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# Circuit theory and interest: a simple descriptive methodology for the allocation of debt

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**Abstract:** A simple descriptive circuit theory of money is proposed, allowing for four actors (banks, government, firms and workers) and interest. A number of conclusions is readily made on the basis of the model. First, in an economy without a government sector (no taxes, no subsidies) and without banks granting household credit, firms end up with debt whenever they must pay interest over their loans; and when people in addition make savings, the debt situation for firms deteriorates. Second, in an economy with a government sector but without banks granting household credit, either the firms, the government, the people, or all end up with debt whenever interests on credit are positive. It is concluded that a way out of the monetary crisis without harming society at large would be the partial or total destruction of obligations on interest.

**Keywords:** *circuit theory, debt, interest, quantitative easing*

## 1. Introduction

As this article is written, hardly a day passes when mainstream media is not reporting on the alarming debt situation of modern Western nation states. Austerity is proclaimed by some observers, Keynesian credit expansion by others, as the answer to the problem. Except for Greece, which may or may not have been declared bankrupt at the time this article went to press, hardly ever it is observed that the debt cannot be repaid in full. In fact, it is mathematically impossible to pay the interest on debts, simply because the corresponding money has never been brought into circulation. As stated by Graziani (2003: 31) based on the circuit theory of money,

in the end “either a debt equal to the interest payments remains unsatisfied, or interest is paid in kind.” This article proposes a simple means to allocate this remaining debt in society, that is to specify which actor or actors (government, business, people) will be required to in the end, pay up “in kind.”

Circuit theory (CT) can be applied to show where debt will be allocated in society, and *ceteris paribus* show what measures should be taken to reduce or eliminate debt of specific stakeholders in society (firms, government, people). Most theories on CT however, take a qualitative rather than a quantitative approach to explaining the allocation of debt in society, or ignore important economic parameters such as interest rates (e.g., Bellofiore *et al.*, 2000). The reason for these (over)simplifications is probably, that circuit theory involves recursive mathematical processes including numerous endogenous variables, e.g., credits, interests, consumer spending, savings, taxes, etc. Still, a thorough understanding of the consequences and implications of CT can only be reached by a careful working out of the involved mathematical equations. In this article, an attempt is made to do so.

The key idea in circuit theory (e.g., Graziani, 2003; Parquez and Seccareccia, 1999) is that money is created as debt, and is destroyed (vanishes from the circuit) whenever debt is repaid. Since money creation is the monopoly of banks, the volume of money created by banks is the only money available for the servicing of debts. In its most simple form therefore, circuit theory assumes two actors, namely banks (that have a monopoly on money creation) and non-banks (that have a monopoly on all other activities in an economy).

The circuit model proposed below accounts for the credit granted to government (bonds etc.), credit granted to firms, credit granted to households, capital paid by government to firms (outsourcing, subsidies, etc.), capital paid by government to people (state pensions, subsidies, etc.), proportion of firms' total cash holdings used for peoples' wages, proportion of peoples' wages and government earnings to consumption, corporate tax paid by firms to government, taxes paid by the people to government, proportion of income that can be disposed over as household income, interest paid by government to banks, interest paid by firms to banks, interest paid by people to banks, interest paid by banks to firms, and interest paid by banks to people. In the next section, the circuit theory is expressed as a mathematical model. This is followed by a section discussing three economic scenarios where the model is applied in fictitious data. Conclusions, closing remarks and avenues for future research remain in the final section.

**Table 1. List of abbreviations**

Symbol	Description
B	Banks
G	Government
F	Firms
P	People
$B$	Credit granted to government (bonds, etc.)
$L$	Credit granted to firms
$H$	Credit granted to households
$O$	Capital paid by government to firms (outsourcing, subsidies, etc.)
$S$	Capital paid by government to people (state pensions, subsidies, etc. )
$p$	Proportion of firms' total cash holdings ( $O + L$ ) used for peoples' wages
$q$	Proportion of peoples' wages and government earnings to consumption
$C$	Corporate tax paid by firms to government
$T$	Total taxes paid by the people to government
$\theta$	Proportion of income that can be disposed over as household income
$s$	Interest paid by government to banks
$i$	Interest paid by firms to banks
$r$	Interest paid by people to banks
$x$	Interest paid by banks to firms
$y$	Interest paid by banks to people

Source: Author's own elaboration.

