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### **RESEARCH ARTICLE**

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# The calculating entrepreneur - The role of economic calculation in supporting alertness and creative destruction

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### Abstract

We integrate the issue of economic calculation into the theory of the entrepreneur. In doing so, we fill a gap in the literature by demonstrating that retrospective economic calculation, i.e., financial accounting, dovetails with Kirzner's theory of the alert entrepreneur and that prospective calculation, i.e., the appraisal of investment objects, supports innovational activities by entrepreneurs and therefore facilitates creative destruction as emphasized by Schumpeter. Our integrative conceptualization of the calculating entrepreneur can lead to a better understanding of the role of economic calculation in the economy, thereby bringing theoretical economics and business administration closer together.

JEL CLASSIFICATION D21, L26, M41

#### 1 INTRODUCTION

Economic calculation is a crucial aspect of most entrepreneurial activities. In line with its important role in business, economic calculation is a central element in the education of managers who lead business enterprises in capitalist societies. Millions of business administration and business economics<sup>1</sup> students learn how to perform calculations in their courses on financial accounting, managerial accounting, and investment appraisal at university. This prepares them for their future jobs in business enterprises, where many of them actually apply this knowledge to communicating information, preparing rational decisions, and monitoring the results of business activities. In this respect, economic calculation appears to be central to capitalism.

Strangely enough, and in contrast to its obvious and crucial function in capitalist societies, economic calculation does not seem to play any meaningful role in modern economic theory. Economics students may attend courses on finance, investment, or accounting, but economics as such, be it microeconomics or macroeconomics, does not address the role of economic calculation. Surprisingly, the science that

is supposed to explain and analyze capitalism ignores the role of the tools that almost all practitioners of capitalism have to learn and apply (Klamer & McCloskey, 1992).

Following Hering (2000a), Schildbach (2012), Olbrich et al. (2015), Braun (2022a), and Follert et al. (2023), who criticize the naïve use of neoclassical thinking within the fields of corporate finance and accounting, we argue that a major reason for the neglect of economic calculation in economics is the neoclassical foundation of mainstream economic theory. In a world of perfect markets with homogenous products, zero transaction costs, and complete information, little room is left for economic calculations since operational problems that make economic calculations necessary do not exist by definition.

In our study, we propose an innovative framework for analyzing the role of economic calculation. We argue that economic calculation can best be conceptualized if we integrate it into the theory of the entrepreneur. Like economic calculation, the entrepreneur is a disequilibrium phenomenon, and as such, the two belong together closely. Furthermore, in capitalism, it is almost exclusively entrepreneurs who carry out economic calculations (Foss & Klein, 2012). As

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Mises (1949: 230) explains, they do so "in order to distinguish the remunerative lines of production from the unprofitable ones, those of which the sovereign consumers are likely to approve from those of which they are likely to disapprove."

Our interdisciplinary study proposes an adequate framework that enables us to conclusively link the fields of economic calculation and entrepreneurship theory. By integrating economic calculation into the theory of the entrepreneur and reflecting the critical roles that both play in the organization of capitalist societies, we contribute to the entrepreneurship, accounting, and economics literatures.

We concentrate on the two most important aspects of economic calculation, prospective and retrospective calculation. We demonstrate that each of them completes and dovetails with a seminal theory of the entrepreneur. Retrospective calculation supports and enables the entrepreneurial function described in the tradition started by Kirzner (1973), while prospective calculation does the same for the theory grounded in Schumpeter's (2003 [1942]) approach to the entrepreneur. We concentrate on these two seminal approaches because Kirzner's concept of alertness and Schumpeter's concepts of creative destruction and innovation are still ubiquitous in the entrepreneurship literature (e.g., Bennett, 2021; Klein & Bylund, 2014; Korsgaard et al., 2016; Norbäck et al., 2016; Srivastava et al., 2021).

The most important instance of retrospective calculation is the construction of the income statement. In their financial accounting, enterprises edit and arrange their actual expenses and revenues such that the income statement reports the monetary result of past actions in the form of net income or profits. We argue that the income statement, as it is traditionally drawn up, rewards enterprises that buy low and sell high, that is, enterprises that find gaps in the price structure. In accordance with Kirzner's theory of the entrepreneur, the income statement rewards enterprises that help to bring about equilibrium. The larger the profits they make, according to the income statement, the larger the disequilibrium in the price system they have detected.

