A Mengerian Theory of Knowledge and Economic Development

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Abstract: This paper reconstructs Carl Menger's theory of economic development centered around the growth of knowledge. Menger made knowledge central to the economic process, long before this was done more widely in economics. His work draws attention to two different types of knowledge, shared cognitive and institutional frameworks which help create coherent and integrated markets on the one hand, and, on the other hand, private—increasingly specialized and differentiated—knowledge used in the production of heterogenous (capital) goods. We situate Menger's work on economic development in the evolutionary endogenous growth tradition going back to Bernard Mandeville and Adam Smith, and later developed by Alfred Marshall, Allyn Young, Ludwig Lachmann, and others. We use these insights to suggest that one of the crucial questions of economic organization is (1) the complementarity between the two types of knowledge we identify here, and (2) the extent to which knowledge is a part of shared social infrastructures rather than being organized privately within firms and other organizations.

Keywords: Economic Growth; Knowledge; Division of Labor; Carl Menger; Endogenous Growth

JEL Codes: B13, B15, O10, O43

INTRODUCTION

The work of Carl Menger contains no full-fledged theory of economic growth or development. Along with his marginalist fellow travelers he seemed more concerned with microfoundations and the development of a subjective theory of value. And yet both his theory of higher-order goods which points forward to the Austrian theory of capital as well as his analysis of the emergence of money as an exchange medium there are clear attempts to connect micro-behavior with macro-outcomes.

The first chapter of Menger's *Principles* contains a section in which he outlines how the growth of knowledge leads to progress and economic development. This section notoriously attacks Smith for failing to recognize the importance of the growth of knowledge by focusing nearly completely on the division of labor. The criticism was not for a lack of respect for Smith; Menger lectured to the Crown Prince Rudolf of the Habsburg Empire about Adam Smith and even took young Rudolf on a trip to Scotland to visit some of the places where the Scottish Enlightenment had

flourished (Streissler and Streissler 1994). Menger also felt deeply connected to the liberal plan that Smith had promoted (Menger 2016). Yet, in his theory of economic development, or rather what comes close to it, Menger has a clear target, the theory of economic growth as laid out by Adam Smith. It was not division of labor, argued Menger, but the growth of knowledge that has caused the increase in the wealth of nations.

His critique of Smith might have been a kind of virtue signaling on the part of Menger, who was keen to make an impact on the German economics of his time. Perhaps something else was behind it. In any case what is striking is that underneath the theories of growth of Smith and Menger, there is a similar idea, namely that of the evolution of market societies and increasing returns to scale. In Smith's theory exchanges and the resulting division of labor evolve by extending the scope of markets (Smith 1981). For Menger increasing returns are achieved through the growth of knowledge, which enhances the value of the existing set of resources. These are open-ended processes of development, rather than theories of closed systems (Wagner 2007). In this paper we argue first of all that Menger's theory of economic development as it might be distilled from his work should be placed in the intellectual lineage that runs from Mandeville and Smith, to Marshall, and Allyn Young (Lavezzi 2003). That itself is important because the later neoclassical synthesis has placed marginalism within the equilibrium tradition which came out of Walras. It is well-recognized that Menger sits uneasily in a tradition of equilibrium thinking (Rizzo 1979; Klein 2012). That said, it cannot be denied that within the second and third generation scholars from the Austrian tradition, perhaps most notably in the work of Friedrich Wieser and Hans Mayer there are attempts to integrate Austrian subjectivism into this general equilibrium framework (Caldwell 2002; Klausinger 2015).

Secondly, we argue that a reconstructed theory of economic development which takes into account both Menger's emphasis on knowledge as well as his theory of the spontaneous development of exchange-facilitating institutions such as money adds something to the endogenous growth tradition that goes from Smith to Young and beyond. Within the tradition of endogenous growth there is extensive recognition of the importance of the *organization* of economic activity (Loasby 1999). But the interaction between market-enabling institutions such as the legal framework, of which money can be considered a part, and private activity within that framework has not fully benefitted from the insights contained in the work of Menger.

