionally acknowledged.

2.2. Funding sectoral expenditure by running down sector’s net financial assets

In contrast to the previous case, an institutional sector can increase its spending without triggering the need for any other sector to limit their expenditure. The sector that is willing to step up spending can do so by running down its net financial assets, which means that it can either decrease its assets or increase its liabilities. In simple terms, it means that some previously accumulated savings (as opposed to current savings) can be drawn down or new debts can be assumed.

Table 3

Funding sectoral expenditure by running down money holdings

Sectors	Domestic economy						Rest of the world
	Aggregate economy	Government sector (g)	Households and NPISH (h)	Nonfinancial corporations (c)	Financial sector		
					Monetary financial institutions (m)	Other financial corporations (o)	
Transactions							
Gross national disposable income	100			100			
Consumption							
Gross fixed capital formation	-100		-100				
Change in stocks							
Exports of goods and services							
Imports of goods and services							
Primary income							
Secondary income							
Capital account							
Statistical errors and omissions							
Net lending	0		-100	100			
Net financing	0		100	-100			
Foreign financing							
Nonmonetary financing							
Monetary financing							
Domestic financing							
Nonmonetary financing							
Monetary financing							
Domestic credit							
Broad money	0		100	-100			

Source: formed by the authors.

Table 3 helps to pin down the transactions and economic processes that take place as a consequence of households' decision to acquire housing by using up their accumulated money balances. In this case, the household sector increases its capital expenditure and the nonfinancial gap is financed "below the line" by a congruent decline in its money holdings (shown with a plus sign, by the sign convention). These funds are used for settling accounts with the nonfinancial corporate sector for the purchased capital goods. Abstracting from real-world complications, such as wages earned in the production process and additional spending from extra wage income (we will come back to that in a later subsection), we can immediately see that the total economy records an increase in the (nominal) levels of income and spending in a stark contrast to the previous case of savings-financed spending. It should also be noted that at the macro-level the money balances do not disappear or get used up in the process — money simply changes hands. This implies that the willingness of a sector to increase spending from its previously accumulated savings (money holdings) is accommodated by higher velocity of money and changes in the sectoral distribution of money balances.

Table 4
Funding sectoral expenditure by borrowing from abroad

Transactions	Sectors							Rest of the world
	Aggregate economy	Government sector (g)	Households and NPISH (h)	Nonfinancial corporations (c)	Financial sector			
					Monetary financial institutions (m)	Other financial corporations (o)		
Transactions	100			100				
Consumption								
Gross fixed capital formation	-100		-100					
Change in stocks								
Exports of goods and services								
Imports of goods and services								
Primary income								
Secondary income								
Capital account								
Statistical errors and omissions								
Net lending	0		-100	100	0		0	
Net financing	0		100	-100	0		0	
Foreign financing							0	
Nonmonetary financing			100				-100	
Monetary financing	-100				-100		100	
Domestic financing								
Nonmonetary financing								
Monetary financing								
Domestic credit								
Broad money	0			-100	100			

Source: formed by the authors.

Another distinct possibility of financing sectoral spending is by borrowing from abroad. Table 4 illustrates the case in which the household sector borrows directly from abroad to finance its acquisition of new housing. We assume here that the economy has sufficient resources to produce the required additional housing domestically so there are no imports and no current account gap. To keep matters simple, it is further assumed that the economy operates under the currency board arrangement, and households borrow in the anchor currency and can exchange any amounts at a fixed exchange rate with the domestic central bank. Therefore, the inflow of funds from abroad leads to an increase in broad money — at first, money holdings of the household sector increase but eventually,

after the house purchase transactions take place, money gets transferred to the accounts of the supplier of housing — the corporate nonfinancial sector. Bank liabilities rise by the amount of new corporate deposits. Since banks do not lend out funds in this example, there is an increase in bank reserves with the central bank (which is not reflected in the IA table because banks and the central bank are consolidated into the MFI sector). There is also in the table a negative entry of the MFI sector's net foreign financing, which reflects an increase in net foreign assets of the central bank. That is because when the central bank issues the domestic currency in exchange for the foreign currency, it accumulates foreign exchange reserves in the process. It is also notable that borrowing from abroad does not automatically imply the deterioration of the current account position of the total economy as long as this external stimulus helps to utilise slack domestic production resources — the pressure on the current account would appear with the need to pay interest to foreign lenders or if the economy's trade balance deteriorates (which is very likely if the economy operates at or above its potential). To sum up the case of borrowing from abroad, we note again that a sector finances its excess spending by running down its net financial assets (i.e. by increasing foreign financial liabilities), and this leads to a rise in domestic demand, higher nominal income levels and increased money balances.

Table 5

Funding sectoral expenditure with bank credit (a closed economy setting)

Transactions	Sectors						Rest of the world
	Aggregate economy	Government sector (g)	Households and NPISH (h)	Nonfinancial corporations (c)	Financial sector		
					Monetary financial institutions (m)	Other financial corporations (o)	
Gross national disposable income	100			100			
Consumption							
Gross fixed capital formation	-100		-100				
Change in stocks							
Exports of goods and services							
Imports of goods and services							
Primary income							
Secondary income							
Capital account							
Statistical errors and omissions							
Net lending	0		-100	100	0		
Net financing	0		100	-100	0		
Foreign financing							
Nonmonetary financing							
Monetary financing							
Domestic financing							
Nonmonetary financing							
Monetary financing							
Domestic credit	0		100		-100		
Broad money	0			-100	100		

Source: formed by the authors.