We encounter prospective calculation most notably in the field of investment appraisal and its subfield business valuation (e.g., Klingelhöfer, 2009; Matschke & Brösel, 2021; Toll & Hering, 2017). Whereas financial accounting deals with the results of actual market transactions of the past, investment appraisal traditionally analyzes the profitability of future uncertain payment streams resulting from potential investments (Hering, 2000b). It does not regard market prices as facts that should not be questioned. On the contrary, it compares the current market prices of investment objects with their future potential (e.g., Herbener & Rapp, 2016). It is understood that this view of the future is influenced by subjective expectations as well as by personal abilities and goals. According to the results of this comparison, entrepreneurs form their judgments on whether to buy or sell certain assets or start or stop certain investment projects. The point of prospective investment appraisal is betting against market prices. In accordance with Joseph Schumpeter's theory of the entrepreneur, we argue that preinvestment analysis accompanies and substantiates entrepreneurs' creative destruction of the present state of affairs and therefore enforces the dynamics of capitalism. In contrast to a balance sheet, which mainly provides a basis for calculating the results of past

actions, an investment appraisal is a calculation that drives the dynamics of markets. The larger the difference between the calculated subjective value, i.e., the decision value (Matschke, 1975), of an investment object and its current market price, the larger the expected profits for the business owners or shareholders, and consequently (e.g., Follert et al., 2018; Matschke & Brösel, 2021), the larger the (potential) contribution of the enterprise to a new and innovative allocation of resources in society. In Friedrich von Hayek's (1937, 1945) terminology, the subjective appraisal of investment objects by entrepreneurs and professional managers incorporates decentralized expert knowledge into the market process and therefore keeps it going and dynamic (Braun, 2023b).

The remainder of the paper is structured as follows: In the following section, we provide some background and specify a gap in the literature. In particular, we show that economic calculation is currently neglected in both economics and entrepreneurship theory. In section 3, we demonstrate that retrospective calculation, particularly the traditional revenue-expense approach to financial accounting, dovetails well with Kirzner's theory of the alert entrepreneur. We do the same for the relationship between prospective calculation and Schumpeter's approach to the entrepreneur in section 4. In this regard, we build on "investment theory," a stream of business economics literature that has several intellectual connections to the work of the Austrian school and has developed particularly in the Germanspeaking world. It deals primarily with the appraisal of investment options under conditions of imperfect markets, uncertainty, and subjective preferences (see Olbrich et al., 2015, 2022). In this approach, prospective calculation is shown to support entrepreneurial judgment à la Foss and Klein (2012) in actual business practice (e.g., Rapp & Olbrich. 2023). In the final two sections, we discuss our results and their implications and draw some conclusions.

## 2 | BACKGROUND AND RESEARCH GAP

# 2.1 | The neglect of economic calculation in economics

In this paper, we demonstrate that the role of economic calculation in the economy can be understood and conceptualized by integrating it into the theory of the entrepreneur. In doing so, we close a gap in the literature. To date, economists have faced difficulties in integrating economic calculation into their theories and models. However, why this is the case is not easy to understand. After all, Hicks (1974) and Chiapello (2007) insist that classical economists took their conceptualization of the important term "capital" from accounting practice. Klamer and McCloskey (1992) and Hopwood (1992) go one step further, claiming that economics *as such* is dominated by accounting ideas. Klamer and McCloskey (1992) argue that the conceptual framework and the terminology used by economists stem almost entirely from accounting practices. In the famous socialist calculation debate, Ludwig von Mises (1920, 1949) made a similar point, arguing that accounting institutions are a precondition for economic theory. Some background knowledge is helpful here. Mises's opponents, most notably Oskar Lange (1936) and Abba Lerner (1938), argued that the instruments of neoclassical economics are applicable not only to capitalist systems but also to socialist ones. The Lange–Lerner theorem claims that a socialist central planning board could act as a Walrasian auctioneer by announcing and adjusting prices until equilibrium is achieved (Boettke et al., 2014). The theorem supposes that the general equilibrium model describes not only capitalist market economies but also socialist economies (Hodgson, 2016).

Conversely, Mises's (1920, 1949) position was that the rational allocation of resources, modeled by neoclassical equilibrium theory, is contingent on a specific institutional and historical context. Large parts of the apparatus of economics, particularly those that take the equilibrating tendency of the market for granted, are directly related to and depend on the capitalist institutions of economic calculation (Braun, 2022a, 2023a).

Despite the close connection between accounting and economics, however, and although even economists leaning toward socialist ideas admit that Mises argued convincingly (Hodgson, 2016: 33), economists are not known for their interest in or knowledge of accounting or other forms of economic calculation (Klamer & McCloskey, 1992). In this regard, economic calculation shares the fate of the entrepreneur. Barreto (1989) demonstrates that mainstream economists gradually lost interest in the notion of the entrepreneur after they had completed the general equilibrium model in the 1930s. At the same time, economic calculation left the scene as well.

There is much to be said for Barreto's (1989) argument that this development can be explained by the fact that the entrepreneur and, by implication, economic calculation, would have jeopardized the internal consistency of the general equilibrium model. After all, in this model, there is no room for entrepreneurship, however it may be defined (Baumol, 1968). The model is an instrument for optimality analyses of well-defined problems. "Firms" and households determine their optimal decision values simultaneously. They make optimal decisions and regain equilibrium instantaneously (Schultz, 1975). No separately acting person, such as the entrepreneur, is necessary in this model (Klein, 2008). Likewise, the imperfect tools of economic calculation do not appear to make sense in a world in which all decisions are optimal by definition. It is no coincidence that Mises's opponents in the socialist calculation debate based their arguments on the neoclassical equilibrium approach. In this way, they were able to address his calculation argument "by assuming it away" (Boettke et al., 2014).

