INTRODUCTION

I

The 1920s and 1930s were a glorious era in the history of the Austrian School of economics. In those days, the city of Vienna saw the first genuine culture of scholars working in the tradition established by Carl Menger, and this culture radiated throughout the rest of the German-speaking world and into other countries.

Many important works of this period have been translated into English, in particular, the books by Ludwig von Mises and F.A. Hayek, and also works of other scholars like Fritz Machlup, Gottfried von Haberler, Oskar Morgenstern, Franz Čuhel, Hans Mayer, Paul Rosenstein-Rodan, and Leo Schönfeld-Illy.[1]

Among the pioneering works of this time that have hitherto not been accessible to the anglophone public is that by Richard von Strigl. First published in 1934 under the title *Kapital und Produktion* by the former Austrian Institute for Business Cycle Research in its series "Contributions to Business Cycle Research,"[2] it was reprinted in 1982 by Philosophia Verlag in

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[1]For a sample of writings by these authors from the inter-war period see *Austrian Economics: A Sampling in the History of a Tradition*, Israel M. Kirzner, ed., vol. 2 (London: William Pickering, 1994).

[2]*Beiträge zur Konjunkturforschung,* edited by the Österreichischen Institut für Konjunkturforschung. The first seven volumes in this series are all classics of Austrian economics: F.A. Hayek, *Geldtheorie und Konjunkturtheorie* (Vienna: Hölder-Pichler-Tempsky, 1929); Fritz Machlup, *Börsenkredit, Industriekredit und Kapitalbildung* (Vienna: Springer, 1931); F.A. Hayek, *Preise und Produktion* (Vienna: Springer, 1933); Erich Schiff, *Kapitalbildung und Kapitalaufzehrung im Konjunkturverlauf* (Vienna: Springer, 1933); Oskar Morgenstern, *Die Grenzen der Wirtschaftspolitik* (Vienna: Springer, 1934); Fritz Machlup, *Führer durch die Krisenpolitik* (Vienna: Manz, [1934] 1998); and Richard von Strigl, *Kapital und Produktion* (Munich:

Munich under the editorship of Professor Barry Smith. The English translation is due to the efforts of Professor Hans-Hermann and Mrs. Margaret Hoppe, and has been made possible by a gift to the Mises Institute by Dr. Mark Skousen. It has been distributed for some time as a typewritten manuscript and is only now being published as a book complete with an index.

In *Capital and Production,* Strigl seeks to come to grips with the causes and possible cures for the Great Depression that plagued the Western world in the aftermath of 1929. Although many other Austrian economists of the time were engaged in similar projects, Strigl's work stands out for its analysis of time-consuming roundabout production processes and of their relevance for the Great Depression.[3] This is what makes the book relevant again at the beginning of the twenty-first century, at a moment of history marked by the most extraordinary global bull market the world has ever experienced.

Strigl combined Jevons's and Böhm-Bawerk's theory of capital into a genuinely Austrian theory of the economy as a whole; and he carefully analyzed the impact of credit expansion on the workings of this macroeconomy. His treatment of these issues is even more systematic, rigorous, and clear than the well-known works by Hayek which covered the same ground. In fact, Hayek hailed Strigl's work "for the simplicity and clarity of exposition of a notoriously difficult subject."[4]

Capital and Production is therefore not merely of interest for historians of thought. Rather it is a yet-to-be-discovered treasure trove for modern economists who seek to develop capital-based macroeconomics. Strigl's ideas will enrich the current literature in this

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Philosophia, [1934] 1982). After Mises's departure from Vienna in 1934, Morgenstern, who in 1931 had succeeded Hayek as the director of the Institute, set out to publish works with a markedly less Austrian orientation. See for example volume eight in the series, Ragnar Nurske, *Internationale Kapitalbewegungen* (Vienna: Springer, 1935).

[3]Other important contemporary works in this field were Mises's booklet *Die Ursachen der Wirtschaftskrise* (Tübingen: Mohr, 1931); Hayek's *Prices and Production,* 2nd ed. (London: Macmillan, [1931] 1935); and Lionel Robbins's *The Great Depression* (Plainview, N.Y.: Books for Libraries Press, [1934] 1976).