Financing sectoral expenditure with bank credit is also a case of financing expenditure by running down sectoral net financial assets. Continuing with the basic example of housing investment, households take up bank loans to acquire new housing from domestic firms (see Table 5). In contrast to the case of tapping into banks accounts (Table 3) but similar to foreign financing (see Table 4), bank lending leads to an increase in the broad money in the economy. The reason is that when a bank issues a loan, its balance sheet necessarily expands — by the amount of the new loan on the assets side

and by an equally sized deposit on the liabilities side. In practical terms, by issuing a loan, a bank credits the recipient's deposit account, i.e. creates money *ex nihilo* (Turner 2013), as an indispensable accounting by-product of the loan issued. Of course, when a new deposit is created, the loan-issuing bank has no hold over that deposit — funds may be transferred to other banks and can be taken out of the banking system altogether exposing individual banks or the banking system as a whole to liquidity (financing) gaps. In our simple example we analyse a closed cashless economy at the sectoral level, thus there is no leakage of liquidity created by bank lending. Table 5 shows an increase in bank assets (loans) and a commensurate rise in bank liabilities (deposits). As loans are issued to households, the household sector records an increase in its financial liabilities, whereas additional firm earnings translate into higher deposit holdings. The immediate macroeconomic implications, as before, include a rise in domestic demand and nominal income levels.

2.3. Bank credit in a more realistic open-economy setting

We now open up the stylised economy and will subsequently add some additional feedback loop to examine macroeconomic implications of bank lending and limitations to credit expansion in a more realistic setting.

Table 6

Funding sectoral expenditure with bank credit (an open economy setting)

Sectors	Domestic economy						Rest of the world
	Aggregate economy	Government sector (g)	Households and NPISH (h)	Nonfinancial corporations (c)	Financial sector		
					Monetary financial institutions (m)	Other financial corporations (o)	
Transactions							
Gross national disposable income	75	25	25	25			
Consumption							
Gross fixed capital formation	-100		-100				
Change in stocks							
Exports of goods and services							
Imports of goods and services							25
Primary income							
Secondary income							
Capital account							
Statistical errors and omissions							
Net lending	-25	25	-75	25	0		25
Net financing	25	-25	75	-25	0		-25
Foreign financing							
Nonmonetary financing							
Monetary financing	25					25	-25
Domestic financing							
Nonmonetary financing							
Monetary financing							
Domestic credit	0		100			-100	
Broad money	0	-25	-25	-25	75		

Source: formed by the authors.

As before, suppose a bank lends 100 euros to households to finance their purchase of housing but now firms engage in a more realistic production process and have to pay wages, taxes and settle with foreign partners for imported materials so that an increase in the production volume leads to an equally distributed rise in incomes of the government, household and corporate sectors and the rest of the world (for an increase in production

volume by 100 euros, each of the sectors earns additional 25 euros). We further assume that there are no additional economic transactions and all domestic sectors simply save the additional earnings. The transactions associated with this scenario are shown in Table 6. So, in this example 100 euros worth of new credit induces an increase in the gross national disposable income of 75 euros, which is lower than the amount of new credit because non-residents also earn their share of 25 euros.

Importantly, an increase in bank deposits by 75 euros does not match a rise in bank credit, exposing banks to the financing gap. In this example the MFI sector is forced to close the financing gap of 25 euros by resorting to foreign monetary financing. There are various ways to close the financing gap but for illustrative purposes it is instructive to consider two specific possibilities. One possibility is that banks borrow liquidity from the central bank.* Such borrowing from the central bank does not immediately trigger changes in foreign nonmonetary financing of the central bank. Rather, firms convert domestic currency to foreign currency and use it for settlement with foreign suppliers. This leads to a decline in foreign reserves held by the central bank,** which is reflected by the IA table entry showing 25 euros worth of foreign monetary financing. However, the amount of liquidity available from the central bank may be limited, and banks typically avoid building their lending business on the premise of central bank financing. Therefore, another possibility, namely that banks will seek a stable market financing from abroad, is more likely. In that case foreign monetary financing in the IA table would reflect commercial bank borrowing from abroad, for example, in the interbank markets or by issuing debt securities. This example shows quite clearly that in an open economy with capacity constraints and reliance on imported goods there are limits to banks' ability to extend credit financed with simultaneously created deposits. Excessive credit-fuelled domestic demand leads to a rise in the current account deficit and a drain of money aggregates from the domestic economy, forcing the banking system to seek external funding.

*This transaction is not shown in the analytical IA table with the consolidated monetary financial institutions sector.
**Recall that we are examining the currency board regime under which the central bank enables conversion of domestic currency to foreign anchor currency at a specified rate. As a result of this currency exchange, domestic currency becomes "extinguished" and foreign reserves held by the central bank shrink.