Interestingly, the development did not stop when both the entrepreneur and economic calculation disappeared from mainstream economic theory. Entrepreneurship scholars successfully created a separate field of research at the interface between economics and business administration, concentrating on the role of the entrepreneur in disequilibrium. Economic calculation as a practical discipline, on the other hand, nearly lost its influence on economics altogether. In fact, a reversal of the relationship between economics and economic calculation began to emerge (Hopwood, 1992). Since the 1960s, scholars in the field of business administration, including the sub-disciplines of investment, finance, and accounting (Barth, 1994; Lev & Ohlson, 1982; Lintner, 1965; Miller & Modigliani, 1961; Mossin, 1966; Myers, 1974; Sharpe, 1964) have increasingly adopted concepts from mainstream economics. This has also been true of management practices since the 1980s (Copeland et al., 1990; Koller et al., 2020; Rappaport, 1981, 1986). In particular, they subscribed to equilibrium thinking and the assumption of perfect and complete capital markets.

It is obvious that the assumption of perfect markets (costless information; no transaction costs and no taxes; all market participants are price takers; see Miller & Modigliani, 1961) contradicts real-world business practice (e.g., Follert et al., 2023; Hering, 2022). We must not forget, however, that neoclassical theory was not originally developed to provide information or decision-making support to managers or entrepreneurs. The assumption of perfect markets is a methodological device that allows social scientists to sidestep the discussion on complicated market processes and their institutional preconditions (Braun, 2021). Similarly, the purpose of the theory of finance is basically theoretical: to explain market results under idealized conditions, i.e., under the assumption of hypothetical market equilibrium prices and perfect and complete markets (Matschke & Brösel, 2021).

The adoption of this approach by business economics in order to support *practical* decision-making was rather surprising, and there is an ongoing debate on the reasons for this development (see, e.g., Follert, 2023; Follert et al., 2023; Olbrich et al., 2015). For our purposes, it is important to understand that by adopting the general equilibrium framework from economics, business economics tends to ignore the function of economic calculation in disequilibrium and therefore to underestimate and downplay its role in the economy. For example, the important distinction between retrospective and prospective calculations, which is crucial in a practical business context, has become blurred in recent years.

Under the influence of neoclassical economics, traditional retrospective calculation, particularly financial accounting, has continually been purged of its "retrospective" elements. The point is that according to the central neoclassical concept of opportunity costs, information about past expenses is of no use for present decisions. This idea has become an integral part of financial accounting, for example, through the implementation of fair value measurement (e.g., Barth & Landsman, 1995), as in the International Financial Reporting Standards (IFRS, see IFRS 13; Brösel et al., 2012; Schildbach, 2012). Under IFRS 13, companies are not supposed to document the actually paid or received prices but rather the so-called "fair values" of assets and liabilities. The "fair value" is independent of historical prices and supposedly only contains information that is important for decisions concerning the future (Braun, 2022a).

However, it is not only retrospective calculations that are impacted by the general equilibrium concept and the corresponding lobbying. The traditional prospective calculations based on investment theory are also under pressure (Follert, 2020, 2023; Quill, 2016). By definition, neoclassical thinking in equilibria does not leave room for innovations and actual entrepreneurial activity. Approaches such as the capital asset pricing model (CAPM) ignore typical entrepreneurial problems that require in-depth calculations, particularly investment decisions under uncertainty (e.g., Follert et al., 2023; Hering, 2022; Olbrich et al., 2015; Rapp, Haßlinger, & Olbrich, 2018). The CAPM assumes, in addition to a perfect capital market, that market participants have homogenous expectations concerning the expected values of future cash flows and their standard deviation (Sharpe, 1964). In a perfect and complete capital market with perfect competition, homogeneous expectations, and zero transaction costs, the value of an investment object and its current market price are identical (Arrow, 1964; Arrow & Debreu, 1954; Debreu, 1959; see also Hering, 2021). There is no need for forward-looking calculations if the market prices provide all the necessary information, and since the net present value of investment objects is zero by definition under the named conditions, investors do not have a transaction incentive anyway (e.g., Hering, 2021; Olbrich et al., 2015). Under neoclassical assumptions, practical entrepreneurial decision-making and economic calculation becomes unnecessary and meaningless.