[4]F.A. Hayek, "Richard von Strigl," *Economic Journal* 54:285 (1943).

field and chances are actually high that they will have a greater success now than in the 1930s when the language barrier, political circumstances, and the general intellectual climate prevented them from having any major impact on economists and the public.[5]

Not all readers will be entirely satisfied with Strigl's analysis of the impact of money on the economy. But they will come to appreciate Strigl as a great pioneer of capital-based macroeconomics whose ideas have particular relevance in the present context.

II

Like many other luminaries of pre-World War II Austrian intellectual and artistic life, Richard Ritter von Strigl was a native of former Moravia (which is today a part of the Czech Republic) where he was born February 7, 1891. He studied at the University of Vienna and was admitted as a very young man to the famous private seminar of Eugen von Böhm-Bawerk, which had produced a whole generation of promising economists, such as Otto Bauer, Nicolai Bukharin, Ludwig von Mises, Otto Neurath, and Joseph Schumpeter.

After World War I, Strigl continued his research and wrote an important book on economic theory for which, in 1923, he received his Habilitation—the traditional professors' diploma of the universities of Central Europe. Five years later he acceded to the rank of titular extraordinary professor. However, like Mises, Machlup, Haberler, and other great Viennese economists of the time, he had to earn his living largely outside of academia, eventually becoming a high official at the Austrian Unemployment Insurance Board.

Strigl was a modest, humane, cultured, and very bright man who impressed both his students and impartial colleagues. As one of his pupils, Joseph Steindl stated after his death, "There were few of his pupils or of the foreign economists who would

[5]For contemporary works in capital-based macroeconomics, see Mark Skousen, *The Structure of Production* (New York: New York University Press, 1990) and Roger Garrison, *Time and Money* (London: Routledge, 2000). A good modern discussion of capital theory is also in Peter Lewin, *Capital in Disequilibrium* (London: Routledge, 1999).

visit Vienna and sojourn in his circle of those days who did not very much like him."[6] He also had extraordinary gifts for systematic exposition and step-by-step argument, which made for great success in the classroom. Due to these personal and intellectual talents, Strigl had a considerable influence on the generation of young economists graduating from the University of Vienna after World War I. More than any other teacher he shaped the minds of Hayek, Haberler, Machlup, Morgenstern, and other future great Viennese economists.[7]

Strigl convinced his students that economic theory could be studied in its own right, that is, without engaging in previous empirical field studies. And this theory could be used both to explain economic phenomena and to direct political action. Today these views are fairly widespread if not yet part of mainstream economics. However, in the interwar period, matters were very different.

Despite the flourishing of Austrian economics in the 1920s and 1930s, the dominating intellectual force in the economics departments of Germany and Austria was the so-called Historical School. The representatives of this school of thought despised economic theory for its advocacy of universally valid economic laws. They argued that laws could only be as universal as the conditions to which they referred. Since history was a process of constant transformation of the conditions of human existence, there could be no such thing as general economic law. At best, there could only be "laws" describing the economy of a more or less unique period and, at any rate, all insights about this economy had to be derived from studies of concrete households, firms, administrations, towns, etc.

Moreover, Strigl's department at the University of Vienna was a stronghold of antirationalist "organic" economics. The most important advocates of this doctrine were Othmar Spann

[6] As quoted in Hayek, "Richard von Strigl," pp. 284–86.

[7] According to Hayek, "Richard von Strigl," p. 284, these young economists "owed more to him than to any other teacher." See also Joseph Steindl as quoted in ibid. and Steindl, "Strigl, Richard von (1891–1942)," in *The New Palgrave: A Dictionary of Economics*, J. Eatwell, M. Milgate, and P. Newman, eds. (London: Macmillan, 1987), vol. 4, p. 521.

and his pupils.[8] Spann claimed that all parts of the economy like households and firms could only be understood as elements of an organic whole. This contrasted sharply with the approach of the Austrian economists who sought to explain economic phenomena as resulting from individual action and from the social interaction of individuals (the principle of methodological individualism).

