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Theory of Debt-Deflation and Financial Instability Hypothesis: Altered Causal Links in Different Regimes of Finance

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ABSTRACT

This study is trying to provide the explanation of aforementioned phenomena – namely Irving Fisher´s Theory of Debt-Deflation (DDT) and Hyman Minsky´s Financial Instability Hypothesis (FIH). As this study argued, not only these theoretical conceptions closely related to each other but also that proposed theoretical dynamics, as described by corresponding theories, may be altered in different regimes of finance. The structure, i.e. the regimes of finance, through which investments are funded, may be pivotal in actual dynamics of deflationary developments. This study have tried to illustrate that a more "intimate" cooperation in the indirect regime of finance between monetary and fiscal policies is necessary for both maintaining financial stability on one hand and keeping price level from falling on the other. The results show that whereas in the direct regime of finance, the main burden may lie in the central bank interventions that may counterpoise the destructive nature of liquidity spirals, which provide in-depth description of interactions during a financial distress. The paradox of tranquillity which may lead to debt-deflation process may be worked out through different channels in an economy.

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1. INTRODUCTION

Financial turmoil of 2008 which engulfed U.S. and European economies has put into question the main tenets of mainstream, i.e. neoclassical, economics. Although the regime of monetary policy based on the inflation targeting may have been effective in keeping inflation stable, the problematics of financial stability has been somewhat played down. As a reaction the so called macroprudential policy has come to the fore. More so, closely connected with recent developments has been the threat of deflationary tendencies particularly in Europe where European Central Bank "shifted" its monetary policy to fight these tendencies. The problematics of deflation has become relevant. As these two "new" phenomena - the financial stability and the possible destructive nature of deflation - have become germane to economic reality, so economic theory has struggled to explain these developments. The natural response has been to turn to those theories that stressed the peculiar nature of financial stability and falling price level. Our paper is dealing with two main, and in our opinion the most relevant, theories that try to provide the explanation of aforementioned phenomena - namely Irving Fisher´s Theory of Debt-Deflation (DDT) and Hyman Minsky´s Financial Instability Hypothesis (FIH).

As this study argue, not only these are theoretical conceptions closely related to each other but also that proposed theoretical dynamics, as described by corresponding theories, may be altered in different regimes of finance. We shall try to illustrate that a more "intimate" cooperation in the indirect regime of finance between monetary and fiscal policies is necessary for both maintaining financial stability on one hand and keeping price level from falling on the other, whereas in the direct regime of finance the main burden may lie in the central bank interventions that may counterpoise the destructive nature of liquidity spirals, which provide in-depth description of interactions during a financial distress. The structure of the paper is as follows. The next section provides the exposition of Fisher´s Theory of Debt-Deflation. The third part deals with Hyman Minsky´s Financial Instability Hypothesis. The fourth section contains our main arguments as well as incorporation of liquidity spirals. The last part concludes our paper.

2. THE DEBT-DEFLATION THEORY OF GREAT DEPRESSIONS[1]

The following section will be dealing with the Fisher´s contribution to explanation of destructive nature of deflation in an economy that may be characterized as over-indebted. In spite of recent rise in interest, most of the academic discussion focuses mainly on Fisher´s paper The Debt-Deflation Theory of Great Depressions, which was published in 1933. However, the paper was seen by its author himself "only" as a summary of his primary work (Fisher 1933, p. 337)[2]. The core of the theory is to be found in his book Booms and Depressions: Some First Principles (1932), which contains knowledge "both new and important" (Fisher 1933, p. 337). Two main tendencies are identified as the most destructive - over-indebtedness of economic individuals and falling price level of consumers´ products. Other tendencies, nowadays identified as the main causes of fluctuation, such as over-investment or over-production are not considered to be able to start significant drop in output.

In the economy that is characterized by over-investment as a point of origin, the fall in investment activity would not have been so severe if it had not been financed by loans. The same conclusion is reached in connection with over-optimistic expectations that have led to an increase in loans in the past. The common denominator is then identified as over-indebtedness of economic individuals and falling price level of consumers´ products, which in turn rises the real value of debt. Fisher identifies nine main factors[3], and three of them are most important in the process of economic crisis. If this study take a state of overall over-indebtedness in an economy as our starting point, then the dynamics of the theory are as follow:

- Attempts at debt liquidation leads to distress selling, i.e. the debt disease, (Fisher 1932, pp. 8-12)

- Contraction of deposits and (possibly also the velocity of circulation), i.e. currency contraction (contraction of check-book money); (ibid, pp. 14-16)

- These effects are forcing the price level of consumers´ products to fall, i.e. the dollar disease, (ibid, pp. 17-26)

- The falling prices (and price level) decrease the net worth of business that might, in turn, lead to bankruptcies, i.e. net worth reduction; (ibid, p. 29)

