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Financial innovation, optimal financing structure, an Austrian perspective

Jason Lermyte[1]

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Abstract

A substantial number of studies, reports, and policies—often advocated by financial regulators or think tanks—state that long-term investments in the equity market are underweighted compared to investments in the fixed income market, and that portfolio reallocation towards riskier assets would benefit both investors and firms. Can an optimal financial structure be determined ex-ante at the macroeconomic level? How could financial innovations and the engineering of structured products contribute to the welfare of the economy? While mainstream financial theories provide some (but incomplete) elements of answers, the Austrian school of economics has not yet developed a comprehensive financial theoretical framework to approach these types of questions. This article has three main objectives: firstly, it provides the basis for the development of an authentic Austrian financial theoretical framework, inherited from Austrian capital theory. Secondly, it uses this framework to analyse the economic benefits of financial innovations. Finally, it studies whether there is any theoretical justification and/or empirical evidence to implement public policies to channel saving from fixed income to equity. The approach followed in this article shares some conclusions with mainstream financial theories, but also some key differences. One of the originalities of this article from an Austrian perspective is to integrate an empirical test into the analysis, in the form of a cross-sectional study. This approach may allow mainstream and Austrian economists to mutually enrich and reconcile their theories and methods, in order to reach some consensus concerning different policies and recommendations.

Keywords Production structure · Financial structure · Modigliani miller theorem · Financial innovation · Efficient portfolio

JEL Classification D24 · D14 · D81 · G32 · O16

✉ Jason Lermyte
Jasonler2000@yahoo.fr; jlermyte@dauphine.psl.eu

[1] Universite Paris IX Dauphine, London, UK

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1 Introduction

A substantial number of studies and reports—often produced by financial regulators or think tanks—advocate public policies that incentivise investors to shift their investments from fixed income instruments to equity instruments.[1] In particular, it is commonly considered that long-term investment in the equity market is underweighted, and that reallocating portfolios towards riskier assets would benefit both investors and firms. This perspective is also implicit in various policies in certain countries where tax exemptions are offered on long-term equity investments.[2] To what extent could we consider that the price system of financial assets would not necessarily lead to an optimal financial structure,[3] thereby justifying public interventions to channel savings towards the equity market? Furthermore, to what extent could financial innovations such as the engineering of structured products[4] (involving hybrid financial solutions with combinations of equity and fixed income components) contribute to the overall welfare of the economy? While mainstream financial theory provides some element of answers to those questions, the Austrian school of economics has yet to develop a comprehensive financial theoretical framework. This is primarily because the financial market (often referred to as the 'loanable funds market') is frequently regarded as homogeneous in macroeconomic analysis, as emphasized by Garrison (2001):

> "Loanable funds is a commonly used generic terms to refer to both sides of the market that is brought into balance by movements of the interest rate broadly conceived. []. Equity shares are included on the grounds of their strong family resemblance, macroeconomically speaking, to debt instruments. The distinction between debt and equity which is vitally important in a theory of structure of finance, is largely dispensable in our treatment of structure of capital" (Garrison, 2001, p36)

[1] This is particularly the case in France. See the study produced by the AMF (French Market Authority) analysing French investors' cognitive bias on financial investment decisions (AMF, 2021) highlighting a lack of risk perception of retail investors, and advocating for further financial education to reallocate savings toward the equity market. Also see Didier, Ferrand, & Emmanuelle (2022) discussing the possibility of creating a fund (with capital guaranteed by the state) investing in equities of innovating firms.

[2] Some tax policies in France can be used as illustrations with the so-called PEA (Plan Epargne Action) where capital gains are exempted from taxation if they are bought through a wrapper (a PEA) and kept for a minimum of 5 years (Code monétaire et financier: Section 6: Plan d'épargne en actions (Articles L221-30 L221-32–7)).

[3] The allocation between equity and debt in mainstream financial literature is referred to as the capital structure (Modigliani & Miller, 1958). The term 'capital structure' in Austrian literature is different and refers to the capital-based macroeconomics theory (Garrison, 2001). To avoid any confusion, and to be consistent with Austrian nomenclature, we use the term 'financial structure' (and not 'capital structure') to define the allocation between different asset classes.

[4] A structured product can be defined as "a packaging standard or exotic options, equity swaps, or equity-linked debt into a single product in any combination to meet the risk/return objectives of the investor and may represent an alternative to the cash market even when cash instruments are available." (Fabozzi, 2002, p749).

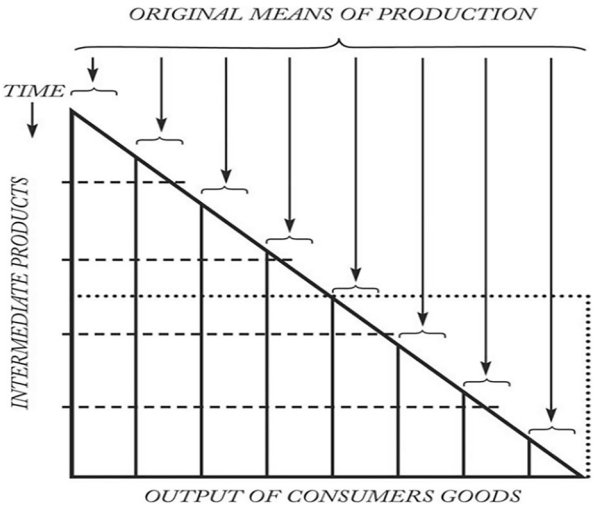

Fig. 1 Production Structure Represented by the Hayek Triangle.

