

# MONETARY POLICY AND THE TIME-DIMENSION OF FIRMS' FINANCING STRUCTURE

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*Resumen:* En este trabajo ofrecemos un esbozo de una teoría austriaca de las finanzas corporativas mediante el estudio de la estructura del pasivo de las empresas, tanto en un contexto de mercado libre puro, como de ciclo económico inducido por la política monetaria. Basándonos en recientes contribuciones sobre la estructura temporal de los ahorros, mostramos que los periodos de auge están caracterizados por un aumento del apalancamiento y mayores niveles de descalce de plazos de las empresas. Tales fragilidades deben corregirse durante las recesiones.

*Palabras clave:* Ciclo Económico, Finanzas Corporativas, Economía Austriaca.

*Clasificación JEL:* B53, E32, G30.

*Abstract:* We offer a sketch of an Austrian theory of corporate finance by studying the structure of firms' liabilities both on an unhampered market and through a monetary policy-induced business cycle. Building on recent contributions on the time-structure of savings, we show that booms are characterized by increased leverage and higher levels of maturity mismatches for firms. Such fragilities are to be corrected during busts.

*Key words:* Business Cycles, Corporate Finance, Austrian Economics.

*JEL Classification:* B53, E32, G30.

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## I INTRODUCTION

The purpose of this article is to offer a sketch of an Austrian theory of corporate finance, with particular attention to the way firms' assets are financed. Following Mises (1912, 1949) and Hayek (1929, 1931), economists of the Austrian school focused mainly on the investment side of business cycles. Namely, lower interest rates induce malinvestments during booms. In line with the Austrian tradition, Rothbard (1962) argued that «the credit expansion reduces the market rate of interest» and that «a lower rate of interest on the market is a signal that more projects can be undertaken profitably» (p. 996). Then,

The banks' credit expansion had tampered with this indispensable «signal» —the interest rate— that tells businessmen how much savings are available and what length of projects will be profitable, (p. 997).

From a balance sheet point of view, this refers to assets whose present book value is greater than their future actual value (all projects undertaken will not be achieved profitably in the future). In an Austrian perspective, this phenomenon has been thoroughly studied. On the contrary, the other side of firms' balance sheets - equities and debt liabilities - has been more or less ignored. If we call *financing structure* the structure of a firm's equity and debt liabilities,<sup>1</sup> then a careful analysis shows that the quality of the financing structure also deteriorates during booms. Our purpose in this article is to describe the mechanisms at stake. Introducing the concept of «time dimension of the financing structure», we show that the overall maturity of firms' financing structure tends to decrease because of money creation, then to increase again with busts. Two mechanisms typically make firms more exposed to

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<sup>1</sup> Outside of the Austrian literature, what we dub *financing structure* is commonly referred to as *capital structure*. We deliberately decide not to use this word, which refers to a different concept in the Austrian tradition (namely, the combination of heterogeneous capital goods along a structure of production).

uncertain events during booms: increased leverage and higher levels of maturity mismatches.

The increased leverage is implied by the canonical Austrian explanation of business cycles - if interest rates are artificially low, it should lead to increased business indebtedness, then to increased leverage. Our main contribution is to study not only the lower «interest rate» as if such a thing existed *per se*. On the contrary, we draw on the recent literature on yield curves and on the time-structure of savings (especially Bagus and Howden, 2010) to show that *ex nihilo* money creation tends to reduce the maturity of newly-issued debts. Along with higher leverage, this leads to unsustainable maturity mismatches that would not appear on an unhampered market, and which have to be corrected at some point.

In a first part, we give an outline of the relevant literature for our purpose. Then we expose the two major trade-offs that corporate finance faces (debt vs. equity, long-term vs. short-term debt) and show the entrepreneurial nature of the choices at stake. In a third part, we describe the financing structure of a firm on an unhampered market. In a fourth part, we show the effects of higher savings on firms' financing structures. In a fifth part, we introduce *ex nihilo* money creation and describe its effects on corporate finance. Then we give an overall description of balance sheet imbalances during the boom and bust cycle. We finally conclude briefly.