Table 7

Funding sectoral expenditure with bank credit (an open economy setting, with a feedback loop)

Sectors	Domestic economy						Rest of the world
	Aggregate economy	Government sector (g)	Households and NPISH (h)	Nonfinancial corporations (c)	Financial sector		
					Monetary financial institutions (m)	Other financial corporations (o)	
Transactions							
Gross national disposable income	85.7	28.6	28.6	28.6			
Consumption	-14.3		-14.3				
Gross fixed capital formation	-100		-100				
Change in stocks							
Exports of goods and services							
Imports of goods and services							28.6
Primary income							
Secondary income							
Capital account							
Statistical errors and omissions							
Net lending	-28.6	28.6	-85.7	28.6	0		28.6
Net financing	28.6	-28.6	85.7	-28.6	0		-28.6
Foreign financing							
Nonmonetary financing							
Monetary financing	28.6					28.6	-28.6
Domestic financing							
Nonmonetary financing							
Monetary financing							
Domestic credit	0		100			-100	
Broad money	0	-28.6	-14.3	-28.6		71.4	

Source: formed by the authors.

To make the IA framework more complete and better suited for the conceptual analysis of macroeconomic and policy implications of bank credit expansion, let us introduce one final extension to this IA setting by allowing for the multiplier effects through a simple feedback loop. We simply assume that households consume 50 per cent of additional income, which is spent on goods produced by domestic firms employing the above-described production technology. Now it takes a number of iterations for the economic system to settle in its “steady” state following the initial credit transaction, and the result is shown in Table 7. Comparing the results of Table 7 with Table 6 we can see that bank credit, just like any positive demand-side shock, creates feedback effects, which lead to larger increases in nominal expenditure and income levels but also put a stronger pressure on the current account. Notably, at least for such behavioural assumptions and parameter settings, an increase in income levels would likely be stronger than a rise in the current account deficit and the required amount of foreign funding. Thus, even if economic developments are largely credit-driven, one might still observe broad-based economic growth accompanied by strong income growth, strong fiscal positions and seemingly manageable trade imbalances.

3. Bank credit as a means to create purchasing power and its role in the equation of exchange

As we have seen from the example of Tables 5–7, bank credit is not merely another way to finance expenditure by reducing the borrower’s net financial assets — it is also crucial in the process of creating money and new purchasing power. The view that bank credit technically creates deposits and not vice versa is also known in the financial literature as “financing through money creation” (FMC) and it strongly contrasts with the abovementioned “old” and technically flawed “intermediation of loanable funds” (ILF) view (see Jakab, Kumhof 2015 for a comparative analysis). Incidentally, the fact that bank credit technically creates deposits is indisputable and is widely acknowledged in the central banking and financial community (see McLeay *et al.* 2014a,b for summary and discussion) and even in introductory textbooks on money and banking (see, e.g., Mishkin 2016) but the modern mainstream models almost universally embrace the old ILF view of banks. To be fair, though the FMC view is undoubtedly correct from financial accounting standpoint, one cannot accept it unconditionally from the macroeconomic perspective: even though banks can issue new credit at will, they still need to be sure that they will have enough liquidity (e.g. reserves with the central bank) in the case of withdrawals or transfers of newly created and old deposits (Federal Reserve 1994). Thus banks’ willingness to grant new loans depends not only on profitability considerations but also on their liquidity situation and, by extension, on their deposit base (because deposits create liquidity in the form of bank reserves at the central bank). Nowadays, ample and cheap liquidity available from central banks downplays the importance of liquidity considerations and diminishes the importance of deposits in determining banks’ willingness to extend new credit.

The FMC paradigm has very important and nontrivial macroeconomic implications. It suggests that bank credit can provide a powerful boost to domestic purchasing power even in the absence of the access to foreign funding. Banks’ inherent ability to create purchasing power at will, with only relatively mild limitations, implies that nominal levels of investment and consumption expenditure are much less dependent on individual saving decisions than is conventionally maintained in the standard macroeconomic theory. Simply put, saving may lead to investment in the absence of banks (e.g. through peer-to-peer lending) but credit-financed investment leads to rises in nonfinancial surpluses and deposits, which can even be loosely interpreted as newly created “savings”.

To see how the same situation lends itself to very different interpretations, consider again the example of credit-financed acquisition of housing detailed in Table 5. Without a proper analysis of the financial side of the economic system, one would still observe the saving and spending processes that balance each other but nevertheless it is very likely

that the drivers behind these decisions would be misinterpreted. The household sector is the net borrower and the nonfinancial corporate sector has a nonfinancial surplus of exactly the same magnitude that is needed to finance the housing acquisition (i.e. the nonfinancial balances of the two sectors add up to zero). So looking at the snapshot of the economy after the transactions have taken place and concentrating on the nonfinancial part of the economy, one could conclude that strong income growth of the nonfinancial corporations sector and withheld corporate investments led to a rise in corporate savings which were channelled to the household sector and bolstered its housing acquisition. But in fact this would be a completely incorrect interpretation of what actually happened. We know that this simple case was devised in such a way that households were willing to acquire housing, while the bank took the decision to grant credit and was arguably the most important economic actor in this regard. In contrast, firms did not make any expenditure and saving decisions beforehand — rather their income levels* adjusted to the situation of stronger credit-driven demand. Banks' ability to issue credit was not predicated upon any of the sectors' willingness to save.