To develop those insights we build in particular on the idea of the complementarity between different capital goods as developed by Ludwig Lachmann (1947), or to put it more precisely the complementarity between the existing structure of capital goods and the individual capital investments. We use the notion of complementarity, to argue for a mutual dependence and development between shared knowledge infrastructures and private capital investments to arrive at a reconstructed Mengerian theory of economic development. Within that theory complementarity is both the cause of endogenous growth, as well as the limit on economic growth (Baetjer 2000; Dekker and Kuchař 2019).

In this paper we first examine Menger's own perspective on economic development. In section two we place Menger's theory in the tradition of endogenous growth from Smith to Marshall and Young and beyond. In the third section we build on more recent research to highlight the peculiarities of Menger's institutional theory of capital. In section four we suggest how this institutionalist reading of Menger's theory of capital and money naturally gives rise to the idea of economic development based on internally complementary structure of heterogenous capital goods that exists within a shared cognitive infrastructure which in turn has important complementarities with regard the very structure of capital goods it makes possible.

I. A MENGERIAN THEORY OF ECONOMIC DEVELOPMENT.

Most of the secondary literature on Menger has focused on his contributions to micro-economics broadly conceived, and rightly so. His major innovations were in the theory of goods, marginal utility, and subjectivism. But equally central to the *Principles of Economics* is the focus on causal relations. In fact, the book opens with that theme. Menger argues that all things are subject to the law of cause and effect:

> Human progress has no tendency to cast it in doubt, but rather the effect of confirming it and of always further widening knowledge of the scope of its validity. Its continued and growing recognition is therefore closely linked to human progress (Menger 1950, p. 51).

The Aristotelian theme of causal relations is developed in section five of the first chapter 'On the Causes of Progress in Human Welfare'. In that section Menger elaborates on his theory of economic development in dialogue with Smith's ideas on the division of labor. Menger argues that the division of labor in a closed community with no growth of knowledge quickly runs into its limits, i.e., cannot lead to further economic growth. As an example, he talks about a tribe of hunter-gatherers who engage in an efficient division of labor, but cannot 'develop'. The treatment is arguably somewhat unfair to Smith who was very explicit that the division of labor is limited by the extent of the market, and so recognized such limits himself.

Nonetheless Menger's critique raises an important point since the extent of any market will be constrained, and so the process of development was always in danger of running into its limits. Menger's reading might be influenced by 19th century classical economics as exemplified by Thomas Robert Malthus and David Ricardo who would, unlike Smith, arrive at theories of stagnation and conflict rather than progressive growth (Hollander 2001). Menger suggests that continued growth is possible through the development of higher order goods. The crucial transition, for Menger, from the hunter-gatherer stage to the next stages was that human beings started planning for future needs through the production of higher order goods. Higher order goods are goods that are produced not directly for consumption, but rather to produce consumption goods in the future. As such he can explain the origins of agriculture as the development of higher order goods such as planting techniques, agricultural tools, etc. This requires knowledge, foresight, and planning. As such both knowledge as well the organization of economic activity become crucial in the theory of economic development of Menger.

Streissler has done much to emphasize the fact that development for Menger is is as much a quantitative as it a qualitative process. He has gone so far as claiming that the *Principles* is an "enquiry into the diversity of goods" (Streissler 1969, p. 249). Streissler is correct in highlighting the fact that for Menger the process of economic development is one of growing complexity from relatively simple wants to more advanced ones, from lower order goods to higher order goods, and most of all increased variety. As Streissler argued, Menger typically talks of the quality and quantity of goods (Streissler 1972). The growing heterogeneity was more generally believed to be a characteristic of advanced liberal societies in Vienna as demonstrated by Deborah Coen (2007). This qualitative process of increased differentiation is a well-recognized aspect of the division of labor and is extended by Menger to the production of capital goods. Just like the increased division and specialization of labor leads to interdependence, so the increased differentiation of goods leads to interdependence, a point to which we will return below.

Menger thus seems to put the common interpretation of Adam Smith on its head:

> The further mankind progresses in this direction, the more varied become the kinds of goods, the more varied consequently the occupations, and the more necessary and economic also the progressive division of labor (Menger 1950, p. 73).