## II RELEVANT LITERATURE

In an Austrian perspective, contributions on corporate finance *per se* are scarce. By corporate finance, we especially mean the way the assets of a firm are financed, either through equity or through debt liabilities.<sup>2</sup> Rothbard (1962) studies, from the point of view

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<sup>2</sup> With such a definition, contributions such as Cwik (2008) on corporate finance are of little use for our purpose. Cwik focuses mainly on additional investments following an interest rate cut.

of the investor, the difference between investing in stock and lending money to a firm in the evenly rotating economy (ERE). He shows that there is essentially no difference, from an economic point of view, between a shareholder and a creditor. Nonetheless, the implications for the firm of those two means of financing are not discussed, neither in the ERE nor in a context of uncertainty with genuine entrepreneurs.

Turning to balance sheet changes in the course of the business cycle, Mises (1912) and Rothbard (1962) only show that, when money is created *ex nihilo*, firms are induced to take on more debt to finance new assets, which suggests an increase of firms' leverage during booms. No further description of changes in the financing structure of firms is provided.

In his writings on the stock market, Machlup (1940) approaches our subject-matter when he examines the view according to which fixed capital should be financed with long-term credit and working capital with short-term credit. Explaining that the distinction between fixed capital and working capital is blurry rather than clear-cut,<sup>3</sup> Machlup shows that short-term credit is likely to finance at least partly what has to be seen as fixed capital from the point of view of the productive system as a whole. It is therefore likely to induce what we would nowadays call maturity mismatches<sup>4</sup>:

From the point of view of the economic system as a whole, short-term credits can rarely be regarded as short-term investments. The division of functions in the productive process may cause what is from a collective point of view a long-term investment to take on the appearance of a short-term investment from the private point of view, (p. 249).

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<sup>3</sup> Machlup advances three main reasons for this. First, the distinction may only be relevant at a given stage of production. Indeed, what is working capital at one stage may be transformed into fixed capital at a later stage. Secondly, working capital in remote producer's goods industries cannot be easily liquidated. It has to go through a time-consuming production process to be *in fine* liquidated as a consumer good. In this sense, an investment in working capital at some stages of production should be looked at in a long-term perspective. Thirdly, investment in working capital in consumers' goods industries are not isolated investments, so are likely to be linked with the processing of goods in earlier stages.

<sup>4</sup> Machlup does not use the term.

We shall refer to Machlup's argumentation in a later section of the present paper. It will provide us with an indispensable building block of our reasoning.

Going back to the traditional expositions of the Austrian business cycle theory (among which the aforementioned contributions by Mises and Rothbard), the relative scarcity of contributions on corporate finance may be explained by the tendency to consider savings to be homogeneous, therefore the market for loanable funds and the interest rate<sup>5</sup> to be unique. If one sticks to this view, then debt liabilities held by firms tend to be regarded, at least implicitly, as homogeneous. The only relevant parameters as far as the financing structure is concerned might then be the leverage (ratio of assets over equity) or the debt-over-equity ratio. Nevertheless, the picture changes as soon as one considers heterogeneous savings. It is then possible to consider several markets for loanable funds - depending on the maturity - and therefore heterogeneous debt liabilities in firms' balance sheets. Consequently, the most relevant contributions for our purpose are those developing the concept of a term-structure of savings, then exploring the yield curve instead of a supposedly unique interest rate (notably Bagus and Howden, 2010). In the following, this will allow us to study the mix of short-term and long-term debt in firms' balance sheets. According to this view, savings are not homogeneous - they differ with respect to their duration. Coordination between suppliers and demanders on the market for loanable funds then occurs not through one interest rate only, but through an upward-sloping yield curve:

Just as unhindered natural rate of interest allows for coordination between investment and consumption activities, unhindered interest rates for distinct durations allow for coordination between investment durations and the corresponding availability of savings. The structure of savings tends to match the structure of investments. (Bagus and Howden, 2010, p. 74).

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<sup>5</sup> In the article, what we simply call *interest rate* for convenience refers not to the pure interest rate (as understood, for instance, by Mises, 1949) but to the market interest rate, that is the rate at which monetary resources may be borrowed on the market for loanable funds.

In the remainder of this article, we explore the consequences of changes in the yield curve on firms' financing structure, both on an unhampered market and with *ex nihilo* money creation.

### III TWO CORPORATE FINANCE TRADE-OFFS

To finance their assets, firms use two broad types of products, namely equity and debt (bonds or bank credit). Equity typically has no maturity. It is not supposed to be fully reimbursed at some *ex ante* given point in the future, but allows its holders to receive regular - usually yearly - payments, i.e. dividends. Debt titles, on the contrary, have an *ex ante* given maturity at which they are supposed to be fully reimbursed if no default occurred in the meantime. So structurally, debt is a shorter-term financing means as compared to equity, whatever its maturity.