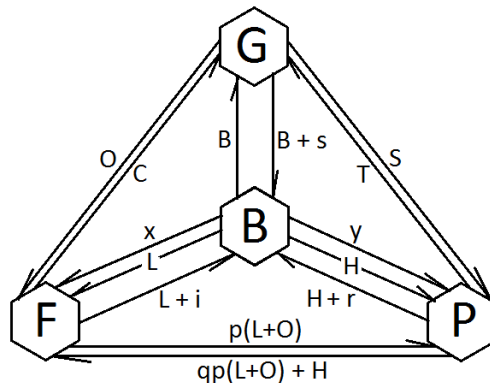
## 2. A descriptive circuit model of money

The theory developed below is based on the idea that the different money flows in the money circuit occur in 4 different phases, which we shall call the accreditation phase, remuneration phase, consumption phase, and debt re-pay phase. In the accreditation phase, the banks B grant loans  $L$  to firms F (based on the promise of production) and household credit  $H$  to workers (based on future pay-rolls). In the remuneration phase, workers get paid the sum  $pL$  by the firms in wages, which must be a proportion of the cash held by the firm ( $0 \leq p \leq 1$ ). In the consumption phase, the workers spend a sum of  $qpL + H$  on commodities and services offered by the firms, where it is assumed that all household credit and a proportion of remunerations is spent ( $0 \leq q \leq 1$ ). In the debt re-pay phase finally, the firms repay the principal loan plus interest  $L + i$ , the workers repay their household credit with interest  $H + r$ , and the banks pay interest on savings of the firms  $x$ , and on savings of the workers  $y$ . At the end of the debt re-pay phase, we are able to compute the firms' profit and the workers' savings. Note that under normal circumstances, the banks will take a sum for bank employees remunerations and try to make a profit too; but since

banks do not print excess money for that purpose we may consider the bank as behaving exactly like any other firm, and bank employees like any other worker.

Another important actor in the money circuit is government, which displays behavior that is similar to that of firms, in that it produces goods and services for which people (including workers) and firms must pay (e.g., VAT, income tax, etc.), and it pays the people money (e.g., pensions, subsidies). However, contrary to firms, government can exert power to take in money. Whereas people can choose to buy or cease buying from most firms, it cannot refuse to pay taxes. Therefore, government takes in a different position than firms. And of course, government is an important allocation of debt. Let  $B$  denote the total amount of money lent by banks to government (e.g., government bonds, credit to local governments, etc.), and let  $s$  denote the amount of interest paid on that loan. Further, let  $C$  denote the total sum of taxes collected from the corporations, and let  $T$  denote the total sum of taxes (including e.g., VAT) collected from the people. Finally, denote  $O$ , the amount of money paid by government to firms (e.g., outsourcing; a credit adding to the sum firms spend on remuneration), and let  $S$  denote the sum of money spent by government directly to the people. We assume that government earns no interest from the banks, which is a reasonable assumption in modern (Western) economies which consistently have budget deficits (but which may change in the future, in which case the model requires an additional term). In Figure 1 a schematic overview of the money flows in the proposed circuit model is presented (see also e.g., Realfonzo, 2006: 108). For the sake of convenience, a full list of abbreviations is given in Table 1.

**Figure 1. Money flows in the circuit model**



Source: author's own elaboration (see Section 2)

The net money flows can also be conveniently displayed in a table (see Table 2), where each row represents the total sum of money in existence, and the last row elements are equal to the *liabilities* of the banks.