- As a consequence of the latter, the profits tend to fall, i.e. profit reduction; (ibid, pp. 29-30)

- Motivating businesses to scale down overall production, thus decreasing the level of employment of factors of production, i.e. lessened production, trade and employment; (ibid, pp. 30-32)

- Aforementioned effects will result in spreading pessimism among public and growing uncertainty, i.e. pessimism and distrust, (ibid, pp. 32-34)

- Leads to hoarding of money, i.e. retarded circulation, (ibid, pp. 34-37)

- The rate of interest being that 'money rate of interest' lowers however the real rate of interest raises. (ibid, pp. 38-39)

It should be noted that the above order is not a chronological one (ibid, pp. 40-41)[4]. Naturally, individual factors may be at work simultaneously reinforcing one another. The DDT then stands on the premise that only the co-existence of over-indebtedness and falling prices is the true cause of particularly destructive cases of recession. Nevertheless, the common denominator for aforementioned factors is the result of falling price level of consumers´ products; with the exception of the first, i.e. debt liquidation, and the last factor, i.e. changes in rate of interest (Fisher 1933, p. 344). Fisher explicitly states that "[o]f these three depression tendencies [first three stated], the second (currency contraction) is important only as a connective process between the other two - which two should be called The Debt Disease (too much debt) and The Dollar Disease (a swelling dollar)" (Fisher 1932, pp. 28-27).

It is argued that should only one of the two main factors, i.e. either the debt disease or the dollar disease, exist, the resulting drop in output (and possibly prices) would be of a relatively lesser magnitude as compared with the case when both factors would co-exist. The destructive force of the co-existence lies in their reinforcing and "feeding" each other, namely that "the very effort of individuals to lessen their burden of debts increases it, because of the mass effect of the stampede to liquidate in swelling each dollar owed" (Fisher 1933, p. 344). The ultimate effect is that "the more the debtors pay, the more they owe" (ibid.). In the other words, the more debtors try to pay off

their debts, then they will force prices to fall and it may cause decline in overall price level but the fall in prices is conditional.

As Fisher argues that debts are connected with and interconnect individuals in an economy through money (1932, p. 8), it is the state of uncertainty that might force creditors to call on their borrowers' loans - the "domino effect" then begins. If a large part of public then tries to sell off their assets to meet their debts due, there may be large drops in prices of sold assets. This "distress selling", or nowadays also called "fire-sales", is the precondition for the aforementioned dynamics[5]. Morever, "remedies" for the debt-deflation are concerned, these are discussed at some length where all of them are already being utilized by monetary authorities in fighting against the deflation[6]; among proposed counter-measures, this study may find recommendations towards the control of interest rates through "open market operations" (pp. 128-132), adjustment of (volume of) credit on business activity (pp. 124-125), i.e. now identified as "monetarist policy rule". All of these counter-measures have only one goal in their core - to prevent the price level from falling and thus starting the aforementioned vicious cycle, for it is the dollar disease that lies in the heart of the explanation of DDT (ibid., p. 39). Moreover, most of these are of monetary nature meaning that mainly monetary variables are used to fight against deflation, one of the other possibilities is to "reflate" businesses' profits through fiscal policies - this provision is heavily rooted into Minsky´s hypothesis of financial instability (1977), which is closely connected with DDT.

3. FINANCIAL INSTABILITY HYPOTHESIS

Similarly to the DDT, the FIH is the product of its era on one hand and a manifestation of the theoretical heritage of John M. Keynes´ famous book The General Theory of Employment, Interest and Money (1936) on the other. Nevertheless, it ought to be noted that Minsky´s work has also been influenced by another Keynes´ work Treatise on Money (1930a, 1930b) and especially by Joseph A. Schumpeter´s famous work The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and The Business Cycle (1911)[7]. The FIH draws heavily on Post-Keynesian theory and methodology and its emphasis on instability of investment activity as the main factor determining fluctuations in aggregate output (Keynes 1937, pp. 215-217)[8]. The FIH is then understood, by author himself, as a reinterpretation of The General Theory (Minsky 1977, pp. 20-21), particularly with respect to Keynes´ reply to professor Viner´s critique (1936).

One of the facts often omitted in utilizing FIH (by non-post-Keynesian strands of economics) is its connection with the (post) Keynesian theory of investment. The instability of capitalistic process is inherently connected with the investment dynamics and the FIH which explaining the phenomenon of business cycles (Minsky 1977, p. 22), certainly it has never been intended as a theory "justifying" or possibly even "proving" the self-destructive nature of capitalistic economies[9]. The function of money in an economy as metioned in Fisher´s work – it dose not only interconnect money by individuals through time and space but also provides necessary means to "bridge the gap" between real assets and financial wealth. FIH is erected around the notion of "fundamental uncertainty", meaning that the future is outside the scope of anyone´s ability of predicting what might happen in any foreseeable time horizon. The instability of investment activity stems primarily from the fact of not knowing whether the undertaken investment would indeed bring the expected yield (cash-flow); the state of "aggregate" expectations with respect to the future profits (cash-flows) is one of the main determinants. However, truly significant variables in FIH are the means and the structure how investments are being financed.