As a combination of both equity and debt titles, the right-hand side of a balance sheet (usually labeled «Liabilities and Owner's Equity») has a time structure.<sup>6</sup> It contains a certain percentage of maturity-dependent liabilities (i.e. debt titles), the remaining part being permanent titles (i.e. equity). Among the maturity-dependent titles, some of them are short-term debt liabilities, others long-term debt liabilities.<sup>7</sup> While choosing how to fund assets (among which are investments), a firm faces at least two trade-offs.

— *A debt/equity trade-off.* Equity financing is safer, as it does not increase the leverage of a firm, but it can be costlier in two respects. First, it gives permanent claims on future profits to

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<sup>6</sup> In this article, we adopt the following accounting equation: Assets = Liabilities + Owner's Equity. This accounting equation is the one commonly used in the United States. In some European countries, owner's equity is included in a broader «liabilities» category.

<sup>7</sup> In this article, «short-term» and «long-term» only exist as a verbal formalism, for the sake of simplicity. No conceptual difference makes short-term loans different from long-term loans. For our argumentation, the only fact that matters is that debt titles may have different maturities.

- new equity owners, whereas lenders are entitled only to the agreed-upon principal of the debt title plus the interest rate. Moreover, equity financing dilutes the owners' ownership in the firm, whereas debt does not.<sup>8</sup>
- For debt liabilities, a *long-term/short-term maturity trade-off*. An entrepreneur chooses between short-term maturities expected to be rolled-over and longer maturities. To finance a given project, expected to be profitable at some given point in the future, long-term debt is typically more expensive but less uncertain (as the interest rate to be served is fixed over a longer time horizon), whereas short-term debt is typically less expensive but more uncertain.

The nature of these trade-offs implies a true entrepreneurial choice in a context of uncertainty, as defined by Knight (1921). By contrast to risk, uncertainty cannot be captured by a probability distribution, be it derived from statistical observation or abstract thinking. Business decisions are uncertain decisions which, according to Knight,

deal with situations which are far too unique, generally speaking, for any sort of statistical tabulation to have any value for guidance. The conception of an objectively measurable probability or chance is simply inapplicable.

The choice of a financing structure, including its proper time dimension, is one of those uncertain business decisions. It can be dealt with neither by pure probabilistic calculation nor logical reasoning, nor any ever-true principle; on the contrary, it requires a true entrepreneurial behavior.

When considering the debt/equity trade-off, the main uncertainty is related to future economic conditions. Indeed, the choice of a greater share of debt financing increases a firm's

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<sup>8</sup> Several other factors are to be considered for an entrepreneur facing such a choice: tax incentives favoring debt, legal requirements to create equities, etc. As we reason *ceteris paribus*, we do not consider them in this article. Our focus is only on the uncertainty attached to choices that have different costs.

leverage, and so makes it more sensitive to any degradation of the economic circumstances. Choosing a higher leverage may turn out to be profitable, leading to an increase of the profit per unit of capital invested (equity). It may also lead to serious losses or to bankruptcy if the value of assets turns out to be lower than previously expected.

With respect to the long-term/short-term maturity trade-off, the main uncertainty is future interest rates (i.e. future availability of real savings), which are not fully predictable *ex ante*. Looking at the yield curve when an investment is realized, short-term debt looks more profitable from an accounting point of view than long-term debt, if they are expected to be rolled-over at the same interest rate in the future. We call maturity mismatches the fact that assets expected to be profitable at some future date are financed by liabilities of shorter maturity. In the theoretical case where short-term loans could always be rolled-over at *ex ante* given conditions, maturity mismatching would always be profitable. But uncertainty regarding future interest rates makes this choice uncertain. Financing an asset with mismatched maturities can turn out to be profitable, if interest rates at maturity date have not increased over a certain level (or even decreased); it may as well turn out to be costlier than longer maturities, if the interest rate increase is sufficient enough.

Each of these trade-offs is fundamentally an uncertainty/profitability trade-off. *Ceteris paribus*, lower uncertainty is preferred. But in market conditions, bearing greater uncertainty may lead to greater profitability.