This clearly shows that the loanable funds paradigm portraying banks as functionally passive financial intermediaries between savers and borrowers is incorrect: banks have a much larger role than merely facilitating the process of reallocation of existing real resources. Also, the ILF view incorrectly regards depositors as savers and "attributes to them an influence on the "supply of credit" which they do not have" (Schumpeter 1954). Of course, the reallocation of resources eventually happens as a consequence of bank lending but by issuing loans the banking sector first and foremost enables systemic balance sheet expansion or, in other words, an increase in the financial leverage at the aggregate economy level. By issuing loans, banks create new nominal purchasing power, which leads to a demand-driven rise in economic activity (domestically or abroad) and changes in various price levels (in particular, consumer and producer prices, financial asset and property prices, wages, and exchange rates), which in turn dilute the real purchasing power to a certain degree.

To further clarify economic implications of credit creation and to distinguish it from other forms of expenditure financing, it is useful to reconsider the above-discussed financing cases in terms of the equation of exchange, $M \cdot V = P \cdot Q$, where M is broad money, $P \cdot Q$ is nominal output obtained by multiplying real output Q by price level P , and V is the velocity of money defined tautologically to equate both sides of the equation. In the case of sectoral spending funded by current savings exemplified in Table 2 there are no immediate changes in any of the components of the equation of exchange. When a sector draws down its financial assets or borrows from other domestic nonfinancial sectors (see Table 3), nominal output $P \cdot Q$ rises but broad money M in the economy remains unchanged leading to an increase in V , the velocity of money. Even though we do not explicitly examine the dynamic implications of the initial expenditure and financing transactions, it is reasonable to think that such an increase in the velocity of money would quickly subside as, figuratively, economic agents, or a sector as a whole, would quickly find limits to tapping into their bank accounts.

In contrast, bank credit helps to overcome these limitations because, as was mentioned above, it expands nominal purchasing power rather than redistributes it. In the case detailed in Table 5 bank credit induces an increase in broad money M and a commensurate rise in nominal output, leaving money velocity V roughly stable. After the initial increase in broad money it is likely to decline only gradually as bank loans are repaid, thus the demand-side stimulus related to bank credit (and, more generally, to money creation) is likely more persistent than a stimulus related to an increase in the velocity of money associated with drawing down sectoral assets. Notably, the impact of bank credit on the equation of exchange is not unique — borrowing from abroad illustrated in Table 4 creates qualitatively similar effects. Domestic bank credit differs from borrowing from abroad in that the latter leads to the accumulation of foreign debt and a flow of cross-border interest payments.

*We do not discriminate whether increases in income levels are driven by rises in output prices or by rising production volumes, as it is not central for our discussion.

4. Drivers behind monetary dynamics as seen through the IA prism

The monetary analysis is one of the most controversial areas in economics because even though the mechanics of money and credit creation is well understood, the endogenous money creation and its causal relationships with other economic processes are not usually modelled in a satisfactory way in macroeconomic models. The main modelling deficiency seems to be the neglect of banks' ability to create (nominal) purchasing power, which is one of the main drivers behind inflationary pressures. The IA framework again can be useful in providing a simple and intuitive way to analyse creation of money, its sectoral distribution and dynamics of monetary aggregates in the macroeconomic context.

Table 8

Visualisation of accounting relations related to sectoral and economy-level money holdings

Sectors	Domestic economy						Rest of the world
	Aggregate economy	Government sector (g)	Households and NPISH (h)	Nonfinancial corporations (c)	Financial sector		
					Monetary financial institutions (m)	Other financial corporations (o)	
Transactions							
Gross national disposable income							
Consumption							
Gross fixed capital formation							
Change in stocks							
Exports of goods and services							-X
Imports of goods and services							M
Primary income							-PI
Secondary income							-SI
Capital account							-KA
Statistical errors and omissions							SEOr
Net lending			NL_h		NL_m		-NL
Net financing							
Foreign financing							-FF
Nonmonetary financing			FNMF_h				-FNMF
Direct investment							
Net foreign borrowing							
Monetary financing					FMF_m		-FMF
Change in net foreign assets of commercial banks					NFA_b		
Change in net foreign assets of central bank					NFA_{cb}		
Domestic financing							
Nonmonetary financing			NMF_h		NMF_m		
From government							
From households							
From non-financial corporations							
From monetary financial institutions							
From other financial corporations							
Monetary financing							
Domestic credit			CRED_h		CRED_m		
Broad money			MON_h		MON_m		
Cash							
Deposits							



Source: formed by the authors.