The division of labor is largely the outcome of the growth in knowledge about production, rather than its cause. Menger concludes:

> The quantities of consumption goods at human disposal are limited only by the extent of human knowledge of the causal connections between things, and by the extent of human control over these things. Increasing understanding of the causal connections between things and human welfare, and increasing control of the less proximate conditions responsible for human welfare, have led mankind, therefore, from a state of barbarism and the deepest misery to its present stage of civilization and well-being, and have changed vast regions inhabited by a few miserable, excessively

> poor, men into densely populated civilized countries. Nothing is more certain than that the degree of economic progress of mankind will still, in future epochs, be commensurate with the degree of progress of human knowledge (Menger 1950, p. 74).

We should ask what type of knowledge Menger talks about. From these passages it is clear that he has the type of causal knowledge in mind, with which he opened his book. Menger discusses the conscious knowledge of the relation between human needs and goods that can satisfy those needs on the one hand, and of the relationships between goods of higher order and consumption goods. Menger does not use the concept of technology to refer to this type of knowledge, but it seems fair to suggest that this type of knowledge equates broadly with what we currently call technological knowledge (the notorious A in the Solow growth model). It is a type of knowledge that economists, including Menger, discuss extensively and yet somehow leave largely unexamined since its content is considered to be outside the scope of economics.

There is, however, also a different strand of thinking about economic development in Menger. A strand in which the type of technical and conscious knowledge of causal processes is far less important. That is the institutional theory, most prominently of the emergence of money. In his book *Investigations into the Method of the Social Sciences* (1883/2009) one can find a broader appreciation of historically grown institutions, based on the work of Savigny and other historical thinkers. Menger makes clear that each historical stage has it 'appropriate' type of money (O'Driscoll 1986). As Hayek has done much to elaborate, these institutions contain a type of historically grown knowledge and functionality that have typically stood the test of time. This knowledge is less conscious. In fact, as Hayek makes clear—carrying forward the work of Menger—individuals and societies might be largely unaware of the benefits of particular institutions which have organically grown and, furthermore, that the lack of complete knowledge of the functions that institutional infrastructures may perform is a necessary feature of the development of extended and impersonal orders (Hayek 1945; 1948). This seems to be true for money, but some scholars would suggest that this is also true for property rights and other aspects of institutional infrastructures (such as language) that foster the division of labor (High 2009).

There is a clear interdependence between these institutional infrastructures and the available set of specific goods at any moment in time. Menger, however, leaves this interdependence unexplored in his *Principles*. After the section on economic development he goes on to discuss the interdependence of different types of primary goods (1.6 Property) but makes no connection between that kind of interdependence and his institutional theory. In an important sense, therefore, there are two elements in Menger's theory of economic development which have remained unconnected. The tension, or potential relatedness of these two elements have been pointed out by different scholars (Hodgson 2004; Garrouste 2008; Braun 2020).

II. ENDOGENOUS GROWTH FROM SMITH TO ALLYN YOUNG AND BEYOND

The disagreement we encountered between Menger and Smith was over the relative importance of the effects of the division of labor and the growth of technological knowledge. In the work of Allyn Young (1928), we seem to find an important reconciliation between these two theories. Young suggested that the higher order goods which Menger made central in his theory are only economically viable when the market is large enough, and hence the potential for the use of this type of technological knowledge depends on the size of the market. In Allyn Young's theory, growth is a major source of further growth.

In fact, a more sympathetic reading of Adam Smith than Carl Menger's might suggest that Smith is already aware of parts of the self-reinforcing effects of the division of labor (Loasby 1996). His discussion of the subject is interspersed with examples of small improvements made in the method of production by individuals with intimate knowledge of particular steps in the production process. Here Smith built on Bernard Mandeville and other writers who had already emphasized the growing complexity in the division of labor and the evolutionary nature of the growth of the knowledge that resulted from it (Prendergast 2007). One might argue that Menger is more interested in the larger aspects of causal knowledge present

in production processes, and less in the incremental improvements that Smith describes, but it is nonetheless important to realize that Smith did have a more dynamic view than suggested by Menger. In fact, some scholars have suggested that Smith had something close to an endogenous theory of technological change (Richardson 1975; Lavezzi 2003). What is also important to note, is that this dynamic element on what causes the increase in the level of knowledge is largely absent in Menger, who therefore also does not seem to have a fully dynamic account of economic development.