**Table 2. Money flows in the circuit model by phase**

Phase	G	F	P	B
0. Genesis	0	0	0	$\emptyset = B + L + H$
1. Accreditation	$B$	$L$	$H$	$-V$
2. Remuneration	$B - S - O$	$(1 - p)(O + L)$	$S + p(O + L) + H$	$-V$
3. Consumption	$B - S - O$	$(1 - p)(O + L)$ $+ q(S + p(O + L)) + H$	$(1 - q)(S + p(O + L))$	$-V$
4. Debt re-pay	$-S - O + C +$ $T$ $-s$	$(1 - p)(O + L)$ $+ q(S + p(O + L))$ $+ H - C - L - i + x$	$(1 - q)(S + p(O + L))$ $- H - r - T + y$	$s + i + r - x -$ $y$

Source: Author's own elaboration (see Section 2)

Mathematically, the flow model is equivalent to a series of matrix multiplications of the form

$$\mathbf{m}_{t+1} = \mathbf{W}_t \mathbf{m}_t, \quad (1)$$

where  $\mathbf{m}_t = (m_{B(t)}, m_{G(t)}, m_{F(t)}, m_{P(t)})'$  denotes the amount of money at time  $t$  held by the banks, government, firms and the people respectively; and  $\mathbf{W}_t$  denotes the money flows in between time  $t$  and  $t + 1$  as proportions. Because the model involves only four phases, the final phase according to Formula (1a) can be written as

$$\mathbf{m}_4 = \mathbf{W}_3 \mathbf{W}_2 \mathbf{W}_1 \mathbf{m}_1. \quad (2a)$$

Going into the details following Figure 1, we obtain:

$$\mathbf{m}_2 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & \frac{B-S-O}{B} & 0 & 0 \\ 0 & \frac{(1-p)O}{B} & 1-p & 0 \\ 0 & \frac{S+pO}{B} & p & 1 \end{bmatrix} \begin{bmatrix} -V \\ B \\ L \\ H \end{bmatrix} = \begin{bmatrix} -V \\ B-S-O \\ (1-p)(O+L) \\ S+H+p(O+L) \end{bmatrix}; \quad (2b)$$

$$\mathbf{m}_3 = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & \frac{q(S+p(O+L))+H}{S+p(O+L)+H} \\ 0 & 0 & 0 & \frac{(1-q)(S+p(O+L))}{S+p(O+L)+H} \end{bmatrix} \begin{bmatrix} -V \\ B-S-O \\ (1-p)(O+L) \\ S+H+p(O+L) \end{bmatrix} = \begin{bmatrix} -V \\ B-S-O \\ (1-p)(O+L)+q(S+p(O+L))+H \\ (1-q)(S+p(O+L)) \end{bmatrix}; \quad (2c)$$

$$\mathbf{m}_4 = \begin{bmatrix} 0 & \frac{B+s}{m_G(z)} & \frac{L+i}{m_F(z)} & \frac{H+r}{m_F(z)} \\ 0 & 1 - \frac{B+s}{m_G(z)} & \frac{C}{m_F(z)} & \frac{T}{m_F(z)} \\ \frac{x}{x+y} & 0 & 1 - \frac{C+L+i}{m_F(z)} & 0 \\ \frac{y}{x+y} & 0 & 0 & 1 - \frac{T+H+r}{m_F(z)} \end{bmatrix} \begin{bmatrix} -V \\ B-S-O \\ (1-p)(O+L)+q(S+p(O+L))+H \\ (1-q)(S+p(O+L)) \end{bmatrix} \\ = \begin{bmatrix} s+i+r-x-y \\ C+T-O-S-s \\ O+q(S+p(O+L))+H-C-L-i+x \\ (1-q)(S+p(O+L))-T-H-r+y \end{bmatrix}. \quad (2d)$$

In the next section this model is applied to three economic scenario's with each scenario having increasing complexity.