It is precisely that the ability of money in the form of receivables and liabilities in balance sheets of economic agents to connect the past investment decisions with the present possibilities and expected profit (cash-flows) trajectories, which in turn may influence present prices of capital goods. Developed contemporary economies are characterized by utilizing highly capital-intensive methods of production that require a high "amount of funds" to finance. It is highly probable that undertaken, but not necessarily finished, investments will have their "counterpart" in the form of investors´ liabilities unless the investments under consideration have been financed internally completely. The structures of lenders´ receivables and debtors´ liabilities are being formed in this way. Though both the interest and principal payments are set and known, the expected profits that should finance these expenses depend on whether the expectations, under which the particular investment has been undertaken, will be fulfilled.

As Minsky was concerned with economies with highly developed financial markets such as those in the US, his theory revolves around the coordination between the banking sector that has the ability of granting loans on one hand and investors-borrowers on the other, both of which conduct their transactions on the financial (capital) markets (Minsky 1986, pp. 191-205). The more complex the structure between lenders´ receivables and debtors´

liabilities become, the more interconnected the financial and the "real" spheres of economy will be. As more loans are being granted, naturally it follows that the "amount" of money in an economy increases.

At this point it ought to be noted that the notion of "veil of money" is qualitatively different from the neoclassical point of view of quantitative theory of money. In the latter case excessive increases of money supply may cause misallocation of resources[10], whereas the former instance stresses the changing nature of the financial structure among economic participants. With a certain degree of inaccuracy it may be concluded that an increased "amount" of money in circulation will result in both the qualitative and quantitative change of the structure of financial interrelations. If the past, respectively present investment decisions are "validated", that is, if the past expectations have been or are being fulfilled, the (relative) stability of the present structure will remain and vice versa (Minsky 1977, pp. 23-24; 1982, pp. 71-99). FIH distinguishes three separate "states" of economic agents participating in financial transactions, these are the hedged, the speculative and the ultra-speculative (Ponzi) units. Individual units differ from one another qualitatively by their "influence" on overall (in)stability of the financial structure.

Expected cash-flows (profits) of hedged units are more than sufficient to meet both interest and principal payments. These agents are characterized by a high "amount" of equity, i.e. the investments are mainly being financed internally by utilizing accumulated past profits. In this case the risk stems from the possibility of expected cash-flows not being realized. However, they are relatively insensitive to increases of rates of interest. Speculative units calculate with cash-flows that will cover interest costs but which are not sufficient to meet principal payments. They speculate that they will be able to roll on their principal expenses by future loans. There is a risk of the expected cash-flows not being materialized and that the rates of interest might rise thus increasing the cost of rolling on the principal payments. Ultra-speculative (Ponzi) units expect that their future cash-flows will cover neither the interest nor the principal expenditures. These units are speculating on rising prices of financial assets they have invested in, the sale of which should provide necessary funds to meet their obligations. They are forced to roll not only the principal expenses but interest payments as well. In addition to being exposed to interest risk, speculative units face the danger of the expected rise in financial assets not coming into existence (Minsky 1977, pp. 24-25; 1982, pp. 66-68, pp. 105-108).

Each type of a unit has a different degree of (in)sensitivity to overall changes both of the development and the state of confidence in financial markets. The most (in)sensitive (stable) are the hedged units whereas the ultra-speculative units may have problems to meet their obligations in the slightest negative change of their ability to roll on their debts. The dynamics of interactions between creditors (lenders), i.e. mainly financial intermediaries, banks, and borrowers, i.e. investors[11], follows Minsky´s theory of investment (Minsky 2008, 5th chapter), which is built on foundations laid in General Theory[12]. The supply of investments is determined by the prices of current investment output, which is in turn the function of nominal wages, productivity of labour, short-term rates of interest and profit mark-up. Prices are held constant in short run however on the condition of "normal" utilization of production capacities[13]. The demand of investments on the other hand is determined by the prices of assets on financial markets, which reflects the valuation of existing capital stock, i.e. the discounted sum of expected cash-flows of a particular investment, which is under the influence of overall uncertainty as to what the future may hold. The investment will take place if the demand is above the supply. Should there be no financial limitations, the investment activity would cease in case of the equilibrium in supply and demand.