There is another interesting element to Young's theorizing. Like Menger, he was not too keen on the analysis of individual goods, but instead spoke of the 'togetherness' of economic phenomena. A concept which denotes both interdependence and possible complementarity. In the work of Young it is mostly consumption goods that are interdependent, but it is again important to realize that this interdependence is equally relevant for the complementarity of the set of production methods, consumption goods, and the elements of institutional infrastructures within which economies operate. The growth of markets can easily be hampered by constraining institutional elements (an insufficiently advanced medium of exchange, for instance) or indeed advanced by enabling institutional infrastructures (impersonal rules of property and contract). In Young's endogenous theory of growth these elements do not have a one-off effect, but further enable the expansion of markets, and therefore the potential for the growth of knowledge.

It is in fact in the work of Alfred Marshall that we find some attention to the shared infrastructures that integrate different markets (and hence influence the extent of the market as a result). Marshall distinguishes between the differentiating aspects of the market system, that is the further division of labor and knowledge, as well as the wider variety of goods available, and the integrative aspects of the market system (Marshall 1920/2013, p. 201; Lavezzi 2003, p. 90). Among the latter he includes credit markets and the means and habits of communication (which includes transportation). Again, these are not the institutional elements which Menger highlights, a shared monetary system, or an integrated legal framework around the market, but it at the very least hints at the kind of distinction that we also find in Menger's work.

Marshall's distinction between differentiating and integrative elements of markets can be used to reconcile the two different notions of economic development, and knowledge in Menger. There is some knowledge of a technical kind which becomes more refined and specialized (differentiated), that is essentially the knowledge contained in private production processes. But there is also a kind of knowledge in the form of institutional elements which is shared (integrated). Different participants in the economy rely on the same set of supporting institutions, and Marshall's notion of integrative elements of the economy captures that characteristic well.[1] Integrative elements of markets are certainly not restricted to a set of 'supporting' infrastructures such as transportation and communication, they become salient in the institutional elements supporting private exchange: law, language, and money.[2]

III. MENGER'S INSTITUTIONALISM

Central to the discussion of market enabling institutional elements is the idea of capital. A recent series of publications by Eduard Braun has highlighted that Menger himself seems to have changed his mind, perhaps even repeatedly, on the meaning of capital. Braun (2020) has been particularly interested in the way in which capital theory can serve as bridge between institutional and Austrian economics. A project that has important predecessors. Samuels (1989), Wynarczyk (1992), Garrouste (2008), and others have attempted to rediscover some of these historical institutional elements within the Austrian tradition. Recent years have seen many attempts to reintegrate Austrian economics and institutional analysis, and with some success (Aligica 2014; Boettke 2018), although substantial work still remains to be done (Hodgson 2019). Braun is particularly interested in a historical notion of capital which refers to the way financial assets are used to generate more financial assets in historically specific capitalist systems. The historicist understanding of capital may, at first sight, seem opposed to the alternative—perhaps somewhat ahistorical—definition of capital as a set of higher-order goods which can be used to produce consumption goods.

We believe that the general insight which Braun derives is highly valuable, it is indeed through historically specific organizational forms, or if you will governance forms, that certain types of production (and combinations of goods) become possible. In earlier work Braun et al. demonstrated that there is some recognition of this specific feature of a monetary economy in Mises's work on monetary calculation (Braun, Lewin, and Cachanosky 2016). That perspective fits well with the evolutionary view of the economy which Menger develops in his theory of money. It also highlights the fact that goods do not have intrinsic properties, but only gain economic significance in the plans of individuals, and these plans themselves are institutionally dependent.