# 2.2 | The neglect of economic calculation in the theory of the entrepreneur

Although entrepreneurship and economic calculations are meaningful only in disequilibrium, they have not yet been linked systematically. Mises (1949) is one of the very few authors who attempts to integrate both economic calculation and the entrepreneur into economics. However, his contribution, while pioneering, is not conclusive. When it comes to the role of entrepreneurs as the driving force of the market, Mises (1949) has difficulties defining the concept precisely (Bylund, 2022). Although Mises recognizes the distinction between retrospective and prospective calculations, he does not address it comprehensively. The later followers of Mises in the Austrian School of Economics continue and advance interdisciplinary research at the crossroads of business administration and economics. In particular, Austrian scholars have made valuable contributions to understanding the roles of the entrepreneur, subjective values, and judgmental decision-making in the dynamic market process (e.g., Bylund & Packard, 2022; Chiles et al., 2007; Foss & Klein, 2012; Kirzner, 1973; Klein, 2008; Klein & Bylund, 2014; McCaffrey, 2016; Rapp & Olbrich, 2023). They also do not forget about economic calculation but continue to consider it an important element of entrepreneurial activities (Bylund, 2022; Foss & Klein, 2012; Packard et al., 2021).

However, these authors do not systematically discuss the link between economic calculation and entrepreneurship. First, as a reading of their works reveals, they do not distinguish between prospective and retrospective calculations. Furthermore, as far as they discuss economic calculation, they do not go into detail. For example, Foss and Klein (2012), in a defining work of this tradition, state several times that economic calculation is the comparison of anticipated future receipts with present outlays and is necessary for rational economic planning. However, as Lewin and Cachanosky (2020: 737) argue, Foss and Klein and their fellow Austrian economists do not explain "how exactly does the entrepreneur arrive at an appraisal of the worth of his production plan in order to compare it with imagined alternatives?" The same applies to Huerta de Soto (2010), a treatise that is explicitly devoted to both entrepreneurship and economic calculation but does not discuss the relationship between the two at length.

There is a related literature that approaches entrepreneurship and economic calculation from a different angle. Olbrich et al. (2015), Herbener and Rapp (2016), Rapp, Haßlinger, and Olbrich (2018), and Olbrich et al. (2022) go into the details of accounting and investment appraisal. However, they do not integrate their insights systematically into the theory of the entrepreneur. A conceptual framework that integrates economic calculation into entrepreneurship is not yet available.

In our view, there are two reasons for this. First, the Austrian literature does not confine the term entrepreneurship to the specific type of actors who try to make monetary profits. In this literature, entrepreneurship is a ubiquitous phenomenon. According to Huerta de Soto (2010: 29), "[a]Il men, when they act, exercise entrepreneurship." He explicitly includes workers and consumers. Foss and Klein (2012) describe entrepreneurship as "uncertainty-bearing" and "ultimate decision-making about factors of production." As Braun (2022b) comments, this wide definition of entrepreneurship also includes workers and land owners. In other words, it includes market participants who do not perform financial accounting or professional investment appraisals. In light of its methodological focus, it is quite understandable that the Austrian approach to entrepreneurship has difficulties integrating economic calculation systematically.

Lewin and Cachanosky (2020) provide a second insight into why the Austrians did not integrate the issue of economic calculation systematically into the theory of the entrepreneur. Lewin and Cachanosky (2020) note a divergence in the Austrian-minded literature on entrepreneurship from Mises's definition of capital toward that of Lachmann (1978). Based on Menger (1888) and Fetter (1937), Mises (1949) conceptualizes capital as a monetary magnitude and the fundamental concept in economic calculation. Among present-day Austrian economists, Reisman (1996), Braun (2017), and Lewin and Cachanosky (2019, 2021) follow Mises's definition of capital.

Lachmann and the Austrian entrepreneurship literature based on his work adopt an entirely different approach to capital (Braun, 2020). Foss et al. (2007), Endres and Harper (2010), Foss and Klein (2012), Bylund (2015), and Bylund et al. (2023) interpret capital as a structure of heterogeneous capital goods, that is, physical resources. According to Lewin and Cachanosky (2020), this notion of capital hinders scholars in the Austrian tradition of entrepreneurship research from understanding the role of economic calculation in entrepreneurial decision-making.

## 3 | RETROSPECTIVE ECONOMIC CALCULATION AND THE TENDENCY TOWARD EQUILIBRIUM

We want to demonstrate that we can improve our understanding of the role of economic calculation by integrating it into the theory

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of the entrepreneur. Before retrospective calculation was reformed in the spirit of neoclassical economics, thereby losing large parts of its retrospective character, it was a tool that allowed entrepreneurs to fulfill their entrepreneurial function as understood by Israel Kirzner.

According to Kirzner (1973) and his followers, the most important feature of entrepreneurship is alertness to unexploited opportunities for profitable actions (Arentz et al., 2013; Foss & Klein, 2010; Sautet, 2013). Kirzner emphasizes the entrepreneur's ability to discover profitable opportunities that already exist but have not yet been detected. The entrepreneur exploits these opportunities and thus makes them disappear. In more technical language, the entrepreneur spots disequilibrium and generates a tendency toward equilibrium (Hébert & Link, 1989).