Single-handedly Strigl made an effective case for economic theory and methodological individualism in this intellectually hostile environment. His early death November 11, 1942 prevented him from making the post-World War II University of Vienna safe for the Austrian School. In an obituary for Strigl, F.A. Hayek mourned: "with his death disappears the figure on whom one's hope for a preservation of the tradition of Vienna as a centre of economic teaching and a future revival of the 'Austrian School' had largely rested."[9]

III

Strigl's *Capital and Production* is squarely rooted within the tradition of the Austrian School, that is, within the approach to economic analysis initiated by Carl Menger's work on economic principles.

Ever since the first publication of *Grundsätze der Volkswirtschaftslehre* in 1871, Mengerian economic analysis had inspired an increasing number of young economists in Austria and Germany. As a result, in the period from 1871 to 1940, each new generation of German-language Austrian economists was larger than the previous one.[10]

The second generation, active from the 1880s to the 1910s, comprised Menger's most brilliant followers Eugen von Böhm-Bawerk and Friedrich von Wieser, and a few lesser economists

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[8]See for example Othmar Spann's *magnum opus*, *Der wahre Staat* (The True State) (Leipzig: Quelle and Meyer, 1921).

[9]Hayek, "Richard von Strigl," p. 285.

[10]On the impact of Menger's work on other countries, in particular on the United Kingdom and the United States of America, see Joseph T. Salerno's important work, "The Place of Mises's *Human Action* in the Development of Modern Economic Thought," *Quarterly Journal of Austrian Economics* 2, no. 1 (1999): 35–65.

such as Emil Sax. He also influenced Knut Wicksell, who at that time wrote and published in German.

By the early 1900s, the third generation—Strigl's generation—came into its own: Ludwig von Mises, Joseph Schumpeter, Hans Mayer, Karl Schlesinger, Franz Weiss, Leo Schönfeld-Illy, Franz Čuhel, Robert Liefmann, and others.

Then, in the 1920s, a fourth generation of Austrian economists arose which included F.A. Hayek, Fritz Machlup, Gottfried Haberler, Oskar Morgenstern, Ewald Schams, Paul Rosenstein-Rodan, Wilhelm Röpke, Walter Eucken, Friedrich Lutz, Ludwig Lachmann, Alexander Mahr, Karel Englis, and others. Some of these economists would become very famous after World War II, when they continued their career in the United States of America. Hayek, who received the 1974 Nobel Prize in economics, had a very strong impact on Austrian economists of the 1970s and 1980s.

Although Carl Menger influenced all these generations considerably, it is not surprising that individual contributions differed from one another in more or less important respects. Here two factors come into play.

On the one hand, other traditions than the one established by Menger often had a crucial impact on these economists. For example, Léon Walras influenced Wicksell's, Schumpeter's, and Schlesinger's work to such a degree that it would in fact be more appropriate to classify these men as Walrasian rather than Austrian economists. And Walter Eucken, Ludwig Lachmann, and other theoretically-minded economists from Germany labored under the legacy of the Historical School.

On the other hand, Menger's work was itself open to different interpretations, or at any rate inspired its readers in different ways, and his followers did not always share the same emphasis in the elaboration of his approach. Thus, for example, Wieser stressed what he perceived to be the psychological foundations of value theory whereas Böhm-Bawerk tended to emphasize the role of objective factors in the determination of value, such as quantities of goods and physical productivity. In Mises's eyes, human choice was the cornerstone of economic analysis. By contrast, the early Hayek and many other students of Mises's were

particularly interested in the equilibrium relationships between market prices and the structure of production; and the later Hayek saw the acquisition and use of knowledge as the central problem of economic theory.[11]

Strigl was primarily interested in the scientific foundation of policy proposals, an interest that he shared with Ludwig von Mises. This concern for practical questions incited him to take particular care of methodological problems, and he was very effective in integrating methodological studies into his research. All in all, Böhm-Bawerk had the most lasting impact on Strigl, but as the reader of this volume will find, the ideas of Walras, Wieser, Schumpeter, and Mises also found their way into his writings.