However, it is probable that investors will seek for outside funding to finance their investment opportunities, i.e. loans. If an investor is granted a loan by his or her creditor, the risk of future insolvency being tied both to the creditor and debtor is increased. The reasoning that the external funding of investments is "inferior" to the internal one, in the Post-Keynesian economics in general, is based, apart from Minsky´s theory itself, on Kalecki´s Principle of Increasing Risk (1937). The investment dynamics is modelled in such a way as to reflect the two types of risk that affect the volume of investment which have not commonly been distinguished, but which it is important to distinguish. The first is the entrepreneur's or borrower's risk and arises out of doubts in his own mind as to the probability of his actually earning the prospective yield for which he hopes. If a man is venturing his own money, this is the only risk which is relevant.

But where a system of borrowing and lending exists, by which I mean the granting of loans with a margin of real or personal security, a second type of risk is relevant which we may call the lender's risk. This may be due to either a moral hazard i.e. voluntary default or other means of escape, possibly lawful, from the fulfilment of the obligation, or the possible insufficiency of the margin of security i.e. involuntary default due to the disappointment of expectation." (Keynes 1936, p. 144). Minsky´s investment theory utilizes this concept by making full use of margins of safety (Minsky 2008, p. 105). Whereas the rising borrower´s risk forces the demand prices of

investment to fall, the increasing lender´s risk on the other hand forces the supply prices of investment to rise. In the latter case the security margin "added" to the price has the form of a premium while in the former case the security margin has the characteristics of a discount. (ibid., pp. 104-110)[14].

In the other words "the margins of safety that Keynes referred to exist in an excess of cash receipts over cash payment commitments, the excess of the value of assets over liabilities and holdings of cash are liquid assets." (Minsky 1981, p. 7). If one takes as a point of departure from the situation characterized by the existence of relatively high margins of safety, then it is safe to assume that the expected profits (cash-flows) that are to cover the outflows of funds, i.e. interest or principal payments, will materialize thus validating the existing structure of liabilities. The structure of liabilities having been validated, the lenders as well as debtors will lower their margins of safety gradually. Simplified, in an expanding economy banks in general will be more than willing to expand their loans to their clients if they have met their obligations so far, similarly it is only natural that entrepreneurs will be inclined to step up their investment activity while also seeking external financing; in turn increasing their ratio of internal to external funds, i.e. leverage. Should the expansion go on, the continual decrease of margins of safety may lead to an excessive lending activity. More so, one of the main determinants are the aggregate profits, for a high investment activity along with other parts of aggregate demand increases the profits thus motivating to even a higher investment activity.

Naturally, the aggregate demand should fall, for any reason that maybe happen, it is reasonable to expect that expected profits (cash-flow) will fall short of payments due invalidating the structure of liabilities in process (Minsky 1984, pp. 71-99). The overall dynamics is endogenous in nature. As the structure of liabilities is being validated in time, the margins of safety increasingly diminish and the preferred way of financing investments shifts in favour of a more speculative one. By shifting the units themselves, the structure is becoming more unstable step by step. The hedged units move to the qualitative characteristics of speculative and ultra-speculative ones. There is a result that the structure of liabilities (financial system), once (relatively) stable, may be prone to collapse with even the slight change of expectations or the situation on financial markets (Minsky 1986, pp. 230-238, pp. 242-245).

The transition from economic expansion to recession works out through changes of (market) rates of interest. Lest the supply of loans should be infinitely elastic, an increasing amount of (unfinished) investments will create pressures for the rate of interest to rise[15]. An infinitely elastic supply of loans may be the result of either a high degree of financial innovations, i.e. new ways of providing funding, or an excess of liquidity in financial system, i.e. the central bank´s supply of liquidity to other banks is infinitely elastic. However, Minsky himself was sceptical to both possibilities, for either financial frictions or inflationary pressures will force rates of interest to rise (Minsky 1978, p. 45). Be that as it may, once rates of interest have started rising, the transition from expansion to recession will take place. Rising rates of interest decrease the net worth of hedged and speculative units, ultra-speculative units may go bankrupt right away. The credit debtors´ creditworthiness is revaluated negatively thus decreasing the demand for investments. Speculative and ultra-speculative units face problems of rolling their debts and as a result may default. The creditors´ expected cash-flows, especially those of banks´, are of lesser magnitude than it has been envisaged therefore forcing them to liquidate their portfolios to meet their own payments due.

This process leads to the collapse of prices of assets on financial markets that will in turn force the demand for investments to move to even lower levels. Now the possible massive liquidation of portfolios strips the financial markets off any liquidity and the markets may all "freeze" together. As a reaction to this development, the expected cash-flows are revaluated downward, which again force the demand for investments to fall. Whatever hedged units may remain, they will be forced to speculative characteristics, for their expected cash-flows have evaporated. The rate of bankruptcies increases and changes the overall sentiment in economy. Creditors as well as debtors realize that the margins of safety have been set too low and try to increase them; the overall risk has increased across the whole economy (Minsky 1984, pp. 92-115). Even if, after these events have been unfolded, investment opportunities be yet deemed profitable, entrepreneurs will not take hold of them, for their ratio of equity to liabilities is too high, i.e. they are in the state of (relative) over-indebtedness. Whatever the remaining cash-flow they still receive may be, it will be used for the recovery of their balance sheets. The fall in the investment activity coupled with attempts at recovering debtors´ liabilities structure will result in unemployment and recession (Minsky 1975, pp. 115-116).