#### IV THE TIME DIMENSION OF THE FINANCING STRUCTURE ON AN UNHAMPERED MARKET: AN ENTREPRENEURIAL CHOICE

By nature, an entrepreneurial choice cannot be characterized *ex ante* as appropriate or not (with respect to the desired ends). *Ex post*, profits or losses appear, that reveal information on the appropriateness of the chosen means to achieve the considered



end (here, the durability and profitability of a firm). In our case, there are no *ex ante* ratios of debt over equity or of short-term debt over long-term debt one needs to stick to. Nevertheless, the choice of a financing structure is not a random decision. Information is elicited through at least two mechanisms.

First, there are to some extent learning processes. Even if there is no pure probability distribution to be derived from past cases, several «good practices» emerge on a free market. From historical experience, most entrepreneurs know that over a certain level of leverage, or a certain proportion of short-term debts, a firm becomes sensitive even to very slight changes in economic conditions. On the contrary, entrepreneurs know they can allow firms some indebtedness without exposing them to an excessive uncertainty.<sup>9</sup> This «knowledge» is not comparable to any *a priori* or scientific knowledge. It is more akin to common wisdoms or rules of thumb which emerged through a historical and evolutionary process of selection, of trials and errors. They are typical of an entrepreneurial market process, where profitable innovations spread through imitation.

Second, the price system plays a major role. Indeed, entrepreneurs are not alone when choosing the structure of their liabilities. They need bankers to grant them loans or investors to buy equity and bonds. Based on their knowledge of the above-described «good practices» and on their own assessment of competing firms, bankers and investors act so as to maximize the *ex ante* subjective profitability of their funds. Investors arbitrate between equity and bonds, banks between short-term and long-term loans. Even those who look for high monetary profitability do not have a systematic interest in investing in too highly leveraged firms, or in firms which bear too high mismatches in their balance sheets. The confrontation of borrowing firms with lenders or investors on the markets for credit and for capital gives rise to a price system for different types of equity

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<sup>9</sup> In the everyday language, one would speak of excessive «risk-taking». We do not use this word purposefully. We want to distinguish clearly uncertainty from risk. An expression such as «uncertainty-taking» does not sound apt. We could also speak of «uncertainty exposure» by contrast with «risk exposure».

and debt titles. Interest rates paid by more leveraged firms, or by firms with higher proportions of maturity mismatches, will typically be higher. Interest rates will also adjust to the expected availability of future funds at different dates.

On an unhampered market, some market levels of leverage and of maturity mismatches will appear, which may differ through time (due to changes in time preference, then in the availability of funds at some future dates) or through sectors (some sectors may be more sensitive to downturns). Of course, nothing prevents individual entrepreneurs to depart from those average market rates, but they will soon be sanctioned by losses if their combination of equity and debt turns out to be unsustainable, either because it is too uncertain, or because profitability remains too low. On the contrary, if some of them are steadily successful, they will encourage other entrepreneurs to adjust their own combination of equity and debt. The average levels of leverage and maturity mismatches on the market will change, to reflect changes in some economic conditions (time preference, supply of loanable funds, etc.). Market competition here works as a «discovery procedure» in the Hayekian sense (Hayek, 1968).

The two mechanisms described here (entrepreneurship and «good practices» learning, prices) do not guarantee a successful course of action, even if they tend to decrease the overall occurrence of errors as compared to a situation in which all choices would be purely random. As errors are sanctioned by losses or bankruptcies and reflected through prices, an unhampered market system prevents collective and prolonged mistakes. Namely, such a market system would not prevent individual firms (or bankers, or investors) from underestimating the uncertainty of future conditions, from introducing unsustainable leverage into their balance sheets or from relying too much on short-term credit. But there is no reason why there would be collective and prolonged errors. The interest rates at different maturities reflect both the expectations on the future availability of funds at these dates and the demand for loans bearing those maturities. There is no systematic incentive to over-estimate the future availability of funds on the credit market.

## V AN INCREASE IN SAVINGS

How does the maturity structure of firms' balance sheets change with the relative costs of equity and debt? For our purpose, we especially need to study the case of lower market interest rates resulting from increased savings. Several cases have to be distinguished. As he regards savings as being essentially homogeneous, Rothbard (1962) considers only one general case, namely that «an increase in saving resulting from a fall in time preference leads to a fall in the interest rate» (p. 995). As a result, debt as a whole should become relatively cheaper than equity, therefore inducing entrepreneurs to substitute one for the other.

Nevertheless, this is only a rough description of the consequences of a savings increase. A first case is not mentioned by Rothbard. If new savings are invested in equities, then no fall in the market interest rate will systematically ensue.<sup>10</sup> On the contrary, the cost of equity financing should decrease as a result of the greater availability of funds on the capital market. *Ceteris paribus*, entrepreneurs will have an incentive to resort to higher equity financing, therefore reducing the overall leverage.