The term "dispensable" is being challenged in this article. Considering the loanable funds market (or the financial market) as homogeneous hinders any attempt to: a) construct an Austrian financial theoretical framework capable of contributing to various financial debates, and b) drawing key macroeconomic conclusions.

This article is divided into three parts: the first part provides some foundations for the development of an authentic Austrian financial theoretical framework derived from Austrian capital theory. In the second part, this framework is used to analyse the economic benefits of financial innovations and financial engineering. Lastly, the article investigates whether any theoretical justification and/or empirical evidence exists to support the implementation of public policies aimed at redirecting savings from fixed income to equity (Fig. 1).

2 Elements for the foundation of an Austrian financial theoretical framework

The foundation of an Austrian financial theory relies on the concepts of production structure, pure rate of interest and an entrepreneurial component. In the Austrian tradition, goods can be differentiated based on their intended purpose. Some goods are aimed at directly satisfying the immediate desires, needs, and wants of individuals (these are referred to as 'consumption goods', or 'goods of the first order'). Conversely, other goods (known as 'production goods', 'goods of higher order', or 'capital goods') are designed to produce other goods (both consumption goods and lower-order production goods). This production structure conceptually outlines a supply chain where capital goods are ultimately transformed into consumption goods, which are then consumed by individuals. This transformation requires the utilization of two types of production factors:

labour and land.[5] The production structure concept is often visually represented using the triangle diagram by Hayek (2008, p228); or in a more detailed manner by Rothbard (2009, p369), using a numerical example which illustrates the concept of time and pure rate of interest:

In both cases, the illustrations neglect any source of uncertainty, changes of preferences, technologies etc., and operates in what Mises (2007, p244) calls an 'Evenly Rotating Economy' (ERE). In Rothbard's diagram, a consumer expenditure of 100 oz of gold[6] on a first-order good (represented at the bottom of the table) will result in 15 oz of remuneration for production factors (land and labour), and 80 oz of remuneration for the acquisition of production goods (which had to be purchased by entrepreneurs-capitalists prior to any consumption decisions) necessary to manufacture the consumption goods. These production goods themselves need to be produced by combining land and labour (16 oz in this case) and by acquiring higher-order production goods costing 60 oz. This process must be iterated throughout the supply chain at each step of the so-called production structure. It is noteworthy that the initial amount spent by the consumer (100 oz in this case) will ultimately be used to compensate the owners of the land and labour.

However, it can be observed that at each stage of the production structure, the amount spent in the previous order (100 oz in stage 5, for example) does not match the amount paid for the different factors of production (land, labour, and production goods = 80 + 15 = 95 oz in stage 5). In an ERE, this apparent discrepancy in the structure arises from a fundamental aspect of the production process: time. Indeed, consumers will only purchase goods once they are produced, and producing these goods requires both time and the use of production factors (land and labour). To operate efficiently, the production structure requires the availability of present goods in exchange for a demand for future goods. This is why savings provided by financial capital owners is a key component of economic growth, as it enables the introduction of more production stages, leading to greater efficiency and a more robust expansionary path.[7] The observed apparent discrepancy essentially reflects the remuneration provided to present goods suppliers in the form of future goods, and constitutes the Pure Rate of Interest (PRI). The level of this remuneration is determined by the degree of preference for the present: a higher preference for the present indicates a greater demand for present goods, resulting in a higher compensation for their suppliers (i.e., a higher PRI), which could potentially reduce the demand for capital goods. Conversely, a decrease in preference for the present (with a lower PRI) may initially lead to reduced demand for consumption goods expenditure.

[5] For a full description of those concepts, see in particular Rothbard (2009), Huerta de Soto (2008). These works rely on Menger, Böhm-Bawerk, and Hayek (2008).

[6] An ounce is a unit of weight in the US customary system and imperial system of measurement that equals one-sixteenth of a pound of gold.

[7] For a full description of the mechanism by which a change in intertemporal preferences may lead to sustainable growth, please refer to Garrison (2001, p61). We will later argue that this change of intertemporal preferences may come from financial innovations and financial engineering to originate financial products which fit more accurately with the preferences of suppliers of loanable funds.

However, this could release resources for firms to acquire more capital goods. In the long term, this could lead to a more robust expansionary path for the economy.

However, this approach omits another crucial component of financial theory: uncertainty. Indeed, the ERE framework described above, excluding as it does changes in preferences, resources, technologies, etc., serves more as a methodological tool to isolate the impact of uncertainty on entrepreneurial decisions than as a description of a realistic version of the world. The production of goods, whether capital or consumption goods, is subject to the market's response from consumers, whose preferences are susceptible to change.