What is required is a recognition along the lines of what Richard Wagner argues in his recent work that markets are subject to enormous historical variability (Wagner 2020). Wagner gives two examples to illustrate his proposition. First, consider that until the eighteenth-century landowners would customarily leave their property to their eldest sons. This custom was due to an injunction on trading land which exists in one form or another until the present day in different parts of the world. Before modern real estate and land markets could develop a set of institutions, as rules governing the social world, had to change. That does not mean that there had been no "trading" in land, for example, land could be acquired through marriage. The second example Wagner provides is the fact that women could not own assets in their own name until the twentieth century. The alienability, or salability of goods is thus not written in stone but historically contingent and institutionally determined. It certainly is no one-way process in which ever more goods become alienable or saleable. The abolition of slavery is a good example of a fundamental transformation in market governance, which limited a certain type of exchange. The ban on child labor in many Western countries is another example of modern restrictions on certain types of exchange. Many more examples such as the designation of certain parts of land as national parks or recreational areas can be added. This historical contingency also highlights the extent to which individual plans are dependent on the existing institutional and legal infrastructures. It therefore makes sense to think of legal rules as durable inputs into the production process (Buchanan 1975, chap. 7). Or to think of economic institutions such as the current form of money—which allows for sophisticated forms of monetary calculation—as an important input or enabler of different types of investments.

Later Austrian theorists have expanded on the historical contingency of investment plans and their relevance in the cycle, most notably Böhm-Bawerk (1891). But it is in the work of Ludwig Lachmann that we find an emphasis on the interdependence of individual investment plans (Lachmann 1971). In his theory the notion of heterogeneity of capital goods is combined with the idea that different physical capital goods are complementary to one another. From the perspective of the individual entrepreneur, it is therefore relevant to consider the existing structure of physical capital goods and the investment plans of others. This is equally true for the existing institutional framework. As we have argued elsewhere, there are important complementarities between the institutional order, the organization of markets, and the structure of privately produced capital goods (Dekker and Kuchař 2019).

Above we highlighted the integrative function of institutional infrastructures based on the work of Alfred Marshall. And it was Marshall who did most to emphasize that economic organization is one of the factors of production (Prendergast 1992). Marshall's analysis of industrial clusters is famous (Hart 2021), and the focus on economic organization extends to the analysis of the firm as an organizational form that changes and evolves over time. As Braun and Hodgson highlight the focus on the historical specificity of economic organization dovetails well with the older institutional approach, including the German Historical School which paid much attention to the organizational forms within the economy and of the economy itself. In the historicist perspective the emergence and the evolution of the division of labor is an important part of the process of economic development, and the institutional structure of the economy.

It is one thing to recognize that money, or property rights are important institutional preconditions for the functioning of a market economy. But it is quite another matter to ask, as we suggest Menger did in his work on the emergence of money, how particular economic systems co-evolve with different types of money. The same is true for the legal framework, the system of guilds (or the type of open competition that

came afterwards) and so on. In Marshall and Young that problem does not come to the foreground because they seem to treat the economy merely as a set of different types of goods and organizational forms, which all exist on more or less on the same plane of analysis. This is not the case for Menger who has a clear understanding of the fact that the economic system is entangled with the legal and social system of its time. Therefore, it is in his work that the tension comes clearly to the fore.

To avoid a kind of economic imperialism in which everything is treated as capital goods that are inputs into the production process, we must develop an understanding of how particular forms of private economic organization are complementary with institutional and legal frameworks. This is also what the stages theory of economic development that both Smith and Menger develop suggests. And what is somewhat cryptically but accurately captured in Allyn Young's idea that "the division of labour depends in large part upon the division of labour" (Young 1928, p. 533). What Young says is that as new private plans develop, as new technologies are discovered and as organizational forms are improved, there is a parallel social process that coevolves with the increased division of labor. The further that this division of labor progresses, and the more heterogenous industries and goods become, the more scope there is for a further division of labor.