IV

Richard von Strigl is the author of pioneering studies on economic theory, applied economics, capital theory, and the relationship between theoretical and historical research.

He published four books. Two of them deal with economic theory applied to specific areas: *Kapital und Produktion* and *Angewandte Lohntheorie* (Applied Wage Theory, 1926). In the latter work he showed himself an unabashed Böhm-Bawerkian, arguing that labor unions cannot increase the wages of all members of the working classes. His last book is an introduction to economic principles that F.A. Hayek called "probably the best modern introduction to economic theory available in German" at the

[11]It is therefore in many respects misleading to speak of "the" Austrian School of economics while in fact there are distinct and competing lines of the Austrian tradition. Two of these lines dominate the contemporary scene: on the one hand, the Menger–Böhm-Bawerk–Mises–Rothbard line and, on the other hand, the Menger–Wieser–Hayek–Kirzner line. See Murray N. Rothbard, "The Present State of Austrian Economics," *Journal des Economistes et des Etudes Humaines* 6, no. 1 (1995): 43–89; and Joseph T. Salerno, "Mises and Hayek Dehomogenized," *Review of Austrian Economics* 6, no. 2 (1993): 113–48, and "The Place of Mises's *Human Action* in the Development of Modern Economic Thought." Hans-Hermann Hoppe, "Einführung: Ludwig von Mises und der Liberalismus," in Ludwig von Mises, *Liberalismus* (Sankt Augustin: Academia Verlag, 1993) makes a compelling case that the Menger–Böhm-Bawerk–Mises–Rothbard line best reflects the essence of the Austrian tradition.

time.[12] Here he discusses the problems that would occupy the energies of the next two generations of neoclassical economists: the shape of the cost curve from which he hoped to derive a long-run supply curve, and pricing in different market structures, in particular competitive and monopoly prices.

Of particular interest is his first book, *Ökonomische Kategorien und die Organisation der Wirtschaft* (1923) which gained him at once a wide reputation and influenced many economists, in particular the younger ones who represent the fourth generation of Austrian economists.[13]

The book deals with methodological problems of economics and with the relationship between theoretical and historical research in the social sciences. Its title can most appropriately be translated as "fundamental economic concepts and the data of the economy." According to Strigl, economic science deals exclusively with states of affairs characterized by scarcity. All the relevant aspects of such states of affairs can be described with just four fundamental economic concepts: (1) economic subject, (2) ownership, (3) possible uses of a good, and (4) value scales. These concepts have the nature of general "forms" with the help of which one can classify or "capture" manifold "relative-historical contents." This classification of concrete reality by means of economic concepts is the task of descriptive economics, one of two branches of economic science.

The four fundamental concepts are also important because of certain necessary relationships that exist between these concepts—and thus, indirectly, between the relative-historical contents that correspond to the concepts in any concrete situation. Describing these relationships is the subject matter of theoretical economics, the other branch of economic science.

Because the fundamental concepts are formal, the relationships between them exist independently of their concrete content

[12] Hayek, "Richard von Strigl," p. 285. The title of Strigl's last book is *Einführung in die Grundlagen der Nationalökonomie* (Vienna: Manz, 1937).

[13] See Hayek, "Richard von Strigl," p. 285. See also the 1923 book review by Gottfried Haberler, "Economics as an Exact Science," in *Austrian Economics*, Israel M. Kirzner, ed. (London: William Pickering, 1994), vol. 2.

in any given historical situation. Thus, Strigl can concede to the economist of the Historical School that history is in constant flux and transformation as it shifts from one unique period to another. Yet this does not alter the fact that at all times and places there are (1) economic subjects who (2) own certain goods that (3) can be used in some ways, but not in others, and that (4) the way in which a good is used is chosen according to the individual's value scale. And since this is so, the laws described by economic theory exist always and everywhere, and economic theory thus contains universally valid propositions.