Let's turn to the case where interest rates actually fall as a result of an increase in savings. If we consider the time-structure of savings, then Rothbard's claim has to be refined. Depending on the type of new savings,<sup>11</sup> several consequences may follow. As a first approximation, short-term savings will imply a fall of short-term interest rates, whereas long-term savings will imply a fall of long-term rates relative to short-term rates.<sup>12</sup>

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<sup>10</sup> There might still be a small decrease of the market interest rate due to arbitrage. If entrepreneurs resort to more equity financing, then the demand for credit might decrease, therefore exerting a downward pressure on market interest rates.

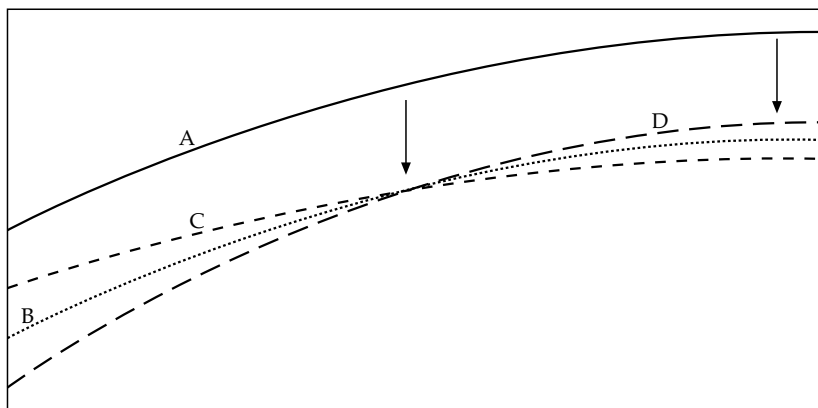
<sup>11</sup> A clarification has to be made on the «time-structure of savings». It exists mainly, or only, from the point of view of the borrowing firm. In fact, a saver buying long-term bonds does not necessarily provide long-term savings from his point of view, because such bonds can easily be liquidated before maturity on the secondary market. But for the borrowing firm, only the primary market matters : from its point of view, savings actually have a time-structure, as it matters a lot whether savers are willing to buy short-term or long-term bonds.

<sup>12</sup> This is an approximation. Phenomena such as maturity transformation by banks or arbitrage between maturities complicate the issue, but it is not our pur-

Such phenomena are represented on figure 1. Curve A represents the *ex ante* yield curve, before savings increase. B, C, and D represent the three possible outcomes of an increase in savings. B represents the case where the fall of interest rates is independent of maturities, i.e. when the additional savings are invested on the whole range of maturities. C represents the case where there are more long-term savings than short-term savings - the fall of long-term interest rates is more significant. Finally, D represents the case where short-term interest rates decline more than long-term rates because of increased short-term savings.

Depending on the changes of the yield curve, the incentives of entrepreneurs choosing the maturity structure of their liabilities will change. In case B, the relative cost of short-term debt over long-term debt does not change (by comparison with case A). In

FIGURE 1  
ADJUSTMENTS OF THE YIELD CURVE  
TO AN INCREASE IN SAVINGS



The horizontal axis represents maturities, expressed in time units (months, years). The vertical axis represents interest rates. In this and in other figures, yield curves are represented as continuous lines, or dashed lines, for the sake of simplicity. On actual markets, there only exists a set of discrete points for relevant maturities.

pose to enter such refinements in this article. Such areas remain open for future research.

cases C and D, long-term debt and short-term debt become respectively less costly as compared to one another. Through prices, entrepreneurship and imitation, we may expect firms' financing structure to adjust to changes in real economic variables. In the three cases, those adjustments, as well as fluctuations of the interest rates, reflect changes in real savings. By increasing the proportion of debt (and eventually, of short-term debts) in their balance sheets, firms do not systematically increase their exposure to uncertainty, as the increased indebtedness (or maturity mismatches) is backed by real savings.

## VI EX NIHILO MONEY CREATION

We now introduce monetary policy to analyze its effects on firms' balance sheets. Namely, we want to describe the consequences of *ex nihilo* money creation. As will appear later on, our primary focus is on money creation due to monetary policy (central banks manipulating interest rates).<sup>13</sup> Following Mises (1912), Rothbard (1962) explains that «the credit expansion reduces the market rate of interest» (p. 996). To a first approximation, this is a logical implication of a more abundant money supply.