Since money is a medium of exchange, a change in money holdings is part of most economic and financial transactions. As almost any spending decision or financial asset and liability management decision would have an impact on money balances of an

institutional unit or sector, it is reasonable to maintain, at least for the purposes of a descriptive analysis, that changes in sectoral money holdings are obtained as a residual from the vertical financing constraint (see Table 8). In other words, changes in sectoral money holdings are a result of sectoral income, expenditure and an exhaustive set of financing transactions. For example, changes in the household sector's money balances are determined by the sum of sectoral net lending position (essentially, income minus expenditure), net foreign financing, net domestic nonmonetary financing and net borrowing from MFIs. It follows directly from equation (7) that:

$$MON_h = -(NL_h + FNMF_h + NMF_h + CRED_h). \quad (8)$$

Expression (8) provides the basis for the contribution charts helping to identify the drivers behind the dynamics of sectoral money holdings.

The total money stock in the economy can be seen as the aggregate amount of nonmonetary sectors' money holdings or, alternatively, as the congruent liabilities of the money-issuing sector. Therefore, changes in money holdings can be obtained from the vertical financing constraint of the monetary financial institutions sector (see Table 8):

$$MON_m = -(NL_m + FMF_m + NMF_m + CRED_m) = -(NL_m + NFA_b + NFA_{cb} + NMF_m + CRED_m). \quad (9)$$

Since net lending (nonfinancial balance), NL_m , of the MFI sector usually is economically insignificant, equation (9) implies that changes in the total money stock MON_m are linked to domestic credit developments $CRED_m$, domestic nonmonetary financing of the MFI sector (NMF_m) and foreign monetary financing FMF_m (which is a change in net foreign assets of deposit-taking institutions, NFA_b , and of the central bank, NFA_{cb}). It should be noted that domestic credit comprises bank* loans to domestic non-MFI sectors and banks' holdings of domestic debt securities, whereas the MFI sector's domestic nonmonetary financing comprises financial instruments other than those included in domestic credit and monetary instruments. Examples of the MFI sector's nonmonetary financing transactions could be an acquisition of bank shares or bonds by the household sector (this would decrease the stock of money in the economy) or financial asset purchases by the central bank (this would increase the money stock). So the money stock is affected by direct interaction between the MFI sector and other sectors but other domestic nonmonetary financing does not enter equation (9), which implies that the non-MFI sectors cannot "extinguish" money by preferring other domestic financial assets — only the sectoral distribution of money changes as a result. However, money can flow in and out of the economy, and this must be reflected in the change of net foreign assets of the MFI sector. As was discussed above, if banks create excessive amounts of credit and money, some of that money might eventually flow out of the economy and banks might need to fill the financing gap by borrowing from abroad (i.e. by running down net foreign assets). Also, under the currency board regime** the central bank's net foreign assets act essentially as an automatic balancing item, reflecting the effect of all other financial and economic transactions with non-residents. However, the representation of equation (9) needs to be detailed further to be analytically useful. Using equations (4) and (6) and decomposing foreign financing into nonmonetary and monetary financing, we can express the equation of monetary dynamics as follows (see Table 8):

$$MON_M = CA + KA + FNMF - CRED_M - NMF_M - NL_M. \quad (10)$$

This equation helps to identify the main macroeconomic factors contributing to the monetary dynamics. In particular, changes in money balances of the total economy are positively linked to current and capital account balances, changes in foreign nonmonetary financing and the change in the MFI sector's domestic credit.*** Equations (9) and (10) clearly show that even though money creation is technically determined by actions of the MFI sector (i.e. bank credit issuance and central bank money issuance), the amount of money balances in the economy is also affected by current, capital and financial account flows between domestic economy and the rest of the world.

*More precisely, deposit-taking institutions, which also include, e.g., credit unions.

**The assumption about currency board arrangement allows us abstract from complications related to possible central bank interventions in the foreign exchange markets and the associated exchange rate fluctuations.

***Recall the sign convention. Domestic credit is shown on the asset side of the MFI sector, therefore the minus sign suggests that an increase in credit is positively associated with a change money, which is the liability of the MFI sector.

5. Discussion on significance of credit flows in a contemporary economy

The IA tables have provided the basic framework for the analysis of the interactions between credit, money and the real economy. A more rigorous analysis should require setting up behavioural assumptions and formulating a stock-flow consistent model, which is outside the scope of this paper. Nevertheless, the current framework does enhance our understanding of macro-financial linkages and helps understand the role of credit and money growth in the economy.

We have seen that bank credit can support domestic demand and act as a strong economic stimulus. It is not fundamentally different from other forms of expenditure financing that rely on running down a sector's net financial assets, though it removes certain wealth constraints and to some extent reduces the economy's reliance on foreign financing. New credit creates new purchasing power, which directly supports an increase in domestic demand and this in turn translates into income rises of domestic and foreign residents. Since the IA analysis concentrates on nominal variables, it tells little about how much of credit-induced stimulus gets translated into a rise in real economic activity and how much of it leads to price increases. However, in the early stages of cyclical expansion credit growth can have a strong stimulating impact on real economic activity and provide boost for real incomes, especially if the economy is characterised by underemployed production factors or if the credit boom is directed toward labour-intensive non-tradable sectors, such as the real estate sector. The real effects should fizzle out as the economy reaches its structural limits and in that case credit would more likely induce rises in property prices, wages, consumer prices and trade imbalances (Aslund 2010). Amid mass exuberance it is very difficult for the policy makers to take away the proverbial "punch bowl", or raise interest rates in response to rising imbalances, before a credit boom becomes unsustainable and economy crippling. The actual extent, to which the economy depended on continuous credit expansion, usually becomes obvious only late in the financial cycle (Kindleberger, Aliber 2005).