Hence, Strigl's fundamental economic concepts perform two important tasks. On the one hand, they serve to classify all relevant historical facts. They thereby "capture" empirical reality and link economic theory to the real world. On the other hand, they are themselves building blocks of economic theory, which in fact is nothing but a description of the relationships that exist between them. This approach to clarifying the link between theoretical and historical research has had a considerable influence in Austrian and German economics. The most important follower of Strigl was the great Freiburg economist Walter Eucken whose work can be considered as an elaboration of Striglian economics.[14]

Unfortunately, Strigl's works fell into almost complete oblivion. To a strong degree, this was the fate of the entire Austrian School in the Germanic countries. Their bastion had always been Vienna and it was from this center that their ideas spread to the rest of Austria and to Germany, Holland, Scandinavia, all of Eastern Europe, and the northern cantons of Switzerland. Yet beginning with the early 1930s, Vienna's Austrian-School culture died by exodus. Mises left for Switzerland where he found a prestigious position that would allow him to write his *magnum opus*. Hayek, Machlup, and Haberler departed for the United Kingdom or the United States, where they could obtain academic positions foreclosed to them back home. And after the 1938 *Anschluß*, many others left because Nazi Austria made life unbearable for Jews like Morgenstern and for all non-Jews who could not find or accept any *modus vivendi* with the National Socialist German Workers' Party.

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[14]See Walter Eucken, *Kapitaltheoretische Untersuchungen* (Jena: Fischer, 1934), and *Grundlagen der Nationalökonomie*, 9th ed. (Berlin: Springer, [1939] 1989).

Although Strigl had remained as the last member of this group at the original home of the School, for him too life and work had become unbearable. His health was gravely affected and he was disgusted by the opportunistic behavior of many of his countrymen. Joseph Steindl wrote at the time:

> Since the invasion of Austria he has been silent; we have not heard of any further publication of his. This is not surprising to those who knew him, and it is probably not only due to an illness which befell him in 1939. The spectacle of the conversion overnight of so many to a new creed was not congenial to him who had so conspicuously lacked the talents of a careerist in all his professional life.[15]

With Strigl's death the Austrian School of economics ceased to exist as an independent force in post-World War II Austria and Germany. It became a closed chapter in the intellectual history of these countries and continued to thrive only in the United States, where Strigl's ideas are now finally beginning to receive the attention they deserve.

V

Capital and Production is an outstanding contribution to economic science and a splendid manifestation of the pedagogical talents of its author. Strigl proceeds in a step-by-step manner to give an account of the workings of the macroeconomy. This account is remarkable in two ways.

First, his argument makes much scarcer use of aggregates than John Maynard Keynes's *General Theory* which, published two years after *Capital and Production*, unfortunately set the standard for macroeconomic reasoning until our own times. But Strigl and Keynes differ not only in regard to the scope they attribute to the use of aggregates, but also in respect to the very use they

[15]Steindl as quoted in Hayek, "Richard von Strigl," p. 285. The outstanding example of a careerist was Hans Mayer who had found a *modus vivendi* with the Nazis, just as he would later make an arrangement with the Socialist Party of Austria, which would rule the country after World War II. It is therefore probably not only for doctrinal reasons that Hayek had called Strigl the "last" Austrian economist in Vienna, omitting Mayer.

make of them. Keynes and the mainstream of macroeconomists seek to uncover constant relationships between the aggregates themselves; for example, they look for constant relationships between the supply of money on the one hand, and the price-level, employment, and output on the other hand. By contrast, Austrian economists like Strigl are not interested in the relationships between aggregates unless they can trace them back to human decisionmaking and to the individual (or marginal) objects that human beings deal with in their actions. For Strigl, then, macroeconomics primarily consists in tracing the connections that exist between all individual prices and quantities "until a picture emerges in which each phenomenon is co-determined by every other, and in which the law-governed nature of the whole follows from the determining forces of each part" (p. 39).[16]

Second, Strigl builds his theory of the macroeconomy on an original account of the part played by different forms of capital. In particular, he stresses the fundamental role that consumer goods, or means of subsistence, play in connection with the fact that production takes time. When consumer goods are used to sustain laborers engaged in time-consuming roundabout production processes, they are used as "free capital" (p. 27). Since without sustenance for laborers no such roundabout production processes can be started at all, consumer-goods-used-as-capital are the most fundamental or "originary form" (p. 62) of capital.