Kirzner (1997) notes that entrepreneurs profit from disequilibrium situations, as these provide opportunities for pure profit. These opportunities for pure entrepreneurial profit are created "by temporary absence of full adjustment between input and output markets" (Kirzner, 1997: 69). Entrepreneurs are then able "to buy low and sell high thus earning a profit" (Arentz et al., 2013: 464).

Kirzner insists that entrepreneurial activities tend to bring about equilibrium. In the following passage, it is clear that entrepreneurs discover price spreads in the economy, and, by exploiting them for profit, reduce these spreads and thereby help to allocate resources better:

> The daring, alert entrepreneur [...] buys where prices are "too low" and sells where prices are "too high." In this way low prices are nudged higher, high prices are nudged lower; price discrepancies are narrowed in the equilibrative direction. Shortages are filled, surpluses are whittled away; quantity gaps tend to be eliminated in the equilibrative direction. [...] [T]his entrepreneurial process cannot guarantee rapid (or slow) convergence to a state of equilibrium. But it does at each moment guarantee profit-incentives tending to nudge the market in what, from the perspective of that moment, must be recognized as the equilibrative direction

> > (Kirzner, 1997: 70).

In the remainder of this section, we demonstrate that the traditional income statement of retrospective economic calculation determines profits in a way that dovetails with Kirzner's theory of entrepreneurial activities and their equilibrative tendency.

The traditional income statement (prior to the fair value revolution inspired by neoclassical equilibrium theory) shows profits wherever and whenever the respective enterprise has detected a gap in the price structure and has consequently managed to buy low and sell high. The so-called "revenue-expense approach" to financial accounting arranges the cash flows entering and leaving the enterprise in a way that guarantees that the income statement indicates how much the enterprise has contributed to nudging the market in the equilibrative direction.

Chang (1962: 636) described the operations of enterprises from the viewpoint of the revenue–expense approach. In bullet point form, business operations can be summarized by the following formula:

Money  $\rightarrow$  Buying goods and services  $\rightarrow$  Converting goods and services into new goods and services  $\rightarrow$  Selling new goods and services for more money than originally invested.

The revenue-expense approach can also be explained by the drawing in Figure 1. Enterprises expend money on land, labor, and produced means of production, which they purchase on the market. They organize the combination of these inputs in their productive activities in order to produce products or output. Then, they try to sell the output on the market for more money than it cost them to purchase the input. The difference between the revenues and the expenses is their profit (or their loss).

It is obvious that the traditional income statement, by contrasting expenses and revenues *ex post*, determines profits as a consequence of actual price spreads. An enterprise whose expenses are lower than its revenues has bought its input for lower prices than it has sold its output.

The fact that profits result from buying low and selling high is not really a revelation. However, financial accounting and the construction of income statements are far from trivial. If going concerns want to determine their income or profits periodically every year, the problem arises that large parts of their expenditures during a particular year are on fixed assets. Fixed assets, such as large equipment and buildings, are usually not used up in the period in which they are acquired. For this reason, it does not make sense to put the expenditures on the purchase of fixed assets into the income statement and match them with the revenues of the current year. The sales of the products that fixed assets help to produce may range over several years or even decades. If we want to know whether the expenses on fixed assets were worthwhile and created profits, we have to match them with the revenues that these fixed assets generate over the years of their employment. In actual practice, therefore, the expenses on fixed assets are not instantly matched



FIGURE 1 The circulation of business capital, as illustrated by Zwiedineck-Südenhorst (1930: 1069).

with revenues. Instead, they appear on the balance sheet. They are capitalized. Accordingly, the balance sheet, which states assets and liabilities, has a subordinate function, namely, as a kind of store for the income statement (Penman, 2007; Schildbach, 2009; Schmalenbach, 1959). The expenses for the assets on the balance sheet are only imputed to the relevant revenues in the form of depreciations over time, which allocate past costs to present revenues (Chang, 1962).

According to the revenue-expense approach, therefore, the point of large parts of financial accounting—of drawing the balance sheet and applying certain rules of depreciation—is to guarantee as well as possible that, in the income statement, expenses are matched with the revenues that they helped to produce. As we have seen, in the very common case of fixed assets, this is anything but trivial.

Income information, though imperfect, is important for entrepreneurs not only in regard to evaluating their past actions and deducing due conclusions for their future decisions. It also helps them to decide on the amount of withdrawals or dividends they may reasonably cash out without reducing the capital of the enterprise.

From the point of view of Kirzner's theory of the entrepreneur, financial accounting guarantees that even in complicated situations, positive profits are only shown when and if the respective enterprise has managed to detect gaps in the price structure. In other words, *economic calculation based on the revenue-expense approach to financial accounting is a tool that ensures that entrepreneurs are rewarded when and if they contribute to creating a tendency toward equilibrium.* By linking retrospective economic calculation to the Kirznerian approach to the entrepreneur, we have demonstrated that profits and losses determined by financial accounting are important signals for coordinating human action in capitalist societies.