Therefore, when financial capital owners supply present goods to corporations to facilitate the production of consumption goods through the purchase of capital goods, there is no certainty regarding the market's reaction vis a vis customers, or the corporation's ability to make this new business opportunity a success. Consequently, the expected profit generated by an entrepreneurial decision not only compensates capital owners for the time supplied, but also to some extent for the level of uncertainty embedded in the project. In mainstream financial theories, Knight's (1921) differentiation between risk and uncertainty is not fully embraced. According to Knight, "risk" is characterized as probabilistic (a finite number of hypotheses about the world associated with a certain level of objective or subjective probabilities), whereas "uncertainty" is non-probabilistic and open-ended (without a finite number of hypotheses, rendering the use of probability inadequate for measuring uncertainty levels).[8] As described by Knight, while a game of chance relate to the first concept, business and entrepreneurship relates to the second.[9] The entrepreneur's key role is to act under uncertainty to pursue new business ideas using their (non-probabilistic) judgement to determine future scenarios. This difference between risk and uncertainty is also described in Mises (2007, p107) with the distinction between "class probability" (risk) and "case probability" (uncertainty). In the Austrian school of economics, the driving force of the market is the capitalist-entrepreneur,[10] who in a context of a dispersed knowledge (Hayek F. A., 1948, p77) uses their judgement to reduce (if the entrepreneur is correct about its future market condition anticipation) the level of ignorance inherent to the real world (Foss & Klein, 2012). However, each entrepreneurial decision does not bear the same level

[8] For a detailed analysis of the impact of Knight theory on institution, see Special Issue on the Centenary of Frank H. Knight's Risk, Uncertainty, and Profit, 2021.

[9] Most of the mainstream financial/economics theories since Arrow (1964), Markowitz (1952) consider financial instruments to be "risky" in a sense that the fluctuation of the financial assets' prices are subject to a finite number of states of nature associated with probabilities. The Austrian approach fully embraces the Knight idea that the fluctuation of asset price is the consequence of "uncertainty" inherent to any business activity, and therefore the use of probability is inadequate to build a robust financial theory. Some (Riedel, 2015) attempt to incorporate the Knightian critique of what will become modern financial theory, by modelling ambiguity through a set of probabilities (rather than just one) but it seems to us that these approaches do not meet the criteria of realism require to study human action.

[10] As noted by Mises (2007), the entrepreneur must simultaneously be a capitalist contributing to the financing of the entrepreneurial activity: "A capitalist is always also virtually an entrepreneur and speculator. He always runs the chance of losing his funds. There is no such thing as a perfectly safe investment." (Mises, 2007, p254).

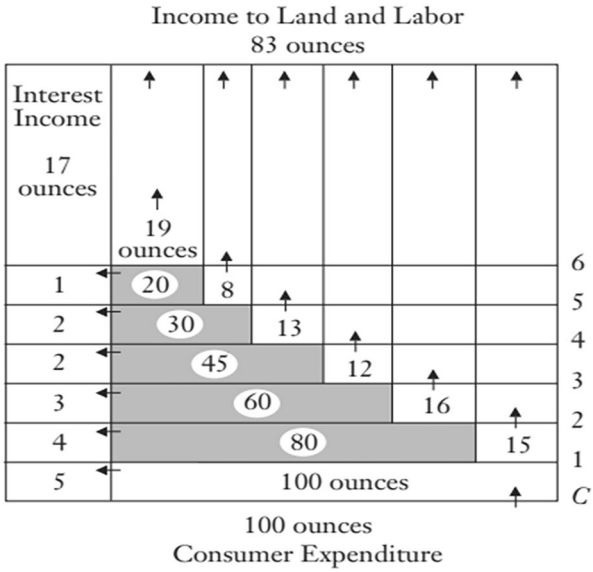

Fig. 2 Production Structure Represented by Rothbard.

of uncertainty and therefore the capitalist-entrepreneur will require a certain level of expected gain—determined ex-ante—to accept the uncertainty embedded in the project.[11] This ex-ante expected gain is referred to as the Entrepreneurial Component (EC) in the Austrian literature (Rothbard, 2009, p550). The equivalent term used in conventional financial literature is "risk premium"; however, it is preferable to avoid this term as the Knightian concept of "risk" implies a probabilistic determination which is far from self-evident. The Market Interest Rate (MIR) is thus the combination of the Pure Rate of Interest (PRI) and the Entrepreneurial Component (EC) (MIR = EC + PRI). At the final production stage depicted in the Fig. 2, the observed MIR is 5 (100 – 15 – 80 = 5). This MIR mainly depends on the degree of preference for the present and the degree of aversion toward uncertainty. It is worth mentioning that while ex-ante the EC is likely to be positive, ex-post it depends on the revealed preference of consumers and the success of the business undertaken. Consequently, either significant losses leading to bankruptcy or substantial gains could materialize ex-post. However, ex-ante, a preference for safety (or for a low degree of uncertainty) may imply a positive EC.[12]

The original contribution of this section is to demonstrate that the loanable fund market is not homogeneous, and various asset classes traded on different financial markets can be used to distribute uncertainty among diverse capitalists-entrepreneurs with varying degrees of tolerance for uncertainty. Consider the options

[11] Ex-post, the remuneration (or loss) will depend on the success of the entrepreneurial activity.

[12] This statement could be further discussed and is far from being self-evident. However, based on empirical evidence, we generally observe higher "corporate risk premium" for companies embedding a higher level of uncertainty (which could be measured—sometimes imperfectly—by credit ratings, for example).

available for a firm to finance its purchase of capital goods and other factors of production through two distinct categories of financial instruments: bonds/credit (involving the issuance of debt securities through the capital market or obtaining credit from a banking institution) and shares/stocks (comprising the issuance of equity instruments by a firm, which may or may not be listed in the capital market).[13] The primary distinction between the two types of instruments lies in the fact that a debt instrument generates a fixed stream of income, with a predetermined repurchase date commonly established at maturity. Conversely, an equity instrument provides entitlements such as dividend payments (limited to the firm's generated profit level), voting rights, and a residual claim in the event of liquidation. The decision for a corporation to issue a combination of debt and equity instruments enables the firm to efficiently share the uncertainty between different capitalists-entrepreneurs with varying levels of uncertainty tolerance: those strongly averse to uncertainty would rather invest in debt securities due to the contractually predetermined income, whereas those with lower aversion might opt for equity securities, offering potentially higher returns along with more uncertainty. While the traditional Austrian framework defines an overall Market Rate of Interest (MRI), it does not completely differentiate the remuneration of various financial instruments issued by corporations (in our example, equity and debt instruments).