This fundamental insight, that productively-used consumer goods are originary capital, had already been expressed in

[16]Low-aggregation analysis is a hallmark of Austrian capital theory. Yet Strigl surpasses in this respect most other Austrian capital theories. Knut Wicksell, *Über Kapital: Wert und Rente* (Jena: Fischer, 1893), *Geldzins und Güterpreise* (Jena: Fischer, 1898), and *Lectures on Political Economy* (London: Macmillan, 1934); Irving Fisher, *The Nature of Capital and Income* (New York: Kelley, [1906] 1965); F.A. Hayek, *Geldtheorie und Konjunkturtheorie*; Mark Skousen, *The Structure of Production* (New York: New York University Press, 1990); and even Murray N. Rothbard, *Man, Economy, and State,* 3rd ed. (Auburn, Ala.: Mises Institute, [1962] 1993), take recourse to higher degrees of aggregation than does Strigl (but to far lower degrees than the economic mainstream). Capital theories that strictly and entirely avoid reference to aggregates are in Ludwig von Mises, *Human Action*, Scholar's Edition (Auburn, Ala.: Mises Institute, 1998), chap. 28, Ludwig Lachmann, *Capital and its Structure*, 2nd ed. (Kansas City: Sheed, Andrews and McMeel, 1956), and Israel M. Kirzner, *An Essay on Capital* (New York: Kelley, 1966).

Jevons's wage-fund theory of capital, and it is still common stock in Austrian economics.[17] However, no one has surpassed Strigl in systematically analyzing the implications thereof, and in integrating these findings into a theory of the macroeconomy. His legacy to present-day capital theorists rests to a great extent mainly on this contribution.[18]

One important implication of this insight is that it is unwarranted to conceive of capital from a purely technological point of view. Machines, buildings, etc.—that is, those capital goods most readily identified with the notion of capital—are themselves products of previous production processes which, ultimately, make use of labor, land, and "productively-used" consumer goods. Moreover, capital goods can only be used if corresponding quantities of consumer goods are fed into the production process to sustain the laborers who work with these capital goods. Using capital goods in production processes and supporting these processes with consumer goods are nothing but two aspects of "one and the same process" (p. 24). In short, the quantities and qualities of capital goods in use at any time depend ultimately on what people choose to do with the consumer goods they control. A man can choose to use all his consumer goods in "pure consumption" or to use a part of them (his "savings") in "productive consumption"; that is, he can use this part to sustain himself or others while being engaged in a productive venture. Depending on such choices, consumer goods become either pure consumer goods or originary capital. Hence, whether one and the same

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[17]See William Stanley Jevons, *Theory of Political Economy*, 5th ed. (New York: Kelley, [1871] 1956), pp. 223f.; Eugen von Böhm-Bawerk, *Positive Theorie des Kapitals*, 4th ed. (Jena: Fischer, 1921), p. 139; Mises, *Human Action*, pp. 488, 501; and Rothbard, *Man, Economy, and State*, p. 46.

[18]Also, Strigl anticipated the main tenets of George Reisman's net-consumption/net-investment theory of interest and profit (see Reisman's *Capitalism* [Ottawa, Ill.: Jameson Books, 1996], pp. 719ff.). Strigl insisted that (a) the rate of interest is codetermined by savings (the wage fund), marginal productivity, and the size of the "rations" (see pp. 68, 71) and that (b) the volume of interest payments and entrepreneurial profits corresponds exactly to the extent of pure consumption by entrepreneurs and capitalists. See pp. 56ff., 99, and 103.

physical object is capital depends ultimately on the choices of the market participants; capital formation has a subjective basis.[19]

Strigl then sets out to give a capital-based explanation of the business cycle by discussing the impact of the creation of "new money" on the real economy.[20] If the new money reaches the market in the form of a "credit expansion," that is, if it first reaches the credit market, then it will depress the interest rate below its equilibrium level. As a result, two shifts will occur in the structure of production: "First, when consumer-goods production is expanded, capital will be consumed; and second, when roundabout production is expanded there will be an increasing immobilisation of capital investments" (p. 131). The result is an overall impoverishment of society. This is, *in nuce*, Strigl's explanation of what caused the Great Depression.