### 3. Examples of theoretical economic scenarios

#### 3.1 Money equilibrium in a governmentless economy

An influential group in society commonly referred to as “neoliberals” strongly advocates a small government sector. Descending from influential 1980's politicians like Reagan and Thatcher, who introduced privatisation of and outsourcing in the public sector (e.g., Kampen, 2009), neoliberals are a dominant force in the first decade of the third millennium as well. While a thorough discussion of their key ideas regarding economy and monetary policy is beyond the scope of this article (not in the last place because these theories are rather heterogeneous, and are not always consistent; e.g., Przeworski, 1992; Hojman, 1996), all appear to support the conception of a “governmentless” state. In this section, we develop the scenario of a governmentless economy keeping money equilibrium, meaning that during an economic cycle no additional money (credit) is printed or distributed. Thus, in an economy without a government sector, in the scenario of money equilibrium the total volume of money  $V = L + H$  remains unchanged, hence  $x + y = i + r$ , meaning that the total sum earned by the banks as interest on loans (firms and people) must be paid out by the banks as interest on deposits (firms and people). It is reasonable to assume that banks limit the total of household credit plus interest to the total potential savings of the workers. Consider the case when workers are allowed to borrow half of

their remunerations as household credit. Upon substituting  $H \equiv \frac{1}{2}pL$ , we have the following money flow table (Table 3):

**Table 3. Money flows in a governmentless economy by phase**

Phase	F	P	B
1. Accreditation	$L$	$\frac{1}{2}pL$	$-V$
2. Remuneration	$(1 - p)L$	$1\frac{1}{2}pL$	$-V$
3. Consumption	$(1 - \frac{1}{2}p + qp)L$	$(1 - q)pL$	$-V$
4. Debt re-pay	$(q - \frac{1}{2})pL - i + x$	$(\frac{1}{2} - q)pL - r + y$	$i + r - x - y$

Source: Author’s own elaboration (see Section 3.1)

Assuming that interest earned on deposits is significantly lower than interest paid on credit, the savings of the workers will certainly turn into debt when  $q > \frac{1}{2}$ . Inserting  $q = \frac{1}{2}$  in Table 3 yields the results presented in Table 4.

**Table 4. Money flows in a governmentless economy by phase where  $q = \frac{1}{2}$**

Phase	F	P	B
1. Accreditation	$L$	$\frac{1}{2}pL$	$-V$
2. Remuneration	$(1 - p)L$	$1\frac{1}{2}pL$	$-V$
3. Consumption	$L$	$\frac{1}{2}pL$	$-V$
4. Debt re-pay	$-i + x$	$-r + y$	$i + r - x - y$

Source: Author’s own elaboration (see Section 3.1)

Note that that the firms and workers can only remain debt-free when  $i < x$  and  $r < y$ . However, when both the people’s debts and deposits equal  $\frac{1}{2}pL$ , certainly  $r > y$  and there will be debt allocated with the people. It is probable (but not necessary) that the interest paid by firms on loans is less than the interest on deposits earned by firms, in which case leaving a tiny margin of profit remains for the firms (on the expense of the people), which seems hardly a reason to call for a Tea Party.<sup>1</sup>

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<sup>1</sup> The Tea Party is a conservative American grassroots organization that advocates, among other things, that government must be downsized., the national budget must be balanced, deficit spending must end, bailout and stimulus plans are illegal, and reducing personal income taxes is a “must” (see <http://www.teaparty.org/about.php>).

3.2 A simplification of an economy with Islamic banking

Islamic banking started its rise in the 1990s, and is presently applied in numerous nation states among which Egypt, Saudi Arabia, Qatar, Kuwait, Sudan, Malaysia and Indonesia, where it exists beside “conventional” banking, and Islamic banking is obligatory in Pakistan and Iran. In 2007, the Islamic banking sector was good for 250 billion dollar in revenues according to an IMF estimate (Čihák and Hesse, 2008). The key idea in Islamic banking is that interest is prohibited (see e.g., Iqbal, 1997). Investors get return on investments by cost-plus financing (*murabaha*), profit-sharing (*mudaraba*), leasing (*ijara*), partnership (*musharaka*), and forward sale (*bay’ salam*). This money is allocated in the term  $i$  in the circuit model (Figure 1). The common characteristic of these financial instruments is that both the investor (the banks) and the entrepreneur run a risk, and also that all profit depends on realized production. That is different from the Western system of obligations, mortgages and loans, in which the banks must be paid a sum of money on top of the borrowed sum (the principal) irrespective of the realized production.