To integrate this additional layer of complexity, a more comprehensive description of the production structure can be illustrated as shown in Fig. 3 below, which distinguishes the different remuneration provided to the capitalists-entrepreneurs based on the type of financial instruments (debt versus equity investments) invested.

Using the numerical example above, in stage 4, we observe an expenditure of 100 oz on consumption goods, covering the purchase of capital goods (previously financed by present goods suppliers), the remuneration of production factors (land and labour) amounting to 10 oz, and a residual amount (the MIR) of 10 oz (or 10/90 in percentage terms). The MIR would then be divided between a remuneration owed to debt holders (in green) of 5 oz and a residual income allocated to equity holders (in pink) of 5 oz.[14] This diagram also highlights how the MRI of debt and equity instruments is split between the PRI (non-hashed area) and the EC (hashed area), with a higher EC associated with equity holders. In this example, the MRI of debt and equity instruments remains consistent throughout the production structure, though this need not always be case. It could be interesting to analyse in another study how the allocation between debt and equity, as well as the distribution

[13] It is interesting to note that in a society based on private ownership of means of production, it is conceivable for a business to finance its investment only by equity. However, it would be more difficult to imagine the case where a business would be financed only by debt. In case of a business failure or a success, the loss or gain would have to be socialised and the community would therefore, de facto, act as equity holder. Equity is therefore the "natural way" to finance a business; and the introduction of debt constitutes a first step toward financial engineering, aiming at reallocating the level of uncertainty across different asset classes.

[14] It is to be noted that since the example show an equal distribution of the MIR between equity and debt and since the level of EC is higher for equity due to a higher level of uncertainty, it implies that in this illustration, the equity-to-debt ratio is below 100% leading to the same nominal remuneration but to a different rate of return.

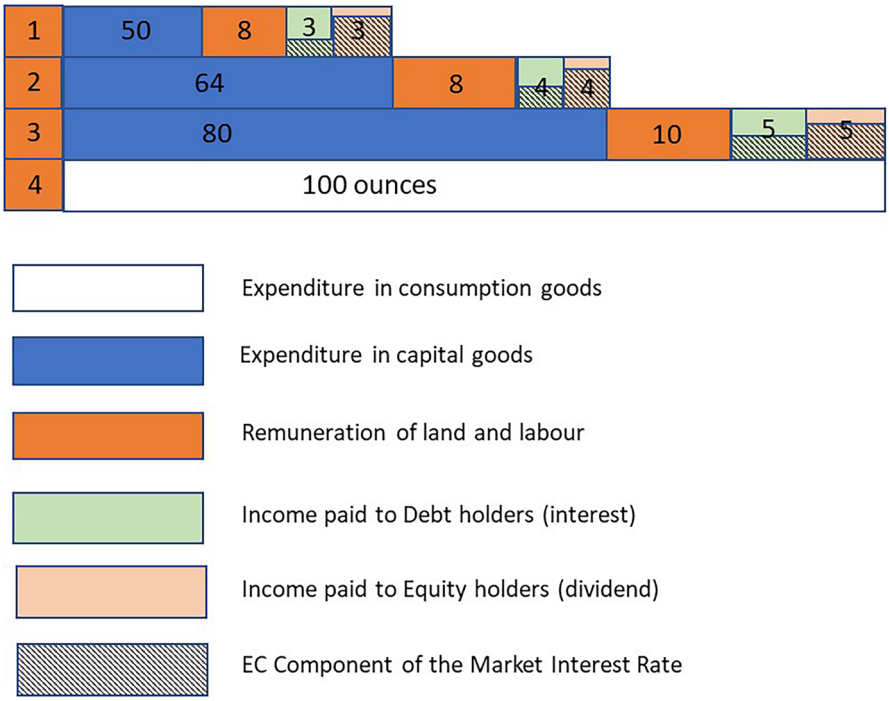

Fig. 3 Production Structure and Financing Structure of the Economy.

between EC and PRI, evolves across different production stages and through different public policies (fiscal and/or monetary), and credit expansion or contraction phases. This diagram also illustrates that the MRI is relatively uniform across distinct production stages. Although there is no inherent reason for the PRI to differ, further investigations should assess whether the same applies to the EC. Using this theoretical framework, we will now evaluate the impact of financial innovations and more complex structures and their economic impact.

3 The benefits of financial innovation

In the neoclassical literature, financial innovation is defined as the outcome of a cost / benefit analysis where new processes or techniques are identified, aiming at increasing revenues or reducing costs.[15] The primary explanatory factors of financial innovation include determinants such as technological changes, inflation (Pouncy, 1998), risk transfer (Van Horne, 1985), cost reduction of financing (Silber, 1975), and shifts in the regulatory environment (Finnerty, 1988) accompanied by the well-documented phenomenon of regulatory arbitrage (Fleischer, 2010; Partnoy, 1997).

[15] See Flood (1992) or Pouncy (1998).

While valuing each of these elements, our attention will primarily focus on those emphasized by Van Horne and Silber (risk transfer and cost reduction of financing), which are, to some extent, interconnected.