Nevertheless, one has to be careful. Following Hülsmann (1998), one as to take expectations into account and to distinguish between cases where the consequences of money creation are foreseen from cases where they are not.<sup>14</sup> Indeed, for an entrepreneur, anticipating the consequences of inflation is not a problem distinct *per se* from other problems of anticipation. Thus,

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<sup>13</sup> Therefore, our focus is mainly on situations where central banks continuously create *ex nihilo* money titles (by contrast with one-shot money injections).

<sup>14</sup> More precisely, in order to consider human action *per se*, one has to adopt an *essentialist* rather than a *consequentialist* view of error in human action. A consequentialist view sees errors as the consequence of preceding events (for example, money creation or any legislation), whereas an essentialist view takes error as a given, without attempting to deduce it from preceding events. For further details, see Hülsmann (1998).

The mere fact that the quantity of money changes does not prevent the entrepreneurs from judging correctly what influence it will exercise on market prices. Therefore an increased quantity of money does not imply that too low of an interest rate be established. (Hülsmann, 1998, p.4)

In such a case, where money creation does not entail a fall in the interest rate, the incentives faced by an entrepreneur remain the same: if interest rates do not decrease, there is no systematic incentive to take on more debt. Nonetheless, as demonstrated by Hülsmann (1998), government meddling with money through a series of interventions (protection of fractional-reserve banking, central banks' monetary policy) leaves room for recurrent clusters of errors, namely business cycles. If *ex nihilo* money creation is not perceived, or inadequately perceived, by market participants, then :

Inflation makes future selling prices higher than they otherwise would have been. Then more investment projects are begun than can ultimately be completed, for the quantity of factors of production has not increased. (Hülsmann, 1998, p. 15)

Market interest rates will be lower than what would prevail if no additional money titles had been created or if the effects of money creation had been properly anticipated. In the remaining part of the article, we focus on this case, which is the canonical situation studied in the Austrian theory of the business cycle. For our purpose, it is also the more interesting case, as the relative cost of debt and equity, from the point of view of the entrepreneur, changes.

Other things being kept equal, the reduced interest rate makes debt financing for firms relatively less costly than equity financing. Because of the altered interest rates, entrepreneurs are induced to think that savings are more abundant than they actually are. In their balance sheets, firms are then induced to substitute debt for equity, therefore increasing their leverage. As debt becomes proportionally more abundant, the proportion of firms' liabilities (which bear a maturity) increases with respect to permanent

financing means<sup>15</sup> (i.e. equity). Such a fact can be interpreted as a first kind of «maturity mismatch», even so we depart from the traditional meaning of the word: assets which were previously financed through equity (which, we recall, bear no maturity) are now financed through maturity-bearing liabilities. Excessive leverage, in this perspective, can be understood as a form of maturity mismatch. By contrast with the case where low interest rates result from higher savings, the increased indebtedness of firms is not backed by any real future resources. Then the increased leverage due to money creation introduces a first kind of instability into firms' balance sheets.

But this is only one consequence of money creation. Here we need to refine the argument by going beyond Rothbard's argument (himself following Mises) on reduced interest rates. In fact, because he implicitly considers all savings to be homogeneous, Rothbard speaks of «the interest rate» as if there were only one such rate. In fact, it is worth looking not at «the interest rate» as if such a thing existed *per se*, but at the yield curve, i.e. at a series of interest rates at different future dates. Namely, there are several reasons why money creation does not affect all rates in a similar manner.

First, the main tool of monetary policy is intervention to set short-term interest rates, such as overnight rates. Typically, central banks borrow or lend money to commercial banks in theoretically unlimited quantities to ensure the targeted interbank market rate is sufficiently close to the target. To do so, they may create as much fiat money as necessary. Second, because the new fiat money offered to the banking sector is present money titles, it tends to give the illusion that more abundant savings are available in the very short-run (contrary to the case where a lower interest rate is due to increased savings, i.e. increased quantities of future goods). Money creation will then imply a fall of short-term interest rates, so a sharpening of the slope of the yield curve. This case is represented in figure 2.a.<sup>16</sup>