The two appendices to *Capital and Production* merit particular attention. In the first one, Strigl deals with methodological problems and political implications of business cycle theory. The second, on the concept of capital, is a splendid general conclusion to the whole book. Here Strigl drives home his main point: that without proper attention to the role of the subsistence fund, capital theory goes astray. It was "all too concerned with outwardly visible occurrences: the supply of durable capital goods and the far-reaching synchronization of production" (p. 161). The result was the "nonsensical doctrine of a surplus of capital" (p. 162), that is, the contradiction of Say's Law, and the idea that synchronization makes time irrelevant (p. 163).

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[19]This subjectivist nature of capital—the fact that capital is tied up with individual plans and choices—was later stressed by Mises, *Human Action*, pp. 488, 492; Lachmann, *Capital and its Structure*; and Kirzner, *An Essay on Capital*.

[20]This integration of capital theory and the theory of money into a business cycle theory was first outlined in Ludwig von Mises, *Theorie des Geldes und der Umlaufsmittel* (Munich and Leipzig: Duncker and Humblot, 1912), translated as *Theory of Money and Credit* (Indianapolis, Ind.: Liberty Fund, 1980). It became the hallmark of Austrian works on business cycle theory as manifested, for example, in the works by Hayek, Rothbard, and Skousen.

VI

Capital and Production has all the features of a classic of economic science: it is clear, profound, and systematic. Still it might be useful to comment on some aspects of Strigl's analysis that otherwise might escape attention. In particular, the following observations are meant as a guide for those readers who are not yet fully acquainted with the whole spectrum of Austrian works on capital-based macroeconomics.

Strigl's method of analysis is to focus on the static economy and on problems of reproduction of capital (see, for example, pp. 17, 38, 88f.). This was the methodological fashion of the day and Strigl shows himself a true master of the art of seamlessly integrating methodological and applied work. Today, equilibrium analysis is not very popular among many Austrian economists since it distracts attention away from what these modern scholars consider to be most important: uncertainty and institutions created to handle uncertainty. Yet even apart from questions of emphasis one may notice that Strigl's method has substantial repercussions for his analysis. For example, his emphasis on the reproduction of capital runs the risk of ignoring the fact that capital goods permit a lengthening of roundabout production by virtue of their mere existence (see Mises, *Human Action,* Scholar's Edition [Auburn, Ala.: Mises Institute, 1998], pp. 492, 495), even if they cannot be profitably reproduced.

Furthermore, so far as the general procedure of the analysis is concerned, Strigl does in fact not heed his announced intention (p. xxx) to first analyze a barter economy and only then turn to dissect the impact of the "veil of money." Rather, his discussion of the law of cost, crucial for his argument in chapter two, refers to money prices.[21] He correctly states: "Each factor of production whose marginal product can obtain a price larger than the price

[21] Let us observe in this context that Strigl lacks a clear distinction between value and physical productivity in his discussion of the law of diminishing marginal productivity and of the law of costs. He sets out (on pp. 48ff.) to discuss marginal productivity exclusively in physical terms. But when it comes to stating the law of costs, he switches to value terms; for now he compares prices paid for marginal physical products with prices paid for factors of production (see pp. 51f.). However, we can exculpate Strigl since the first satisfying account of the relationship between marginal physical productivity and marginal value

of this factor will be employed up to the point at which these two prices are equal." It follows that the two prices must be money prices since otherwise it would be impossible to tell whether they are equal or not. It is therefore best to read the second chapter, not as an account of the connectivity of prices in a barter economy, but as a description of the connectivity of money prices under the impact of nonmonetary factors. These are, for example, the supply of factors of production, the law of return, and interest.