## 4 | PROSPECTIVE ECONOMIC CALCULATION AND THE DYNAMICS OF CAPITALISM

# 4.1 | Entrepreneurial judgment and creative destruction

If capitalism were confined to what we discussed in section 3, it would tend toward equilibrium and would stay there forever. Retrospective calculation in the form of the revenue-expense approach to financial accounting employs past and, at the most, present data. The income statement shows revenues and expenses resulting from *past* purchases and sales. Likewise, the Kirznerian entrepreneur, who is alert to existing price spreads, leaves little room for innovation, progress, or growth. New opportunities for action are not part of the story (Hébert & Link, 1989).

Progress is tied to future developments, and thus, successful entrepreneurial judgments require the formation of expectations about *future* but uncertain results (Klein & Bylund, 2014). Progress and innovation are inseparably linked to the *œuvre* of Joseph Schumpeter (Shane, 2003).

Kirzner (1999) believed that his interpretation of the function of the entrepreneur did not differ fundamentally from that of Schumpeter. Indeed, both Schumpeter (2003 [1942]) and Kirzner highlighted the dynamic nature of the market. Yet, while Kirzner's alert arbitrageur-entrepreneur responds to price discrepancies, Schumpeter's innovative entrepreneur introduces new combinations (Bylund & McCaffrey, 2017). Therefore, while Kirzner's entrepreneur paves the way toward equilibrium, Schumpeter viewed the entrepreneur as a distorting or unbalancing factor (Chiles et al., 2007; Huerta de Soto, 2009). The role of the entrepreneur is innovation or, in Schumpeter's terms, "the setting up of a new production function" in a wider sense, including new products, new markets, and new forms of organization (Schumpeter, 1939: 87). Schumpeter interpreted entrepreneurial activity as "creative destruction" (p. 81) of the previous equilibrium. As summarized by Huerta de Soto (2009), Schumpeter believed that the economy would permanently stay in a state of equilibrium if it were not for entrepreneurs.

The point is that, for Schumpeter (1939: 36), an economy in equilibrium "merely reproduces itself." Schumpeter (2003 [1942]: 83), however, was concerned with the evolution of the "capitalistic machine," that is, with "the new consumer's goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprises create" (p. 74). He attempted to understand the qualitative and quantitative changes in output in capitalist societies. Through his theory of the entrepreneur, Schumpeter sought to explain the creation of change and progress.

Entrepreneurs are crucial to Schumpeter's view because they ponder and shape the future. In Schumpeter's (1939: 37) own words, entrepreneurs are not relevant insofar as they run their "plant in the customary way, going through all the motions of daily business routine." The important thing is "setting up the plant or changing its setup." Since decisions like these refer "to the future, this implies foresight; and since the fruits of every effort mature in the future, it also implies caring for the future \_ forethought" (Schumpeter, 1939: 53). As Schumpeter (1939: 53) explicitly abandoned the assumption "that people react to existing prices only," he was well aware "that expectation or anticipation enters the picture, to threaten the existence of our equilibrium tendency."

In our reading, Schumpeter's idea of creative destruction has some close connections to the judgment-based approach to entrepreneurship. At the beginning of a process that generates innovation and thus the destruction of the previous status quo, there must be entrepreneurial judgment about the future (Mises, 1949: 585). Judgment can be understood as decision-making under uncertainty in the Knightian sense (Foss & Klein, 2015; Klein, 2008). The selection of asset positions is crucial for the financial performance of a company due to their potential to generate future earnings (Herbener & Rapp, 2016; Klein, 2008). Therefore, entrepreneurs must decide whether to purchase resources and deploy them under conditions of uncertainty in an attempt to generate a future economic return (Foss & Klein, 2015; Klein & Bylund, 2014). In other words, before there can be innovation and "creative destruction," there must be entrepreneurial judgment. The traditional prospective calculation methods of multi-period planning, particularly investment appraisal and its application in business valuation, dovetail with Schumpeter's vision of the dynamics of capitalism and the role of entrepreneurial judgment therein. Investment appraisal can even be interpreted as a preliminary stage in the realization of judgments. If a judgment on the employment of resources is to be prepared, prospective calculation is a vital prerequisite. When several alternative investments are available to choose from, entrepreneurs need an idea of how to rank them in view of their subjective goals (Herbener & Rapp, 2016). In this regard, prospective calculation helps entrepreneurs to assess the advantageousness of alternative uses of capital (e.g., Hering, 2022).

As Rapp, Haßlinger, and Olbrich (2018) and Rapp and Olbrich (2023) point out, the approaches of "investment theory" in the business economics literature, inspired by the subjective approach of the Austrian School (Olbrich et al., 2015), adequately support the entrepreneur in this regard. Prospective calculations, in other words, provide entrepreneurs with information that helps them judge whether and how to implement innovations and thus destroy the current state of affairs creatively.