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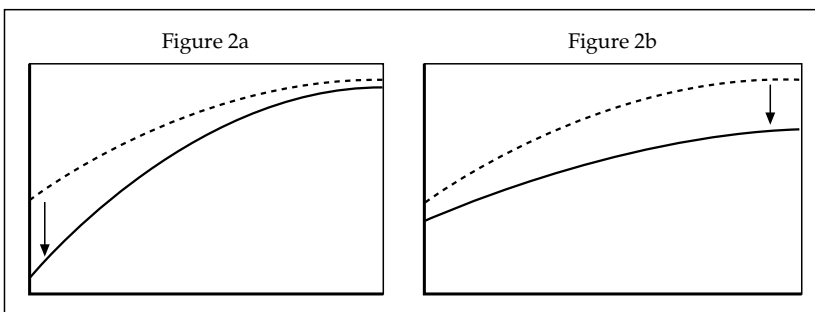
<sup>15</sup> By *financing means*, we simply mean the right-hand side of a balance sheet (debt and owners' equity). The financing structure then refers to the time dimension of those means.

<sup>16</sup> Even if monetary interventions on short-term rates have no direct impact on long-term interest rates, we represent on figure 2.a a small decrease of them, which is

At the other end of the yield curve, central banks can not directly cut long-term interest rates. Nonetheless, several so-called «non conventional» monetary policy interventions actually aim at lowering long-term interest rates (this occurs for example when central banks create fiat money to buy long-term debt titles - bonds - on the market), so that this case has to be mentioned. When such interventions are implemented, *ceteris paribus* the slope of the yield curve decreases, as displayed in figure 2.b.

We now focus more extensively on the most common case, that is monetary policy interventions aiming at lowering short-term interest rates (figure 2.a). Again, this is the canonical case studied in the Austrian literature on business cycles. Because of its heterogeneous effect on the yield curve, money creation makes short-term debt relatively less costly than long-term debt. Firms are then induced to substitute short-term debt for long-term debt. *Ceteris paribus*, the maturity of firms' debt will decrease as long as artificially low short-term interest rates are imposed by money creation. Such a phenomenon tends to introduce more maturity mismatches inside firms' balance sheet than what would prevail

FIGURES 2.A AND 2.B  
POSSIBLE ADJUSTMENTS OF THE YIELD CURVE  
BECAUSE OF MONEY CREATION



explainable by an arbitrage phenomenon. Namely, the increased demand for short-term loans may imply a slight decrease of the demand for loans of longer maturities. However, this effect is not obvious. For an extensive discussion on the issue, see Cwik (2004, 2005). Bernanke and Blinder (1992), for instance, contends that short-term interest rates move whereas long-term rates do not.



on an unhampered market. Contrary to the case where short-term debt becomes more attractive because of increased short-term savings, the greater availability of short-term resources is nothing but a mere illusion.

Nonetheless, a last step of the reasoning needs to be mentioned for the argumentation to be complete. For excessive maturity mismatches to actually exist as a result of money creation, one has to ensure that new short-term debt liabilities actually finance, at least partially, assets of longer maturity - which, for the sake of simplicity, we might call long-term investments. This is actually the case for two reasons. First, if entrepreneurs are induced to think that short-term savings are more abundant than they really are,<sup>17</sup> then they are also induced to think that maturity mismatching is less uncertain than it actually is. Even if all new investments are not financed through short-term debt, there will be a tendency for entrepreneurs to choose a higher level of maturity mismatches as compared to the situation which prevails on an unhampered market. The second reason has been exposed by Machlup (1940). Namely, there is no certainty that credits designed to finance short-term investments do not actually finance assets that have to be regarded as long-term investments. The reasons for this to occur have been mentioned in footnote 3, in our literature review. We do not reproduce them here.

As a first conclusion, we observe that money creation alters the overall time-structure of firms' balance sheets, reducing their maturities. Because it renders debt as a whole relatively more attractive than equity, money creation gives incentives for firms to increase the leverage of their balance sheets. Among debt liabilities, it makes short-term debt more appealing than long-term debt, which gives an incentive to substitute one for the other, therefore increasing maturity mismatches during booms.<sup>18</sup> Those two simultaneous phenomena are represented on figure 3.

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<sup>17</sup> This is the case as soon as market interest rates have actually decreased as a result of money creation. Indeed, a fall of interest rates in such a case means that money creation has not been adequately perceived or that its effects have not been properly anticipated.