As explained in a note in the preceding section, it's conceivable for a business to fund its investments solely by equity. Nevertheless, the scenario where a business is solely financed by debt is less plausible. Consequently, equity constitutes the "natural asset class" for business financing, with the introduction of debt already constituting a first stage of financial engineering aiming at redistributing uncertainty across diverse investors with different preferences.

The main benefit of financial innovation relies on its ability to offer capitalist-entrepreneurs financial instruments more closely aligned with their individual tolerance for uncertainty and time preferences. Relying solely on a single generic instrument (such as, by default, an equity instrument) could discourage certain investors. Introducing a debt instrument would thus attract savings from capitalist-entrepreneurs with high and low levels of tolerance towards uncertainty, and with high or low appetites to capture any EC to boost and leverage the return of their investment. It would still allow others to diversify their portfolios through an allocation of debt and equity, to achieve any desired uncertainty level. Financial innovation, by offering diverse asset classes with varying degrees of uncertainty, incentivizes capitalist-entrepreneurs to save, consequently initiating a saving-induced expansion, as described, for instance, by Garrison (2001).

In a complex economy, financial innovation aims to achieve even more granularity in distributing uncertainty among distinct investors with varying risk profiles and time preferences. The case of subordinated debt (or junior debt) provides another example, illustrating how hybrid products can also attract even more loanable funds into an economy. Subordinated debt denotes debt owed to an unsecured creditor, which, in a liquidation scenario, can be repaid only after the claims of secured creditors (non-subordinated or senior debt) are satisfied. This potentially corresponds to the uncertainty preferences of some investors with intermediate profiles, falling between secured debt and common equity. The impact of all financial innovations (such as mezzanine debt, perpetual bonds, convertible bonds, pooled securities through vehicles like CDOs, ABSs, preferred stocks, etc.) will not be analysed but it can be acknowledged that they contribute to fit any financial investment solutions with the various tolerances toward uncertainty.[16] Consequently, financial innovation incentivizes the accumulation of savings (at the cost of reduced consumption expenditure), ultimately reducing the PRI and increasing the demand for capital goods. This, in turn, adds a new stage of production generating an induced-saving expansion mechanism.

The same mechanism applies not only to the evolution of financial securities but also to the development of financial contracts such as financial derivatives. Consider two examples:

[16] This idea is not new in the mainstream financial and economics literature. According to Arrow (1964), financial innovations contribute to market completeness and therefore to the welfare of the economy.

Case 1: Currency Forward Agreement. An investor with a specific tolerance towards uncertainty might consider investing in an equity or bond instrument issued in a different currency. While the level of uncertainty and expected return of this instrument fit the preference of the potential investor, the existence of a currency risk may discourage this investor from proceeding with the investment. This investor could mitigate this source of uncertainty and potentially proceed with the investment by using a currency forward.

Case 2: Structured Product with Capital Protection and Partial Upside Participation. These types of savings products distributed to retail investors aim to offer capital protection at a future date and a level of performance equivalent to a fraction (referred to as 'participation') of the return of an equity instrument (called "underlying"), provided the performance is positive. These products are structured by financial engineers at investment banks using a combination of secured debt instruments (providing protection) and derivatives (via a call option or an equity-linked swap embedding the call option). This swap exchanges the bond's return with the equity instrument's return, but only if the latter is positive. These saving products incentivize investors to save more thanks to the engineering of a tailor-made degree of uncertainty. Consistent with the Austrian approach, financial innovation thereby alters the production structure by reducing expenditure on consumption goods and reallocating resources toward the production of capital goods, as depicted in Fig. 4.

In this example, new financial innovations would encourage individuals to increase their savings, consequently reducing their expenditure on consumption goods (from 100 to 90 oz in this instance). It is noteworthy that this could temporarily have a negative impact on the returns of equity holders of corporations producing consumption goods (stage 4), which in this case decreases from 5 to 0. However, the impact on the return of debt instruments with predetermined contractual income streams would be less pronounced. While the economy might experience a decrease in consumption, the additional savings would enable firms to acquire more capital goods due to an excess of loanable funds. This would lead to a more vertical production structure, introducing new stages of production (stage 1) and a more capital-intensive former stage 2 (now stage 1). In the long term, this structural shift would enhance the economy's capacity to manufacture more consumption goods. Figure 4 exclusively illustrates a financial structure comprised of debt and equity. Nonetheless, as discussed earlier, financial innovation provides more sophisticated methods to allocate the burden of uncertainty among individuals, aligning with diverse preferences toward uncertainty. Consequently, a more realistic depiction of the capital structure might integrate additional instruments (subordinated debt, preferred stocks etc.).

The question that we will now answer is whether an optimal financial structure (from the standpoint of financial instrument issuers) or an optimal (or efficient) asset portfolio (from the perspective of financial instrument investors) can be determined.