In other words, further private economic specialization, a further refinement of causal knowledge, and the resulting division of labor require increased institutional and legal integration. There is by now a good literature on the way in which the Habsburg Empire inspired later ideas on European and international integration within the Austrian tradition (Van der Haar 2011; Slobodian 2018; Rohac and Mingardi 2021).

Young identifies a mutually reinforcing effect of the two elements that Menger and Smith identify. The extent of the market on the one hand and the growth of knowledge on the other. As occupations and goods become more varied through the process of the division of labor, there is a greater scope for the development of new knowledge in the form of plans, technology, and organizational forms. But we believe that Menger points to one additional type of development that results from the increased division of labor; one that is, as far as we are aware, largely neglected in most of the literature on economic growth and development.

IV. THE CROSS-COMPLEMENTARITY OF TWO TYPES OF KNOWLEDGE

In his *Investigations* Menger compares the emergence of common law in an analogous manner to how he describes the emergence of money (Menger 2009, p. 223). He argues that the initial emergence of both law and money was a spontaneous process. Afterwards, thought Menger, this process came to be refined by "reflective consideration and judgment of needy human nature and the conditions that environ the members of a nation" (Menger 2009, p. 230). He emphasizes that its design is not the outcome of human intelligence but did develop through reflective judgment by members of the community in a process of trial and error. As such we can see that the legal rules which facilitate voluntary private exchanges are to a large extent an unintended by-product of human interaction. But once those rules are developed into common law there is a reflective process through which common law is altered and sometimes improved.

The knowledge thus developed creates a shared framework in which private activity can take place. But just as individual plans and their feasibility depend on the social structure of plans, so the feasibility of individual plans depends on their compatibility, or if you will complementarity with this shared body of knowledge. It is probably true that a large part of the reason that we find mutual compatibility between individual plans has to do with the fact that there is a shared framework or a shared body of knowledge. Demsetz has even suggested the organization of knowledge between what is shared or rather common knowledge and what is specialized knowledge is one of the crucial problems in societal organization (Demsetz 1988, p. 157). By analogy we might argue that another crucial problem in societal organization is that of what is left to private forms of organization and what is organized collectively and governed as commons.

In a discussion on the contributions of Alfred Marshall, Brian Loasby speaks of the organization of knowledge (Loasby 2021). It is a good angle from which to approach the way Menger thinks about the process of the division of labor, which Loasby described as the combination of coherence and change. The cen-

trality of this problem is recognized by some scholars working in the law and economics tradition. Epstein, for example, provided a strong argument for a relatively minimal *and* stable shared framework of rules to allow for the greatest freedom of private activity (Epstein 1997). But more recent literature has emphasized the benefits of having more flexible social and legal infrastructures that allow for new kinds of activities to develop (Hadfield 2016), as well as a better appreciation of the extent to which many resources in society are shared (Frischmann 2012). This problem is not restricted to legal or economic problems. In language we also see a trade-off between the need for specialization and precision in the form of jargon and the need for a shared vocabulary and understanding. Recurring complaints about too much jargon can be interpreted as an argument that too much specialization of language has come at the cost of easy coordination based on shared language. And regarding money we can also observe this issue. Money functions well when it is widely accepted and shared, but needs might arise for specialized monies or tokens, between different regions and countries, or for specific purposes such as in the recent emergence of cryptocurrencies. In all these matters it is a crucial question of organization to which extent such infrastructures are shared and stable, or organized in more specialized and smaller communities, or even private.

The spheres beyond law demonstrate that this is not merely a problem of the proper role of the state in the economy. Rather it is a genuine problem of economic organization and the governance of markets, which can be done privately, through the commons, or publicly. As Hodgson, building on Marshall, recently emphasized in an essay on the limits of markets, knowledge is the most powerful engine of production (Hodgson 2021). It is the organization of knowledge both within the firm (private governance), within society (as knowledge commons) and within the state (as the governance of legal rules) that is the central problem in the Mengerian perspective of economic development.