Of course, the results of prospective calculations do not necessarily lead to innovations. For example, they may also reveal that a project is probably unprofitable. Furthermore, we emphasize that prospective calculation is not itself an act of judgment. The decomposition of decision problems into arithmetical subproblems does not render the final judgment of the entrepreneur unnecessary (Hering, 2021; Rapp & Olbrich, 2023). In the end, the judgmental decisions of entrepreneurs are not based solely on formal models or decision rules (Foss & Klein, 2012; Foss & Klein, 2015; Klein, 2008; Rapp & Olbrich, 2023). As shown above, prospective calculations only *support* entrepreneurial judgment; they do not *replace* it.

# 4.2 | Prospective economic calculation and the market process

In the following, we will discuss the role of prospective calculation when it comes to implementing innovations. For our argument, the nature of the investment object does not matter. The free capital of an industrial company may be invested in new machines, in the acquisition of competitors or supplying companies, in financial or nonfinancial objects, and in tangible or intangible objects. In any case, if an entrepreneur wants to make a rational and informed decision, he or she must compare the expected future benefits of an investment with those of alternative actions, i.e., the opportunity costs (e.g., Herbener & Rapp, 2016).

The appraisal of investment presupposes monetary figures as a common unit so that investment objects can be compared with each other before a judgment is made. Given that expected future benefits are denominated in money, this appears to be an easy task. In the very common case in which the entrepreneur invests capital for several periods, however, the expected cash flows occur at different times, so it is not easy to compare and evaluate different projects. This is one of the main reasons why investment projects must be made comparable by means of financial mathematics in the first place. This can be done by calculating the present value of the expected future benefits.

We must emphasize that prospective economic calculation has to operate with both uncertainty and subjectivity. Whereas retrospective calculation resorts to past and present data, investment appraisal depends on subjective expectations regarding future returns. Since the present value must be calculated under uncertainty, logically, it can only exist as a range, and investment appraisal can only calculate a *range* of possible values (e.g., Hering, 2021).

Whereas the allegedly objective market price plays a central role in neoclassic economics, an entrepreneurial perspective leads to the conclusion that, in the end, market participants are guided by sophisticated yet subjective appraisals of investment objects. Most importantly, when investment appraisal demonstrates the (potential) benefits of investing in a particular asset, this implies that the entrepreneur assumes that its future potential is not reflected in its current market prices. By investing, entrepreneurs bet against the market based on their subjective investment appraisals.

As long as the prospective calculation helps entrepreneurs form their subjective valuations of investment projects, it tends to support them when it comes to innovating, that is, to establishing a new production function. While financial accounting rewards enterprises that have equilibrated the price system à la Kirzner, traditional investment appraisal detects opportunities for throwing the price system out of equilibrium in a Schumpeterian fashion. In fact, the larger the disequilibrium that is created by innovation, the higher the potential for profit.

Of course, due to uncertainty and incomplete knowledge, investment projects do not always prove to be advantageous from an ex post perspective. This is why some projects end up generating losses instead of profits. In these cases, retrospective calculation reveals that the company's investments did not lead to a better allocation of resources from the point of view of consumers.

It is interesting to follow the effects of prospective calculations in the economy. The information created by prospective calculations is absorbed by the price system during the realization of the respective investment projects (Huerta de Soto, 2010). As Hayek (1945: 519 f.) explains, the knowledge that is necessary to secure the best use of resources in society is not given to anyone in totality but only exists as "dispersed bits of incomplete and frequently contradictory knowledge which all the separate individuals possess." Through the price system, however, market participants are connected to each other. By buying and selling based on their local knowledge, they influence prices and, in this way, pass on their particular information concerning the scarcity or abundance of individual goods.

From this perspective, the prospective economic calculations that entrepreneurs use to valuate investment opportunities contribute decentralized but professional information to the market process (Braun, 2023b). If an investor believes that a certain business model promises high profits in the future, this is reflected in high present values of this model and therefore a high willingness to pay. By constantly purchasing and selling assets based on their investment appraisals, professional investors keep the market process going and continue to shift it off its track towards equilibrium. They create or at least amplify the dynamics of capitalism.

To sum up section 4, we have integrated prospective economic calculation into the Schumpeterian approach to the entrepreneur. *It provides a rational basis for creative destruction and is therefore crucial for the dynamics of capitalism.* In addition, by so doing, prospective economic calculation creates new and professional information that can be digested by the price system à la Hayek such that this system better reflects the scarcity of resources in society.

### 5 | DISCUSSION AND IMPLICATIONS

Economic calculation was marginalized in economics in the 1930s at the latest. Nonetheless, business economists came to use the general equilibrium framework of neoclassical economics as a blueprint for their corporate finance and accounting concepts. The models developed by academics to explain equilibrium prices under the restrictive conditions of perfect markets are very important for business practice, not least because they are widespread in the Mergers and Acquisitions business and have inspired institutional reforms, such as the IFRS project or the forced marketization of corporate control in the European Union (Apeldoorn & Horn, 2007). In this respect, we have arrived in a very strange situation: Both retrospective and prospective economic calculations are inspired by a theory that does not really bother with economic calculation—or the entrepreneur, for that matter.