4 Optimal financial structure and welfare economics

The debate on the financial structure of firms was initiated by the well-known article by Modigliani and Miller (1958). The main conclusion of the article is that the financial structure of a firm does not affect its value. A higher debt ratio

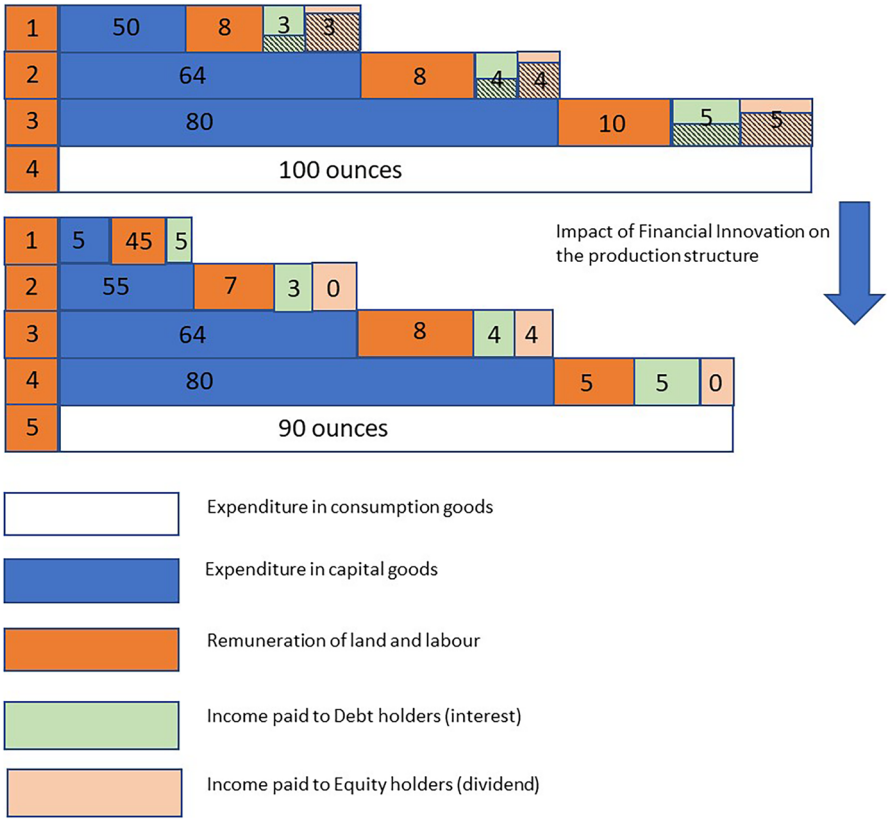

Fig. 4 Impact of Financial Innovation on the Capital Structure.

(which usually costs less than equity) is associated with a higher leverage effect, resulting in a higher uncertainty and a higher cost of equity. Modigliani and Miller demonstrate that the Weighted Average Cost of Capital (WACC) is not impacted by the financing structure of the firm in the absence of transaction costs. Since a firm's value is determined by aggregating the discounted value of future cash flows using the WACC, the financing structure does not determine its value. Modigliani and Miller (1958) also revisit this conclusion when transaction costs, such as differential tax treatments (tax shield) between equity and bonds, come into play. This article has led to further studies with the integration of transaction costs, such as the principal-agent problem, the existence of asymmetric information, credit rationing, and bankruptcy costs. While these elements may be determinant at the firm level, they seem unlikely to be pertinent at the macroeconomic level.

Can Modigliani and Miller's conclusion be extrapolated to the macroeconomic level? In other words, by aggregating the financing structures of corporations (and potentially the state, though this would significantly complicate matters), could an

ex-ante optimal macroeconomic financing structure be defined? In its simplest form, this would involve an allocation between debt and equity, and in a more complex version, other financial instruments. Would this structure be unachievable through the price system, justifying public policies to correct this type of market inefficiency?

The neoclassical approach of financial theory initiated by the articles of Markowitz (1952) and Modigliani and Miller (1958) can already provide some elements of answers. Firstly, it should be noted that at the macroeconomic level, the questions raised by these two articles converge. One focuses on the issuers of financial instruments (the firm's liability), and the other on the investors of those financial instruments (the investors' assets), which should logically—once aggregated—fully match. While Modigliani and Miller argue that the financing structure is irrelevant in determining the value of the firm in perfect competition and in absence of transaction costs, Markowitz, from a portfolio management angle, shows that a set of dominant portfolios exist (efficient portfolios illustrated graphically by an "efficient frontier" in a mean–variance diagram); at least from the perspective of a risk-averse investor. Among these dominant portfolios, one with a certain risk-return profile will maximize the utility of the investor. The utility function used is a wealth function positively correlated with the average expected return of the portfolio and negatively correlated with its risk (measured by variance). In this context, financial innovation by providing access to new instruments with different risk profiles would contribute to portfolio diversification, risk reduction (for a given expected return), and utility optimization. Given a certain universe of financial instruments, a socially optimal financing structure is therefore the one maximizing the utility function of investors. In other words, the optimal financial structure at the macroeconomic level is mainly determined by the preferences of investors. There is no theoretical evidence to show that one allocation would be more efficient than the one determined by investors themselves maximising their own utility.

Using the Austrian framework described above, a similar conclusion can be reached: The MRI of both debt and equity instruments fully reflects individuals' preferences toward time (PRI) and uncertainty (EC). Any public policies such as taxes and subsidies aimed at incentivizing investors to switch their investments from debt to equity will not increase the global quantity of loanable funds and may not impact the overall MRI (even if the MRI of each instrument could be impacted). The reduction of private debt in the economy would potentially decrease the leverage effect, but this would be compensated by more investment in equity, which carries a higher level of uncertainty. The allocation between debt and equity is more a way to share the burden of uncertainty than to alter this uncertainty. As long as the global MRI remains unchanged, the production structure is not impacted, apart from the distribution between debt and equity instruments. What drives the economy in our approach is the nature of the project (more or less uncertain) and the existence (or not) of financial innovations (which may encourage the accumulation of more savings), but not the way it is financed, which depends solely on the preferences of capitalists-entrepreneurs. The impact of such a policy could be illustrated by Fig. 5 below.