The line between appropriate and excessive levels of credit in the economy is largely elusive, and there is no consensus among economists about the right levels of debt or the optimal rate of credit growth.* One of the fundamental reasons behind the difficulty or even impossibility to know the right amount of credit is the above-discussed ability of economic systems to absorb large amounts of credit and grow — at least in nominal terms — on the back of a credit expansion. Consider again Table 7. New private or public debt directly translates into additional domestic demand, which in turn is likely to substantially increase nominal income levels, even if this growth were largely inflationary. Importantly, measures of relative indebtedness of the economy, such as the debt-to-GDP ratio, might not significantly deteriorate and the economy can retain its capacity to pile up new debt if credit-driven nominal GDP rises sufficiently quickly. As a striking (yet typical) example, over the period from 1970 to 2015 the stock of total (private and public) United States debt grew by a factor of 38, while real GDP increased only by a factor of 3.5, yet the debt-to-GDP ratio increased relatively little from 151 per cent in 1970 to 348 per cent in 2015. The increase in the debt-to-GDP ratio was substantially dampened by a strong rise in the price level (and, by extension, in nominal GDP).

It is quite obvious that abstracting from nominal quantities, working with debt ratios or excluding credit and money creation processes from the macroeconomic analysis altogether (as it is still often the case in the mainstream economic analysis) may lead to serious omission errors when trying to identify the drivers behind economic growth in contemporary economies. The IA analysis offers economists the right tools to understand the mechanics of credit and money creation and relate that to price and activity developments. One of the main macroeconomic implications of the conceptual IA analysis of bank credit flows is that bank credit is largely, though not necessarily entirely, self-financing. This implies that new credit directly adds to domestic demand — consumption and investment expenditure by domestic sectors. This credit-driven spending is not conditioned on previous savings but rather is the outcome of newly created purchasing power. Furthermore, a credit-driven rise in domestic demand translates in increases

*For example, some authors (Cecchetti *et al.* 2011; Reinhart *et al.* 2012; Baum *et al.* 2013) argue that public debt levels above 90–100 per cent are associated with significantly lower economic growth rates. Others (Panizza, Presbitero 2012; Herndon *et al.* 2013) challenge these claims and show that there may be no causal relationship between levels of debt and growth. A growing body of macroprudential literature concentrates on identifying excessive credit growth and developing early warning systems, and a lot of this research is based on studying deviations of credit-to-GDP ratios from long-term trends (Drehmann *et al.* 2010; Alessi, Detken 2014).

in economic activity (either in the domestic economy or abroad) and/or rises in price levels. In any case, new credit provides a smaller or larger boost to the nominal GDP, which effectively slows down an increase in relative indebtedness indicators and enables additional take-up of debt. In this light it becomes clear that creation of private and public debt is one of the most potent ways to stimulate the economy from the demand side. This also helps to explain why, over the decades, the majority of industrialised economies (and many developing economies) have accumulated vast amounts of private and public debt (BIS 2016 10; Jordà *et al.* 2016) and have in many cases become overly reliant on it.

The economy can soak up a lot of credit but, of course, there must be economic drivers behind credit growth. The natural driving force is the profit-seeking behaviour of banks, and it should be noted that there are possibilities for banks to earn profits both in the environment of sound economic growth and in inflationary environment. An inherent feature of partial self-financing of bank credit is also an important driver, as banks themselves can create the bulk of financial resources (deposits) to sustain credit expansion.* Credit expansion is also supported by low interest rate environment, which has largely been a global phenomenon for a better part of the last couple of decades and which fosters demand for loans, yet does not lead to a scarcity of bank deposits. In the light of the IA analysis this makes sense because, technically, new credit creates new deposits, and even though bank depositors have incentives to switch to other financial instruments in search for a larger yield, this demand simply raises financial asset prices while money only changes hands (but does not become “extinguished”). In some circumstances, for example in the environment of a global liquidity glut fostered by extremely accommodative monetary policies conducted by major central banks, real deposit rates may remain suppressed at near-zero or even sub-zero levels for prolonged periods of time (Reinhart, Sbrancia 2011; Hannoun 2014). There are also other self-inducing forces at play. For example, credit contributes to price and nominal wage growth, which drives real interest rates down, fuelling further credit expansion. The well-known financial accelerator works in quite a similar fashion: low interest rates fuel credit and asset price growth, leading to better collateral values and even more new credit (Bernanke *et al.* 1996; Kiyotaki, Moore 1997).