In connection with what has been said above, Minsky draws two theorems: (i) "the economy has financing regimes under which it is stable, and financing regimes in which it is unstable"; (ii) "over periods if prolonged prosperity, the economy transits from financial relations that make for a stable system to financial relations that make for an

unstable system." (Minsky 1994, p. 8-9) The ultimate conclusion is that "if hedged financing dominates then the economy may well be an equilibrium seeking and containing system and the greater the weight of speculative and Ponzi finance the greater the likelihood that the economy is a deviation amplifying system." (ibid.)
The above statements are sometimes referred to as "the paradox of tranquillity", which states that stability breeds instability (Lavoie 2009, pp. 72-73)[16].

4. REGIMES OF FINANCE AND ALTERED CAUSAL LINKS

It is no surprise that financial markets play a significant role as being stressed by Minsky. The question is whether every "system of borrowing and lending" may be the same. The contemporary monetary theory recognizes two regimes, under which a financial system may operate (Mishkin 2010, pp. 25- 29). The first, connected with both the DDT and FIH, is the direct channel of finance that operates through financial markets "directly". The other is the indirect channel of finance where funds in the first instance flow to financial intermediaries that, in turn, provide funding for entrepreneurs. The economies of the U. S. or Japan utilize mainly the former regime, whilst in Continental Europe the latter is preferred. The favoured regime of finance has a pivotal role in both theoretical frameworks, for it may alter significantly the sequence and dynamics of both theories as well as it may have consequences as to what (monetary) policy action should be undertaken in case of crisis. Of course, both regimes are intertwined and may not be separated from each other completely. However, as we shall argue, some of the causal links will be played down while the others will have their effects amplified in different regimes.

In the regime of the direct finance debtors issue securities in debt and equity markets to raise necessary funds. These securities are in turn bought by creditors. The "downside" of the direct finance is its (at least) double amplifying effect if a downward turn in quotations has started. If we take Fisher´s standpoint of "debt liquidation" and connected distress selling of (financial) assets, the cause of which is at present time (relatively) unimportant, the distress selling of financial assets will lower their prices in case of debt securities thus making it more difficult for the issuer to raise additional funds (to roll on existing debts). More so, should the solvency of the issuer be put into question, as a consequence of the latter, it would be reasonable to believe that quotations of issuer´s equity securities would be under pressure as well, therefore the issuer´s net worth (capitalization) will also drop. Paradoxically, the "run" on debt securities (on issuer) need not, by itself, lead to insolvency unless there is a co-existence of pressure on the prices of equity securities. If the distress on debt and equity markets should be systemic in nature, investments will decline, decreasing the aggregate demand (profits) in process.

However, the other negative amplifying effect will be on the side of creditors. If the general public (households and businesses mainly) has a large part of their wealth "stored" in financial assets, the systemic decline in prices of financial assets may decrease their ability or willingness to maintain the current level of consumption, again decreasing the aggregate demand but now its consumption part. Minsky´s recommendation on the "investment side" is an action of the central bank that ought to intervene in financial markets against price drops by providing liquidity to the markets, and to ease the refinancing. On the "consumption side", fiscal policy should aim at offsetting both the drop in households´ wealth and profits by transfers and tax reduction (credits) (1981, p. 14, p. 16).

So far, our view has been an "aggregate" one nevertheless the situation begs the question as to what the conditions are so that the fire-sales/distress selling may take place. The dynamics that occurred during the U.S. financial crisis of 2008, when a significant portion of the largest financial agents had the characteristics of (ultra-)speculative units for their dependence on short-term financing and high levels of financial leverage provided an "example" of how a phenomenon of distress selling might come into existence[17,18]. One of the "features" was the quick and almost complete "freezing" of financial markets, particularly in its interbank part. The "liquidity" in markets evaporated literally overnight[19]. The loss of liquidity had the features of Minsky´s dynamics however with somewhat peculiar interactions between individual financial agents. This "peculiarity" is described best as the "liquidity spirals" that explains the interactions between market and funding liquidity (Brunnermeier and Pedersen, 2009; Brunnermeier, 2009). Although in the aforementioned papers, Minsky´s or Fisher´s theories are not quoted, they nevertheless follow the causality of Fisher´s and Minsky´s theoretical frameworks but they enrich them significantly by an in-depth analysis of interactions on financial markets.