Looking at stage 3, the tax policy would impact the MRI of both equity and debt instruments (6 and 4 oz, respectively, rather than 5 oz each), but will not change the global MRI (10 oz). As a consequence, the structure of production remains

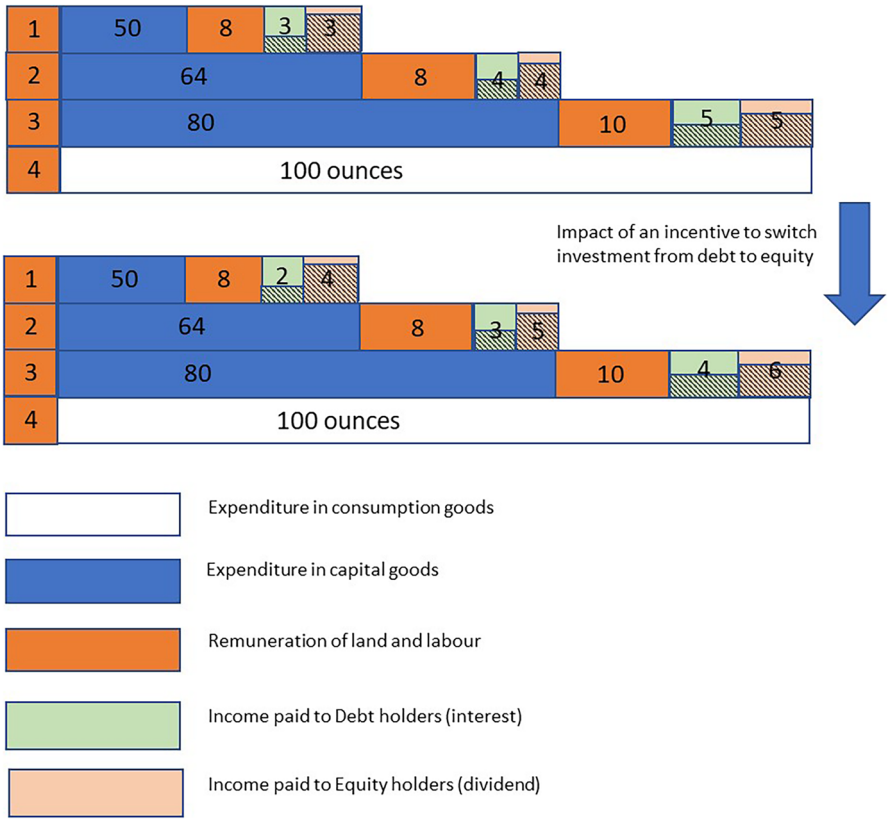

Fig. 5 Impact of a Policy to Incentivise Investors to Invests in the Equity Market.

unchanged, and the economic efficiency of the country would not be affected. The tax policy could potentially impact this structure of production but it has to be demonstrated that it will affect the time preference and uncertainty tolerance of economic agents—which is not self-evident.

Therefore, the only conceivable justification for such a policy could be an empirical observation (not necessarily grounded in robust theory) showing that countries with a relatively higher equity-to-debt ratio tend to outperform others economically. An empirical test using a cross sectional analysis[17] is proposed. The proposition tested is as follow: the financing structure (equity vs debt) positively impacts the level of GDP per capita of a country.

The proposition will be tested using the following relationship:

$$\mathrm{GDP} = \alpha + \beta \mathrm{F} + \varepsilon$$

[17] Most of the empirical studies use time series analysis and apart from Carmack et al. (2015), cross sectional analysis is not extensively used. The problem with time series is the inability to determine the appropriate lag between the independent and dependant variables. An hypothetical shift of the financial

With:

GDP: GDP per capita, PPP (current international $)—World Bank databank—Data Source World Development Indicators. The average over the last 5 years (from 2016 to 2020) is used for the 32[18] countries listed in Appendix 1.

F: The ratio of equity to debt with F = MC / PD.

MC: Market capitalization of listed domestic companies (% of GDP)—Data Source World Development Indicators. The average over the last 5 years (from 2016 to 2020) is used for the 32 countries listed in Appendix 1.

PD: The level of Private Debt with PD = B + C.

B: Total debt securities outstanding by countries, amounts outstanding in billions of US dollars of financial and nonfinancial corporations (% of GDP). The average over the last 5 years (from 2016 to 2020) is used for the 32 countries listed in Appendix 1. Source: BIS: http://stats.bis.org:8089/statx/srs/table/c1?p=20204&c=&f=xlsx

C: Domestic credit to private sector by banks (% of GDP). World Bank databank—Data Source World Development Indicators. The average over the last 5 years (from 2016 to 2020) is used for the 32 countries listed in Appendix 1.

Here are the results obtained using the ordinary least square method:

	Coefficients	*Standard Error*	*t Stat*	*P-value*
α	50,985.03	8036.257	6.344375	5.35E-07
β	-18,745.4	14,744.53	-1.27134	0.213375

Firstly, a negative coefficient for β is observed, implying that an economy with relatively more equity than private debt does not lead to a higher GDP per capita. In fact, quite the opposite is true. Additionally, we note that the relationship is not statistically significant, with a *p*-value of 0.21. Therefore, we cannot conclude that a more capitalized economy, relative to the amount of outstanding debt, demonstrates higher economic development.