Assume that the other interest terms ( $r$ ,  $s$ ,  $x$  and  $y$ ) are equal to zero. In a “governmentless” economy applying Islamic banking all debt in society would be allocated with the firms if the people spend less than half of their income on commodities and services (i.e.  $q < 1/2$ ; see Section 3.1). However, we shall now also take a government sector into consideration, which leads to the following money flow Table 5.

**Table 5. Money flows in Islamic banking by phase**

<b>Phase</b>	<b>G</b>	<b>F</b>	<b>P</b>	<b>B</b>
1. Accreditation	$B$	$L$	$H$	$-V$
2. Remuneration	$B - S - O$	$(1 - p)(O + L)$	$S + p(O + L) + H$	$-V$
3. Consumption	$B - S - O$	$(1 - p)(O + L) + q(S + p(O + L)) + H$	$(1 - q)(S + p(O + L))$	$-V$
4. Debt re-pay	$-S - O + C + T$	$(1 - p)(O + L) + q(S + p(O + L)) + H - C - L - i$	$(1 - q)(S + p(O + L)) - H - T$	$i$

Source: Author’s own elaboration (see Section 3.2)

The total amount of money in existence at the 4<sup>th</sup> stage equals the sum of the elements of the 4<sup>th</sup> row in Table 5, which equals  $V = B + L + H$ . Since a sum equal to  $V + i$  is paid to the banks, an amount of  $i$  shows up as debt distributed over the firms, government and the people, the precise

amounts of which can be computed by filling in (empirical) values of the parameters  $B$ ,  $L$ ,  $p$ , etc. (see next section).

### 3.3 A simulation of a Western economy

We must now turn to a more realistic economic scenario in which interest is a vital component. In this simulation, for reasons of simplicity we introduce a fixed interest rate  $\pi$  for obligations and  $\mu$  for deposits (see Table 1 for a full list of applied abbreviations), such that

$$\begin{cases} s = \pi B \\ i = \pi L \\ r = \pi H \end{cases} \quad \text{and} \quad \begin{cases} x = \mu\{O + q(S + p[O + L]) + H\} \\ y = \mu(1 - q)(S + p[O + L]) \end{cases}, \quad \mu < \pi.$$

We shall also assume that government creates no deposits, such that  $B = O + S$ ; furthermore, we assume that an equal sum is spent by government on firms and the people such that  $O = S = \frac{1}{2}B = b$ . For both the firms and the people, for illustrative purposes we introduce a number of simplifications in the model. First, the amount given by  $(1 - p)(b + L) + q(S + p[b + L]) + H - L - i + x$  is the *profit before tax* of the company, and since corporate tax is a percentage of that profit, usually in the order of 20%, we define

$$C \equiv .2 \times \{(1 - p)(b + L) + q(S + p[b + L]) + H - L - i + x\}.$$

Also, because the people's tax can be expressed as a percentage of their income, which we set to equal 40%, we further define

$$T \equiv .4 \times (S + p[b + L]).$$

We (justifiably) assume that the household credit represents a proportion of the disposable income of the people, a proportion arbitrarily set at .3 such that  $H = .3 \times (b + p[b + L])$ . In addition, we assume that  $p = 1$ , meaning that firms expect to maintain a cash position only when the household credit is spent on consumption: "Why borrow and pay interest on loans that are not needed? (Nell, 2002: 526)." We set  $q = .5$ , meaning that the people try to keep 50% of their income as a source for tax paying, debt servicing, and savings. Because the mathematical

expressions that result from using these definitions are (still) rather tedious, we illustrate the scenario in a numerical example, setting  $B = 1$ ,  $\mu=1\%$  and  $\pi=5\%$ . Using these definitions we arrive at the following flow table (Table 6) for  $L = b$ :