Another kind of a "vicious cycle", similar to that of Fisher´s, has emerged in connection with the liquidity spirals. Specifically, the dynamics of financial margins[20], i.e. loan-to-value ratios, and levels of leverage. The first, a loss spiral is the result of utilizing leverage in financing investments. Should the value of assets in an agent´s balance sheet drop, the agent´s net-worth will decrease faster than the value of assets themselves. As the most of financial

agents utilize leverage-targeting or even the pro-cyclical leverage behaviour[21], the loss spiral has "dis-equilibrating" effects, for a drop in assets value forces the agent to unwind a part of his or her portfolio to maintain the level of leverage.

The more agents try to sell their assets to maintain their levels of leverage, the more they will force prices to decrease. The resulting effect is that their net-worth shrinks even faster, their levels of leverage increase and the margins widen increasing the cost of obtaining funds, i.e. the funding liquidity decreases (Brunnermeier and Oehmke 2013, pp. 41-44). The other, a margin/haircut spiral enforces the former by "adding" additional feedback to a negative price shock. If there has been a negative price shock and/or volatility has increased, margins have a tendency of rising[22], which in turn forces agents to sell even more of their assets, for, again, they need to decrease their leverage, but most importantly it leads to a lower funding liquidity (ibid., 44-48); in an extreme case, should margins reach 100%, margin funding would not be available at all as agents would not be able to use their assets to raise additional funds, effectively cutting the ability to roll on debt. By combining the two spirals, the aforementioned "vicious cycle" comes into existence - after the initial negative price shock, agents are forced to unwind their positions to maintain/decrease their levels of leverage, the market liquidity drops, which in turn precipitates even a larger price drop if assets are being sold, which, at the same time, decreases the funding liquidity, i.e. widening margins, which again results in even more forced selling (ibid., p. 46; Brunnermeier 2009, pp. 93-94)[23,24].

It is not surprising to see that this "vicious cycle" is de facto the same as the Fisher´s however with two notable distinctions - the first that the latter works on a "macro-level" whilst the former is "contained" to a financial "micro-level", and the other, more important, that the latter starts if the price level of consumers´ products has begun to decrease as opposed to the former, which initiates if there has been a negative shock to assets quotations. This, in turn, leads us back to Minsky´s provision that the central bank should intervene against quotations drop by furnishing liquidity to financial markets, i.e. increasing the funding liquidity. By doing so, it may avert the possible "spill-over" of turmoil in financial markets to the "real" economy. More so, it is not hard to notice that the liquidity spirals have got the same dynamics as the FIH has got. But in this case, Minsky´s units may be "reinterpreted" in terms closer to those of liquidity spirals (and, of course, vice versa) - simplified, (ultra-)speculative units may be characterized by their maturity/liquidity mismatch in their balance sheets and high levels of leverage, which determines their relative sensitivity to a change in the market and funding liquidity. Similarly, the infinite/relative elasticity of supply of (collateralized) loans (see above) is determined by the financial margins, i.e. the margins of safety.

The dynamics of liquidity spirals defacto provides "conditions" so that the Minsky´s and to a lesser degree Fisher´s link of events may take place by specifying situations when both margins (of safety) destabilize and fire-sales might occur. In other words, it is the state of affairs that leads to "a deviation amplifying system" but on a "micro-level" of the structure of financial markets that is sometimes referred to as "the new financial architecture"[25]. The situation will be qualitatively different in an economy with indirect finance regime. As the function of financial markets is provided by financial intermediaries, the burden of a possible crisis will rest mainly with them. Non-existence of direct finance regime will mean that the two amplifying effects will be lessened and twofold interrelations - between depositors and financial intermediaries on one hand, and between debtors and financial intermediaries on the other - will take precedence. Once we take the direct finance regime out of the equation (not financial markets themselves), the crucial element of the stability of financial intermediaries, i.e. the (commercial) banking sector, will come into being. As to the first part of the link, depositors need not be concerned about their deposits unless there is a risk of bank runs, which is in turn determined by the (relative) stability of financial intermediaries themselves. Simplified, it follows that the degree of relative (in)stability will lie in the other causal link.