In static equilibrium, the institutions and organizations that characterize the market process are irrelevant. In fact, it is not possible to explain the function of entrepreneurs and their calculations within this framework. To be clear, we do not argue that this is a flaw of neoclassical economics. It is not the purpose of general equilibrium models to serve as a role model for calculation and decision-making in business practice.

We propose that we have to find a different place for economic calculation in economic theory. We argue that the role and function of economic calculation become clear if we consider it as a part of the theory of the entrepreneur. Tellingly, the specific task of entrepreneurs in economic theory is "to deal with economic disequilibria" (Schultz, 1975: 828). In the same way, obviously, economic calculation is only necessary because and in so far as we are not in equilibrium. Only then do entrepreneurs lack complete information, act in a rationally imperfect way, and therefore have to rely on the sophisticated yet imperfect tools of financial accounting and financial mathematics.

When it comes to the relationship between the entrepreneur and disequilibria, we point out two approaches to the entrepreneur. The Kirznerian approach discusses how entrepreneurs coordinate the market process and therefore create a tendency towards equilibrium. The Schumpeterian approach, enriched by insights from the judgement-based approach to entrepreneurship, deals with the innovative activities of entrepreneurs that destroy equilibrium and thus create progress and growth.

We are convinced that these two theories of the entrepreneur provide a much better framework for discussing the role and function of economic calculation in the economy than does the general equilibrium approach. Based on Kirzner's theory, we provide a new understanding of the rationale of the retrospective calculations of financial accounting. The income statement of the (pre-neoclassical) revenueexpense approach dovetails well with Kirzner's notion of the alert entrepreneur. It is built in a certain way so that it rewards entrepreneurs who detect gaps in the price structure and thus set the economy on the track toward equilibrium. Schumpeter's approach to the entrepreneur, on the other hand, helps us understand the role of prospective economic calculation. Investment theory, which is in line with the subjective approach of the Austrian School, does not base investment decisions on hypothetical market values. Instead, entrepreneurs who employ these tools and follow their results are convinced that they know better than the market. Therefore, they break the input factors out of their current uses and employ them according to their own business plans. By supporting and underpinning entrepreneurial judgments (Foss & Klein, 2012), prospective calculation helps entrepreneurs perform what Schumpeter (2003 [1942]: 81) called "creative destruction."

In short, retrospective calculation is a tool that catalyzes equilibration, whereas prospective calculation is a tool that guides progress. Economic calculation, in other words, is an important aspect of entrepreneurial activities, as described in the Schumpeterian and Kirznerian approaches to the entrepreneur.

In this paper, we added to the entrepreneurship literature by inserting economic calculation into the theory of the entrepreneur. It was not our purpose to take sides in the debate on the proper definition of the entrepreneur. To the contrary, we think that our analysis contributes to a mutual understanding of the various schools of entrepreneurship thought. The distinction between prospective and retrospective economic calculations, found in actual business practice, indicates that the entrepreneur does not have to be reduced to a single function. We have shown that Kirzner's alertness, Schumpeter's creative destruction, and Foss and Klein's entrepreneurial judgment are all relevant and helpful in conceptualizing and explaining the role of the different aspects of economic calculation in the economy.

By connecting the theory of the entrepreneur with economic calculation, we pave the way for entrepreneurship scholars to understand and conceptualize the impact of important institutional reforms on entrepreneurial activity. Paradoxical regulations within financial reporting fundamentally change the way entrepreneurs have to measure and report the performance of their firms. Moreover, entrepreneurs are faced with neoclassical models widely used for investment appraisal, perhaps without realizing that these methods may not support real entrepreneurial decisions because they are based on a concept of value that is not helpful in real markets. By demonstrating the relationship between retrospective and prospective calculations on the one hand and alertness and creative destruction on the other, we have laid the groundwork for assessing these developments from an entrepreneurial perspective.

## 6 | CONCLUSION

Economics in general and the neoclassical equilibrium approach in particular do not deal with economic calculation. They banished the topic just as they banished the entrepreneur. Nonetheless, they strongly influence the practice of financial accounting and investment appraisal through business economics, given its focus on the neoclassical theory of finance. In this paper, we criticize this state of affairs and provide an alternative for the theoretical and conceptual treatment of economic calculation by economists and entrepreneurship scholars. Economic calculation dovetails with the theory of the entrepreneur. Financial accounting based on the revenue-expense approach complements the Kirznerian approach to the alert entrepreneur who brings about equilibrium. Future-oriented investment appraisal according to traditional capital budgeting developed for imperfect capital markets complements the Schumpeterian approach to the creative entrepreneur who implements innovations and creates the dynamics of capitalism. We offer an interdisciplinary and integrative approach that brings the fields of entrepreneurial economics, accounting, and investment appraisal closer together in order to explain crucial yet neglected aspects of entrepreneurial activities in capitalist societies.

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#### CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

#### DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

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#### **ENDNOTES**

<sup>1</sup> We use both expressions synonymously.

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