**Table 6. Money flows in a simulated Western economy by chase**

<b>Phase</b>	<b>G</b>	<b>F</b>	<b>P</b>	<b>B</b>
1. Accreditation	1	$\frac{1}{2}$	.45	-1.95
2. Remuneration	0	0	1.95	-1.95
3. Consumption	0	1.2	.75	-1.95
4. Debt re-pay	-.31	.55	-.31	.08

Source: Author’s own elaboration (see Section 3.3)

Leaving all conditions unchanged, of course the next cycle will bring debtors more debt and creditors more credit (i.e. profit). When debtors and creditors act rationally and will expose behavior that inflicts the least pain and the most pleasure (Bentham’s “felicific calculus”; see e.g., Mitchell, 1918), at the next cycle debtors will lower their loans (minimizing pain) and creditors will increase their spending (maximizing pleasure), arguing that such investment would increase earnings (firms, government) and/or consumption (people). In the above numerical example, these conditions imply that neither government nor the people will borrow any money in addition to what they already owe to banks, and all money in circulation must come from the loans of firms. The resulting spiral of decreasing borrowing leads to a “moneyless” economy which in reality will correspond to massive deflation causing the impossibility of servicing existing debt. In short, the “felicific” model leads to devastating deflation.

#### 4. Conclusions

The descriptive circuit model proposed above leads to some immediate conclusions. First, in an economy without a government sector (no taxes, no subsidies) and without banks granting household credit, firms end up with debt whenever interest charges on loans are higher than zero ( $i > 0$ ). When  $q < 1$ , meaning when people make savings, the debt situation for firms deteriorates. For the people, the most beneficial position is to take no household credit. Second, in an economy where total interest on obligations exceeds total interest on deposits, at least one of the stakeholders (government, firms, people) remains with debt. Third, when conditions remain unchanged new debt cumulates with the stakeholders that already hold old debt, that is

they are in a “debt trap”. Fourth, if conditions change in that stakeholders in debt reduce their loans in next cycles (the “felicific” model discussed in Section 3.3), total money in circulation drops leading to deflation and the further impossibility for society (firms, government and people) to service existing debts.

Debt therefore, and unsurprisingly, posits a momentous problem in modern monetary economies. The money value of firms, government and the people, that is the “kind” to be paid (see Introduction), does not show up as a variable in circuit theory, but the servicing of interest in kind can only be accomplished by selling part of this value (which means that in the end, with conditions unchanged, the banks will own all value of the stakeholders in debt). Another possibility is of course, by the banks to destroy obligations on interest as in e.g., Quantitative Easing (QE, i.e. the purchase of long-term government bonds; see e.g., Ugai, 2007). Contrary to the layman’s intuition, such monetary action is not inflationary. As said by the current Chairman of the Federal Reserve, Ben Bernanke, in the broadcast of “60 Minutes” on December 5th, 2010: “One myth that’s out there is that what we’re doing is printing money. We’re not printing money”. Instead, QE reduces money demand (and supply) at the next production cycle, and could potentially keep money supply constant or even reduce it. With less debt to service, such decrease of money supply would not have a deflationary effect (let alone an inflationary effect). A way out of the monetary crisis without harming society at large would therefore be the partial or total destruction of obligations on interest (or more radically, of obligations *pars pro toto*).