Nowadays in Continental Europe, one of the main functions of the commercial banking sector, is to make available funding for the development of residential housing, infrastructure and for entrepreneurs either via business or collateralized loans, i.e. mortgages mainly. From our current perspective the vital component is the solvency of debtors, households and businesses that have been granted loans. These loans may be considered "fixed" for a relatively long period of time, generally up to five years from the moment the loan was provided. Yet if in the meantime, such a situation in the loan market has developed, either because of a downturn in the aggregate output or a change in the central bank´s monetary policy, i.e. the main monetary policy instrument has been raised, in the way that it forces the banking sector to raise the market rates of interest charged on loans, the debtors´ (households and businesses) ability of meeting payments on debts due, whichever it may be an interest or a principal part of their liabilities, may be stretched to the limit even more so if the risen market rates of interest, which is the most

probable case in the situation of an unfolding crisis, coincide with a decline in debtors´ cash-flow resulting from a drop of the aggregate output. The situation will be more severe if there is also a spike in unemployment, for the solidity of a wage-bill is one of the main determinants of households´ and entrepreneurs' level of cash-flow.
The stability of financial intermediaries may change into instability. Basically, now the banking sector may be under the pressure from four sides - the debtors´ inability to cover payments on debts due, the reduction of net worth, the increased costs of obtaining liquidity from the central bank and a higher probability of bank runs. The shrinkage of net worth may be due to several reasons, each of which will have a different significance based on the organisation of domestic financial (debt and equity) markets and the structure of financial intermediaries´ balance sheet. If, for any reason, the prices of financial intermediaries´ equity securities should drop, it will result in a "squeeze" of their net worth. It is a question of importance who will hold the securities in question, for this fact will determine how far the decline may go. Should the significant portion of the securities be held by households and entrepreneurs that are in distress, they could be forced to liquidate their portfolios in order to meet their payment commitments, i.e. Fisher´s distress selling.

On the other hand, if the domestic banking sector is "owned" by foreign capital, i.e. international financial institutions, the level of capitalization may remain unchanged. The profitability of the domestic banking sector is closely connected. In face of the possibly increasing rate of defaults on granted loans, the profitability may sink. This effect will be pivotal particularly in the former case as paid out dividends might have been incorporated in and might form a large part of households´ and business´ expected cash-flow that was to cover payments due; theoretically, it may even depress the aggregate demand if paid out dividends make up a large share of the national income. Again, it will have a lessened effect in the latter case. All of these effects will increase the probability of bank runs coming into existence, i.e. massive outflows of deposits. In this point if the "contraction of check-book money" that might be underway is not counterpoised, the debt-deflation spiral may commence if the price level of consumers´ goods starts falling. However, in this case the dynamics of DDT will be closer to that of FIH, for the essential element will be the level of employment.

The DDT original sequence will be altered; the causal linkage will be worked out through the decline in the rate of employment of factors of production, i.e. Fisher´s 6th link, to the lowering the households´ and business´ cash-flow that will be precipitating problems of meeting their payment obligations. This de facto validates Minsky´s critique of Fisher´s causal link (Minsky 1981, pp. 14-15), but in the indirect finance regime. It also ought to be noted that especially small open economies may be susceptible to this development, for a large portion of their profits (cash-flows) depends on the foreign demand for exported goods that are being produced in the domestic economy. Should the foreign demand decrease, businesses´ profits will descend and entrepreneurs may be forced to lower their utilization of factors of production. The (monetary) policy action will be, again, qualitatively different from our previous case. The situation will be more difficult for monetary and fiscal policies to solve.

In the aforementioned example with the direct finance regime, the intervention against the decline in financial markets by the lender of last resort may stabilize quite conceivably unstable financial markets and simultaneously offset any possible decrease in households´ and business´ wealth thus maintaining the current level of the aggregate consumption. In the latter instance, the lender of last resort has only in its power to maintain the stability of financial intermediaries, more specifically it may avert their technical insolvency by providing enough liquidity via refinancing operations and emergency loans. In other words, it may influence the "monetary" sphere of economy. The burden of sustaining effective demand lies mainly in the hands of fiscal policies. The overall effectiveness of monetary authorities´ intervention will also depend on the legal frameworks that specifies how a creditor may dispose of debtors´ collateral. If a debtor has the option of "voluntary foreclosure" in case of the market value of his collateral, i.e. real estate, being below the nominal value of the loan unless it is a loan with recourse clause, then the debtor´s liabilities are "transferred" to the creditor´s balance sheet.

In this event the lender of last resort´s intervention will have its effect amplified, for the problematic loans are concentrated in the financial "part" of economy. On the other hand, as it is the instance in Continental Europe, the debtors, for most part, have not got this option as their debts are negotiated with a recourse clause. Monetary authorities may deal with problematic assets in banks´ balance-sheets, however the problem of households´ and business´ solvency is outside their purview, i.e. it is the matter of fiscal policy and ease with which the debt relief is made possible. An economy with the indirect finance regime requires a relatively deeper collaboration of monetary and fiscal policies on the macroeconomic level than an economy where the main function of allocation of funds lies within financial markets. Our aim has been to illustrate that it will be quite erroneous to apply both DDT and FIH as "they were" without taking into account the systemic properties of economies, the explanation of which the theories in question were to provide.