To further validate the results, we conduct an additional regression analysis using three control variables: trade openness, property rights score, and the total ratio of loanable funds to GDP. The first control variable indicates a country's degree of openness to international trade, serving as a proxy for determining the level of specialization. The second control variable offers a qualitative assessment of the extent to which a country's legal framework allows individuals to accumulate private

Footnote 17 (continued)

structure toward equity for example may have a very long term impact on the level of economic development. The second issue is that time series analysis requires the use of historical data. While historical data on domestic credit is easy to obtain, the outstanding amount of bonds is more of a challenge as bonds are mainly traded OTC. Time series analysis developed in some articles avoid this problem by neglecting the bond market and only focusing on the credit market where data is more accessible. For these reasons we decided to opt for a cross sectional analysis which does not require a long track record.

[18] The list of countries selected mainly depends on data availability. The most difficult information to obtain is the outstanding amount of bonds, as a large majority of those instruments are traded OTC. Alternative databases like Cbonds could be used to obtain more precise data.

property freely. This framework is secured by clear laws that are effectively enforced by the government. The property rights score measures how well a country's laws protect private property rights and the degree to which those laws are upheld. It also evaluates the risk of state expropriation of private property, analyzes judicial independence, the presence of corruption within the judiciary, and the ability of individuals and businesses to enforce contracts. Given that property rights are a recognized prerequisite for economic growth, this control variable has been included. The third control variable is the ratio between (1) the total amount of equity and private debt (through credit and debt securities) and (2) the GDP. The regression under consideration can be formulated as follows:

$$\mathrm{GDP} = \alpha + \beta_1 \mathrm{F} + \gamma_1 \mathrm{TO} + \delta_1 \mathrm{PR} + \theta_1 \mathrm{LF} + \varepsilon$$

With:

GDP and F defined above.

TO: Trade (% of GDP)—World Bank databank—Data Source World Development Indicators. The average over the last 5 years (from 2016 to 2020). It measures the degree of globalisation of the country.

PR: Property rights score—World Bank databank—Data set: Heritage Index of Economic Freedom.

LF: Total Loanable funds (equity and debt) with LF = MC + PD with MC and PD define above.

	Coefficients	*Standard Error*	*t Stat*	*P-value*
A	-41,644.5	12,487.34	-3.33494	0.00249
γ_1	86.0233	27.72926	3.102257	0.004465
δ_1	925.4229	171.1179	5.408099	1.02E-05
β_1	-2959.49	6968.554	-0.42469	0.674426
θ_1	28.07859	9.019558	3.113078	0.004347

The results tend to confirm the initial conclusion: while most of the control variables show a statistically significant relationship with GDP per capita (p-value below 1%), the link between equity to debt ratio and GDP per capita is not significant. This cross-sectional analysis does not allow us to assert that countries with relatively higher equity holdings, compared to their levels of debt, generate a more productive and prosperous economy (the opposite cannot be asserted either). This finding is consistent with the macroeconomic theories of Modigliani and Miller, as well as the Austrian approach. According to these theories, the global PRI and the EC remain independent of the allocation between debt and equity. The structure of production is therefore not impacted, and the policy does not show any positive impact on the economy. However, financial innovation capable of designing distinct degrees of uncertainty might impact investors' preferences; and as studied in the previous section, may induce higher economic growth. Empirical evidence showing the relation between financial innovation and economic development could be of interest.

5 Conclusion

In this article, we introduced a new framework inspired by the capital-based theory of the Austrian school of economics, aiming to approach various financial debates. It considered the loanable fund market as non-homogeneous where different financial instruments are issued with varying degree of uncertainty. In this context, financial innovations, by providing investments more closely aligned with individual preferences, are not economically neutral. They create incentives for increased savings supply, influencing the production structure and reducing the MRI.

The article also explored the idea that long-term investments in the equity market are underweighted, and reallocating portfolios towards riskier assets could be beneficial for both investors and firms. Using the Austrian framework and consistent with neoclassical conclusions, we argued that the allocation between equity and debt reflects individuals' preferences for uncertainty and does not impact the global MRI. Consequently, the idea of an optimal financial structure that cannot be achieved through the price system in a decentralized manner is rejected at the macroeconomic level. Thus, tax policies aimed at shifting savings towards equity may not necessarily lead to a more robust, long-term expansionary path. As support for this analysis, a cross-sectional study tends to corroborate this perspective, revealing that countries more inclined towards equity rather than debt do not necessarily outperform other countries in terms of GDP per capita.

Beyond these conclusions and empirical findings—which remain fragile, incomplete, and perfectible—the article's ambition is to provide some foundations for the development of an authentic Austrian financial theory able to contribute to a wider range of financial debates. For example, it could lead to further analysis on how economic policies and credit expansion impact the EC, MRI, and PRI for different asset classes (such as equity vs. debt, and even potential real estate investment return). Additionally, it could be used to explore how the Austrian business cycle is altered or amplified by a country's financial structure; and how, in case of credit expansion, the issuance of new financial innovations may increase voluntary savings thereby reducing the magnitude of the boom-bust cycle.

Appendix 1: List of countries used for the cross-sectional study

Austria
Belgium
Cyprus
France
Germany
Greece
Ireland
Luxembourg
Malta
Netherlands

Portugal
Slovenia
Spain
Norway
Australia
Japan
United States
Singapore
Israel
China
Malaysia
Philippines
Thailand
Bulgaria
Croatia
Czech Republic
Hungary
Poland
Turkiye
Argentina
Chile
Peru

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