One of the implications of the above discussion is that, by design, contemporary credit systems are supposed to continuously expand, whereas credit contraction (in absolute nominal terms) episodes are relatively infrequent and are typically associated with economic and financial distress. Continuous credit expansion might seem at odds with the intuition about individual borrowing budget constraints. When a person borrows, he can initially boost his expenditure but then has to save more in order to repay his debts over the lifetime. By contrast, at the macroeconomic level new credit subsequently contributes to a rise in nominal income levels and, moreover, there is no definite lifetime of the economy over which the debts need to be repaid. Therefore, if nominal quantities of credit rise but indebtedness relative to income levels remains in check, credit could continue growing indefinitely, at least in theory. As long as the aggregate amount of nominal debt grows, new credit issuance exceeds repayment of existing debts, which implies that credit creation provides a continuous stimulating impact on aggregate expenditure and the aggregate debt repayment phase effectively does not kick in.

In practice, however, we should expect to see a widespread systemic over-use of such stimulus (Hannoun 2014). As noted in the 2015 Annual Report of the Bank for International Settlements (BIS), “debt has been acting as a political and social substitute for income growth for far too long” (BIS 2016: 8). An economy’s overdependence on debt could manifest itself in various forms: deindustrialisation and concentration of economic activity in procyclical sectors; capital misallocation; wasteful spending; asset price bubbles; external imbalances; inflationary pressures; bloated and fragile balance sheets of firms, individuals and banks; high income and wealth inequality; excessive levels of private or public debt; systemic bankruptcies in nonfinancial and financial sectors, etc. Over-reliance on debt might eventually culminate in a “balance sheet recession” as borrowers become unwilling or unable to expand their balance sheets further at prevailing market rates, and

*Of course, this does not imply that these deposits are cost-free to banks.

the effective aggregate debt repayment phase eventually kicks in. That was effectively the situation that a lot of countries found themselves in during the global financial crisis of 2008 and its later sequels in Europe and elsewhere.

During a balance sheet recession, a flow of new credit to the nonfinancial sector stops, which would naturally lead to a net repayment of debt and the associated decline in money aggregates. A sharp slowdown in domestic demand leads to declining corporate earnings, lower real economic activity, worsening labour market conditions and personal income dynamics, corporate solvency problems, deteriorating quality of bank loan portfolios, fiscal problems, etc. This is what is called the debt-deflation spiral (Fisher 1933), which is in principle a natural part of the credit (or financial) cycle and which eventually leads to the deleveraging of the economy and restoration of sound balance sheets. There is no doubt however that over the medium term such deleveraging bears very high economic and social costs and it may be politically unacceptable if there is a deep-seated belief in the society that the boom-level standards of living are a norm. Therefore, in the wake of the recent global financial crisis policy makers almost universally resorted to debt reflation (or asset price reflation) strategies, which effectively aimed at reversing the aggregate debt repayment effects. At the macroeconomic level, a resumed flow of credit to the nonfinancial sector is supposed to lead to a rise in nominal income levels (nominal GDP). And again, even if it is purely inflationary, it could in principle help to achieve deleveraging, i.e. lower debt-to-GDP ratios.* As a by-product, credit flows increase the money stock in the economy, put an upward pressure on consumer price inflation and help central banks achieve their formal inflation or employment targets. So far there has been a mixed success with reflation strategies: extremely accommodative monetary policies helped to achieve tepid recoveries but, on the other hand, contributed to a rise in new asset price bubbles and a further increase in debt ratios (often a temporary deleveraging of the private sector was offset by concurrent growth in public debt; see, e.g., Tichy 2013). The BIS (2016) report offers an accurate characterisation of the global economic situation and the policy response: "The global economy cannot afford to rely any longer on the debt-fuelled growth model that has brought it to the current juncture. A shift of gears requires an urgent rebalancing of the policy mix. Monetary policy has been overburdened for far too long. Prudential, fiscal and, above all, structural policies must come to the fore."

Conclusion

In this paper we applied the integrated accounts framework to analyse different means of sectoral expenditure financing and, in particular, financing through credit and money creation. The IA framework represents the economy as a closed system of economic and financial flows among institutional sectors, which is well suited for tracking the origination and macroeconomic impact of credit and money flows. The IA framework helps identify bank credit as one of the means of expenditure financing from "below the line", i.e. by running down net financial assets, as opposed to restraining other spending. Money and purchasing power creation is an indispensable corollary of bank credit issuance, which implies that the "financing through money creation" paradigm does a much greater job in explaining the actual mechanics of bank credit creation than the "loanable funds" model. Credit is not predicated upon existing savings but rather creates new savings and is therefore to some extent self-financing. However, credit is not necessarily fully self-financing because, in simple terms, money can flow out of the banking system leaving banks exposed to financing gaps. Financing through money creation has huge macroeconomic implications: bank credit directly adds to domestic demand, which translates into some combination of stronger domestic economic activity, stronger foreign economic activity and higher prices — with particular configuration depending on the structural features of the economy.

There are macroprudential implications of credit-driven growth as it may result in a systemic over-reliance on continuous debt accumulation. Beside the partial self-financing feature of credit, one of the most remarkable aspects of credit expansion is the large capacity of economies to absorb new credit. The self-propelling and overextended credit

*This requires that nominal GDP growth would outpace that of privately held debt. It is outside the scope of this paper to discuss the plausibility and long term implications of such developments.

booms may result in a situation where economic agents are unwilling or unable to take up additional credit and further expand their balance sheets, which naturally leads to a reversal of credit flows and invokes the “aggregate debt repayment phase” and the associated balance sheet recession. The policy makers’ standard response seems to have been to resort to debt (or asset price) reflation strategies by trying to reignite private sector credit growth or replacing it with growing public debt. The long-term implications of these strategies applied in response to the recent global financial crisis are still largely unclear.