5. CONCLUSION

The main aim of this study is to show that possible deflationary tendencies and financial instability that are closely connected, particularly in economies that have accumulated large "amounts" of debt. Although thorough discussion of theoretical connection of DDT with FIH, Minsky´s critique of Fisher´s causal links particularly, is beyond the scope of this paper, nevertheless their dynamics is closely intertwined with each other. The results show that the paradox of tranquillity, which may lead to (debt-) deflation process may be worked out through different channels in an economy. The structure of the regimes of finance, through which investments are funded, may be pivotal in actual dynamics of deflationary developments. Whereas in the direct regime of finance the monetary policy, more specifically the lender-of-last-resort interventions, may maintain very well the financial stability in the times of distress, characterized by liquidity spirals dynamics, and keep the price level from falling by offsetting the possible drop in the wealth of households and entrepreneurs stemming from decreasing valuation of (financial) assets, in the indirect regime of finance a deeper cooperation between monetary and fiscal policies may be needed in order to counterpoise deflationary processes and keep financial intermediaries, i.e. financial system, from falling apart.

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FOOTNOTES

1. This section is based on an earlier paper that dealt with a possible incompatibility of the main goals of monetary policy stemming from proposed dynamics of DDT and Hayek´s critique of Wicksell´s conception of dichotomy of rates of interest, see Metrah (2017).

2. Fisher is quoting, then, one of the greatest experts in the field of business cycles, however he does not provide the name. It is possible that it was W. C. Mitchell, whom the book is dedicated.

3. A thorough discussion of the "*starters*" (of debt-deflation) may be found in Fisher (1932, pp. 44-50).

4. The outline of possible chronological order is provided in an appendix, see Fisher (ibid, pp. 161-162).

5. For the original discussion, see Fisher (1933, pp. 8-30).

6. Consult Fisher (1932, pp. 113-142) for more details.

7. Especially by his theory of endogenous money supply, see Schumpeter (1911 [2012], pp. 95-127). For Schumpeter´s comprehensive work on business cycles, see Schumpeter (1939).

8. For a detailed and very comprehensive account of Post-Keynesian theory and methodology, see Harcourt and Kriesler (2013a, 2013b) or Harcourt (2008); an introductory exposition may be found in Lavoie (2009). An excellent account of the history of Post-Keynesian economics provides King (2003).

9. cf. Schumpeter (1928).

10. This view is stressed particularly by the Austrian business cycle theory, see (Hayek 1933, 1935; de Soto 2009).

11. Or to use Keynes´ preferred term – entrepreneurs.

12. The notion of "fundamental uncertainty" aside, for it is not as emphasized in *Treaties on Money* (1930a, 1930b) as in *General Theory*, we are of an opinion that interrelations between investment and the means of

financing it is to be found mainly in *Treatise on Money*, or to be more precise, that the Keynes´ exposition *"of how finance affected system behaviour"* (Minsky 1975 [2008], p. 104) is elaborated in a significantly more detail in the latter work.

13. The principle of "normal" (firm´s) output is deeply rooted in Post-Keynesian microeconomic theory of firm, see Lavoie (2009, pp. 41-44), Harcourt (2005, pp. 32-54), Screpanti and Zamagni 2009, pp. 360-363, pp. 415-420).

14. It ought to be noted at this point that very similar line of thought may be found in *Treatise on Money* (Keynes 1930a, p. 126, pp. 140-146).

15. Hayek have come to a similar hypothesis regarding the relationship between the behaviour of rates of interest and the "amount" of *unfinished* investment. The conclusion is that rising rates of interest need not solely be induced by monetary authorities but may be the result of real variables, see Hayek (1937 [2008]).

16. *" The volatility paradox* stated in Brunnermeier and Sannikov (2014) is a "restatement" of the same notion as *the paradox of tranquillity "*.

17. For example, between 2000 – 2007 the amount of repo operations that were used as a source of funding increased almost twofold (Brunnermeier 2009, pp. 79-80).

18. For detailed exposition of interactions between the loss of liquidity in markets and the leverage effects, see Davis (1999) or Duffie (2008).

19. For an excellent account of the development of U.S. crisis, see Barrell and Davis (2008).

20. Simplified, to a certain degree these may be thought of as the margins of safety in Minsky´s and Fisher´s terms.

21. See Adrian and Shin (2010).

22. See Gorton and Metrick (2011).

23. Availability of funding liquidity, i.e. the "behaviour" of margins, is crucial, see Brunnermeier and Pedersen (2009) for the discussion of (dis)stabilizing effects of margins (pp. 12-13, cf. pp. 13-14).

24. Another issue that was omitted were network externalities, see Brunnermeier and Oehmke (2013, pp. 52-57).

25. For details and the historical development, see Crotty and Epstein (2009), Crotty (2009) or Silvers (2013); for a broader critique of contemporary financial systems, see Kay (2015) or King (2017).

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