<sup>18</sup> Inside the proposed framework, it is easy to foresee the consequences of monetary policy interventions aiming at lowering long-term interest rates. Other things kept

FIGURE 3  
BALANCE SHEET CHANGES FOLLOWING MONEY CREATION

*Balance sheet on an unhampered market*

Assets		Liabilities	
Assets	100	Short-term debt	25
		Long-term debt	25
		Equity	50

*Balance sheet after money creation*

Assets		Liabilities	
Assets	125	Short-term debt	50
		Long-term debt	25
		Equity	50

Figure 3 offers a simple example, graphical and numerical, of the balance sheet dynamics. First, it is noticeable that the balance sheet of the firm expands as a consequence of money creation (overall size of 125 *ex post*, as compared to 100 *ex ante*). This happens because new investments (i.e. assets) are financed as a consequence of money creation. New assets are exclusively financed by short-term debt (for an amount of 25). Straight-forward computations show that the leverage (expressed as the ratio of assets over equity) increases from 2 to 2.5. At the same time, the ratio of short-term debt over long-term debt increases from 1 to 2.

On an unhampered market, such adjustments in the structure of firms' liabilities were due to real changes in the economy (especially increased real savings) and to entrepreneurship. Errors were essentially individual errors, but there was no reason for collective and prolonged errors. This is no longer true here. If it is not properly identified, or if its consequences are inadequately anticipated, then money creation alters the yield curve that everybody faces. It gives investors and entrepreneurs the illusion that

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equal, they will induce higher leverage and lower maturity mismatches, because the proportion of long-term debts relative to short-term debt is likely to increase.

more abundant goods are available at some future dates. There is room for massive and collective corporate finance errors (so-called «clusters of errors»), which will be corrected during busts.

## VII BALANCE SHEET IMBALANCES AND THE BOOM/BUST CYCLE

Let us quickly insert those conclusions into the bigger framework of the trade cycle. The boom phase of a business cycle is characterized by malinvestments, as explained by Rothbard:

The distortion caused by credit expansion deceives businessmen into believing that more savings are available and causes them to malinvest - to invest in projects that will turn out to be unprofitable when consumers have a chance to reassert their true preferences, (p. 999).

From a balance sheet perspective, this refers to assets whose book value during the boom is higher than their future value. Our previous analysis has showed that the quality of the financing structure also deteriorates. Compared to the situation which prevails on an unhampered market, firms are then much more exposed to uncertainty (because of higher leverage and increased maturity mismatches).

The unsustainable leverage and maturity mismatches that appear with money creation have harmful consequences which - along with malinvestments - threaten the economic system as a whole. In fact, whereas lower interest rates would require higher savings to be sustainable, here they come along with lower savings - money creation gives incentives to over-consume. Then inevitably comes the bust. «The depression phase is actually the recovery phase», according to Rothbard (1962, p. 1000). Namely,

The depression is the next stage, during which malinvested businesses become bankrupt [...]. The liquidation of unsound businesses, the «idle capacity» of the malinvested plant, and the

«frictional» unemployment of original factors that must suddenly and *en masse* shift to lower stages of production - these are the chief hallmarks of the depression stage, (p. 1000).

The bust implies a reorganization of the assets of a firm - low quality assets are liquidated. A similar process takes place for liabilities. Namely, firms face increased difficulties to roll-over their debt, especially their short-term debt. Bad debts may be liquidated. Maturity mismatches and leverage are therefore reduced.

All other things being equal, the business cycle is also a balance sheet cycle. During the boom phase, when money is created *ex nihilo*, the ratio of equity over liabilities falls (leverage increases) and the ratio of short-term debt over the overall debt increases (maturity mismatches increase). The contrary takes place during the bust phase of the cycle. Then the leverage decreases (with the increasing ratio of equity over liabilities) and the maturity mismatches are corrected (with the increasing ratio of long-term debt over total debt). Balance sheet imbalances are therefore, at least partially, corrected.

## VII CONCLUSION

Studying firms' balance sheets allows for a proper Austrian theory of corporate finance. Instead of studying «interest rate» as such, it is worth looking at the yield curve and at changes of its shape depending on monetary interventionism. Namely, we showed that money creation induces firms to bear unsustainable leverage and maturity mismatches on their balance sheets, therefore favoring an overall decrease of the maturity of their financing structure. Such a process occurs during the boom phase. The bust then matches a necessary adjustment (de-leveraging and reduction of maturity mismatches through the liquidation of bad debts). Such phenomena are fully consistent with the standard Austrian business cycle theory, whose focus in the past was essentially the asset side of balance sheets.

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