Menger in the second edition of his *Principles* (Menger 1923) pays more attention to the institutional variety in types of governance that can be found in the economy (Becchio 2014; Dekker 2021). A crucial issue in this way of thinking becomes how we ensure the proper balance between what Marshall calls the integrative elements of markets and the private or specializing elements of markets. The combination, or rather the problem of economic organization that results from this tension is central to Menger's work, which on the one hand highlights the benefits from the division of labor and the resulting division and specialization of knowledge and on the other hand the emergence of integrative institutions which facilitate private exchange, money being the exemplary case, but certainly not the only one.

V. CONCLUSION

We have suggested that Menger's evolutionary view of the growth of knowledge gives rise to a novel perspective on economic development. The same perspective that Menger applies to law and money can be applied to different elements of knowledge. And hence we argue that alongside the development of markets, often even as an unintended consequence of private exchange, a shared cognitive framework develops. This cognitive framework consists of the relevant market categories, classifications, as well as instruments of interpretation and evaluation which facilitate both production and consumption choices. It is fully in line with Menger's subjectivism as well as his attention to the increasing heterogeneity of economic activity and consumption goods, to think that with the expansion of the quality and quantity of goods we will also find an expansion of the cognitive frameworks used to understand, classify and value these goods.

The contemporary of Menger, Georg Simmel, articulated this point of the interdependence and complementarity of different institutions well. Technological change and the resulting changes in the division of labor is mediated by the existing legal order, and we might add the broader cognitive frameworks in which the technology is developed:

> It is thus in the very least a claim prone to misunderstanding to consider the use of the steam engine as the cause of social and legal transformations of this century. This mere technology has

> nothing to do with society and law as such. Only because it impinged upon an existing legal order and was conceived in the form of the same, the process emerged which one describes as the degradation of the crafts and the proletarization of the masses (Simmel 2018, p. 201).

Simmel's analysis is somewhat more materialistic than an Austrian point of view would suggest but the conclusion he derives from his analysis is highly insightful:

> Under a different legal order, for example under a socialist or anarchist order, the invention of the steam engine would have had completely different social and legal consequences. The social significance of a changed production technology is thus dependent on its manifestation in specific legal forms, thereby creating social phenomena which can then push towards changes of the legal constitution.

What Simmel illustrates here is not merely the interdependence of the institutional framework and the set of existing goods, but also the extent to which the two have to be compatible, the extent to which there is cross-complementarity between the two. The accompanying problem of economic organization is to find the appropriate way in which to organize productivity while harnessing new technologies, that is to find an economically profitable way of organizing new types of production. That, and not the technology itself, determines whether the benefits from a particular technology can be realized. As Baetjer (2000, p. 147) argued in a related context: "What prevents exponential growth is neither diminishing returns nor upper bounds to human capital, as growth models assume. It is the constant challenge of maintaining capital complementarities in a world of incomplete and rapidly changing knowledge."

In this paper we have shown that Menger's work provides an understudied angle for the analysis of the relationship between knowledge and economic development. We have placed Menger in the long tradition of endogenous growth thinkers within economics but have shown that Menger was more aware of the dual nature of knowledge, both private and shared. Menger's theory of the development of shared institutions such as money can be combined with his theory of increased heterogeneity and complexity of private knowledge and goods. In this paper we have shown that these two building blocks give Menger a unique position in the tradition of thought on endogenous growth. It enriches Marshall's notion of integrating and differentiating elements of markets, and provides the tools for a dynamic analysis that can explain the origins of exponential growth through the increased differentiation and heterogeneity of knowledge, as well as its limits, through the emphasis on the necessity of shared knowledge and market-enabling knowledge commons.

NOTES

1 Prendergast highlights that Cantillon also saw the importance of the existence and design of market institutions for both the coordination of individual plans and the knowledge contained in them (Prendergast 2007, p. 686).

2 In *The Wealth of Nations* Adam Smith outlines extensively how important the breaking down of regional trade barriers and regulatory differences as well as differences in standards of measurements were in the creation of an integrated market within Britain. The difficulty of maintaining an integrated market despite cultural and linguistic differences was well-known to Menger from his experience in the Habsburg Empire. And in the German-language literature the reflections on German unification and what it meant for the development of the economy were omnipresent.

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