The simple application of Islamic banking in circuit theory provided in the previous section did not give promising results, a finding which is confirmed by other research done on this topic. A number of studies have inquired the effectiveness of Islamic banking. From a study of the International Monetary Fund (Čihák and Hesse, 2008) it became clear on the one hand, that medium-large Islamic banks are more stable than small conventional banks, but on the other hand that large Islamic banks are more unstable than both small and medium-large conventional banks. The authors of the study argue that this difference is because for large Islamic banks risk control is more difficult than for smaller banks. However, it might also be the case that whereas smaller banks have access to exogenous money (i.e. money brought into circulation by other Islamic

banks), large Islamic banks account for all money in existence ( $V$ ) and based on the circuit model (see Section 3.2) they are unable to extract the non-existing sum  $i$  from society.<sup>2</sup>

Attention must be drawn to a number of “short cuts” that have been taken during the discussion of the descriptive circuit model. First, it was assumed that the proportion of money spent on consumption ( $q$ ) is the same for wage earning ( $pL$ ) and government sponsored people ( $S$ ). This may not always be realistic, because people in the latter category have low incomes and are likely to have a higher marginal propensity to consume, i.e. will likely in terms of proportions spend *more* on consumption (housing, food, energy, health care, etc.). For the sake of simplicity, this proportion was set equal, but there is no inherent necessity in the model to do so. Needless to say that more spending on the side of the people leads to deteriorating deposits, and thus to more debt allocated with the people. Second, it was assumed that none of the stakeholders (government, firms, people) had reserves or savings at the start of the cycle. In practical applications, this means that the vector  $\mathbf{m}_0$  should be adjusted to more realistic starting values. Another important assumption was that government money ( $O$ ) and firm loans ( $L$ ) went in equal proportions ( $p$ ) to the people (workers), when there is good reason to suspect that government money in many cases ends up for a large part on bank accounts of corporate entrepreneurs. Further, in the simulations (Section 3.3), we artificially kept interest rates across stakeholders to be equal. And we had to make a decision as to which proportion of government loans  $B$  went to firms ( $O$ ) and to the people ( $S$ ), the reality of which is hard to determine because national Statistical Agencies do not organise their statistics in ways to calculate the actual ratio in an easy manner.

Finally, the model does not consider exogenous sources of money, which particularly in the case of firms may have significant impact on realised turnover and debt allocated within firms. This means that the model developed above is applicable only to a globalized economy, and requires amendments to be applicable to national economies too. Firms with profits from exogenous sources however, act as banks because the excess money will enter the money circuit as an additional source of money at  $t > 4$ . The alien money can be used to repay outstanding debt, as a replacement of loans, as a way to increase production (in which case  $V > B + L + H$ ), or as “dead” capital earning an interest. Conversely, stakeholders can have debt with exogenous

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<sup>2</sup> Part of the explanation may also be that large Islamic banks are much more exposed to the conventional system than smaller Islamic banks.

sources which also changes the parameters of the model. Though simultaneously being very interesting and relevant, exogenous money flows are beyond the scope of this study and should be the subject of future research.

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### ***Teoria obiegu a odsetki: prosta opisowa metodologia alokacji długu***

#### ***Streszczenie***

W niniejszym artykule zaproponowano prostą opisową teorię obiegu (ang.: *circuit theory*), uwzględniającą cztery podmioty (grupy podmiotów) – banki, rząd, przedsiębiorstwa i pracowników – oraz odsetki. Na bazie modelu sformułowano liczne wnioski. Po pierwsze, w gospodarce bez sektora rządowego (bez podatków i subsydiów) oraz bez banków udzielających kredytów gospodarstwu domowemu, firmy nie unikną zadłużenia, jeśli muszą spłacać odsetki z tytułu pożyczek, a gdy dodatkowo ludzie oszczędzają, sytuacja zadłużonych przedsiębiorstw będzie się pogarszać. Po drugie, w gospodarce, w której istnieje sektor rządowy, ale nie funkcjonują banki udzielające kredytów gospodarstwu domowemu, w przypadku dodatnich odsetek od kredytu długi będą posiadać albo przedsiębiorstwa, rząd i pracownicy, albo też wszystkie grupy podmiotów. Ostatecznie skonkludowano, iż sposobem wyjścia z kryzysu monetarnego bez krzywdzenia społeczeństwa jako całości byłaby częściowa lub całkowita likwidacja obowiązku płacenia odsetek.

***Słowa kluczowe:*** teoria obiegu, dług, odsetki, ułatwienia ilościowe