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Santrauka

KREDITO IR PINIGŲ KŪRIMAS INTEGRUOTŲJŲ SAŪSKAITŲ POŽIŪRIU

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Pasitelkiant integruotųjų sąskaitų analitinę sistemą, šiame straipsnyje nagrinėjami esminiai realiosios ekonomikos ir finansų sektoriaus sąryšiai. Analizuojant supaprastintus institucinių sektorių išlaidų finansavimo atvejus, siekiama atskleisti kreditavimo sukeltą perkamosios galios kūrimo procesą, sąryšį tarp pinigų ir kredito kūrimo ir tokią ypatybę kaip dalinis bankų kredito finansavimas, taip pat kreditavimo ir kitų finansavimo būdų panašumus bei skirtumus.

Integruotųjų sąskaitų sistema ekonomiką leidžia nagrinėti kaip uždarą ekonominių ir finansinių srautų tarp institucinių sektorių sistemą. Ji padeda atskleisti, kad išlaidų finansavimas skolinantis iš bankų iš esmės yra finansavimas žemiau integruotųjų sąskaitų lentelėje brėžiamos linijos, skiriančios ekonominius ir finansinius sandorius. Kitaip tariant, toks finansavimas yra susijęs su sektoriaus grynojo finansinio turto mažėjimu, o ne su kitų sektorių taupymu (išlaidų ribojimu). Taigi, suteikiant banko kreditą, finansuojamos papildomos nominaliosios išlaidos, ir nėra būtinybės dėl to savo nominaliąsias išlaidas mažinti kitiems ūkio subjektams.

Bankų kreditas kuriamas bankams plečiant balansų apimtį, o šio proceso metu didėja ir paskolų suma balanso turto pusėje, ir indėlių suma įsipareigojimų pusėje. Taigi, pinigų ir perkamosios galios kūrimas yra neatsiejama bankų kreditavimo išdava. Todėl vadinamoji finansavimo kuriant pinigus paradigma faktinį kreditavimo procesą paaiškina daug geriau nei vadinamasis skolintinių lėšų modelis, vis dar vyraujantis ekonominėje ir finansinėje literatūroje. Esamos santaupos nėra būtinoji kreditavimo procesų sąlyga – kreditavimas makroekonominio lygmeniu pats kuria naujus išteklius (indėlius, arba santaupas), taigi bent iš dalies vyksta savaiminis finansavimas. Toks finansavimas dalinis yra todėl, kad, be kredito, veikia ir kiti pinigų kiekio pokyčius lemiantys veiksniai. Pavyzdžiui, lėšos iš bankų sistemos gali išplaukti, taip kiltų papildomo bankų finansavimo poreikis.

Finansavimas kuriant pinigus turi reikšmingų makroekonominių pasekmių: bankų kredito srautai tiesiogiai didina vidaus paklausą, o tai tam tikrais atvejais gali būti svarbiausias ekonominį aktyvumą ir kainas lemiantis paklausos pusės veiksnys, nors ekonomistų jis paprastai tinkamai neįvertinamas. Kreditavimo sukeltas vidaus paklausos didėjimas gali lemti didesnį ekonominį aktyvumą šalies viduje ar užsienyje (dėl išaugusios importuojamų prekių paklausos) arba aukštesnį kainų lygį. Tokia galimybė priklauso nuo struktūrinių šalies ekonomikos ypatumų ir verslo ciklo fazės.

Be abejo, jei ekonomikos augimas tampa priklausomas nuo nuolatinio kreditavimo, gali kilti finansinio stabilumo problemų, susijusių su balansų recesijos rizika. Ekonominėms aplinkybėms po pernelyg ilgai užsitęsusio kreditavimo bumų pasikeitus, ūkio subjektai gali nebenorėti ar nebeturėti galimybių toliau skolintis ir plėsti balansų apimtį, o tai gali lemti kredito srautų krypties pasikeitimą ir sukelti vadinamąjį kolektyvinio skolų grąžinimo reiškinį bei su juo susijusią balansų recesiją. Nors tvirtų balansų atkūrimas mažinant finansinį svertą ir vykstant bankrotams yra svarbi tvirtos ilgalaikės ūkio plėtros atkūrimo prielaida, trumpuoju laikotarpiu šie procesai paprastai turi ypač neigiamų socialinių ir ekonominių pasekmių. Todėl ekonominės politikos formuotojai paprastai imasi skolos apimties (ir turto kainų) atkūrimo strategijų, t. y. siekia atkurti aktyvų privačiojo sektoriaus kreditavimą, arba jį laikinai pakeičia aktyvus valdžios sektoriaus skolinimasis. Tokios kovos su skolos krize strategijų ilgalaikės pasekmės kol kas neaiškios.