It also has to be observed that Strigl completely neglects the political factors determining economic growth and the formation of the economy's structure of production. Apparently in the 1930s only Mises was courageous enough to point out that political organizations, like labor unions, were responsible for the unnecessary aggravation of the economic crisis of 1929. Strigl's account of the Great Depression, and Striglian interpretations of similar situations, as pertinent as they might be on behalf of the relationships between money, prices, and production, thus need to be complemented by an analysis of such political factors.[22]

Speaking now more narrowly about capital-based macroeconomics, we notice that Strigl does not offer a complete disaggregation of "capital." He distinguishes between free capital, intermediary products, and fixed capital. This is progress in comparison to the theoretical treatment of capital by most of his predecessors. And the three concepts are located on a much lower level of aggregation than "aggregate demand and supply" etc., which are still fashionable in modern economics. However, the fact remains that all these aggregates are aggregates and thus deal with the very heterogeneous goods that we find in reality as homogeneous blobs. As Mises would observe some years after *Capital and Production* appeared, there is no such thing as a class of free capital. There are only concrete and specific goods. Each is well suited only for the satisfaction of a very limited set of needs,

productivity (that is, marginal money-price productivity) was published almost thirty years later by Rothbard in *Man, Economy, and State*. Rothbard also emphasizes that factors of production earn the *discounted* value of their marginal product rather than, as Strigl (p. 72) asserts, the entire marginal product.

[22]See for example the studies by Murray N. Rothbard, *America's Great Depression*, 5th ed. (Auburn, Ala.: Mises Institute, 2000) and Richard Vedder and Lowell Gallaway, *Out of Work*, 2nd ed. (New York: New York University Press, 1997).

less suited to meet various other goals, and completely incapable of satisfying still other requirements. Presumably Strigl would have agreed; disaggregation of his three forms of capital would have been very much in the spirit of his general method: starting from a general, somewhat unrealistic model, and then step by step relaxing the unrealistic assumptions.

So far we have been concerned with relatively minor aspects of Strigl's analysis. Now we turn to some elements of his argument that have great practical relevance.

Strigl correctly notes that monetary calculation can enable market participants to gauge the quantity of the capital they own. However, in distinct contrast to Menger and Mises, who emphasize that a homogeneous and quantifiable capital exists only in the form of such aggregated money prices and has no counterpart in the physical world of heterogeneous goods,[23] Strigl insists that money can "represent" or "correspond to" capital. In short, Menger and Mises see homogeneous units of capital as *ontologically* bound up with money prices and calculation, whereas Strigl perceives this link as merely *nominal*. For him, there are homogeneous units of "capital" out there in the physical world. He believes that the system of money prices is nothing but a veil layered over a barter economy (see pp. 20, 91, 98, 100, 142); and so is the capital sum that results from monetary calculation just a veil overlaying a sum of physical capital.

If the calculated money capital adequately represents the quantities of physical capital, then money is neutral and the monetary economy is in equilibrium: that is, it operates just as a barter economy. By contrast, if money fails even slightly in its representation job then problems occur which manifest themselves in business cycles.

In Strigl's view, the representation of physical capital is rendered inaccurate by *all* money-induced price changes because he tacitly postulates *static expectations* on the side of all market participants. Thus, when banks create uncovered money titles and pump them into the credit market, then for Strigl "it is

[23]See Carl Menger, "Zur Theorie des Kapitals," *Gesammelte Werke,* 2nd ed. (Tübingen: Mohr, [1888] 1970), vol. 3; and Mises, *Human Action,* chaps. 11–13, 26.

clear" (p. 116) that this additional credit can *only* be accommodated at an interest rate lower than the equilibrium interest rate. The market participants do not take into account that the new money titles will bring about a price increase; rather, they assume that all prices will remain at the present level. Therefore, creditors do not ask for higher (equilibrium) interest rates and debtors do not bid them. More investment projects appear profitable than can be sustained with the available quantities of capital goods since money prices and interest no longer adequately represent the real supply of capital; an artificial "boom" is created which is doomed to break down in a crisis.

Accounting for the fact that expectations are not static but free leads to a different picture. The monetary calculus of market entrepreneurs essentially depends on the selling prices that these entrepreneurs expect to realize in an uncertain future. Only if they underestimate the impact of credit expansion on these prices will credit expansion depress the rate of interest below its equilibrium level. Only then will more investment projects appear profitable than can be sustained with the available quantities of capital goods; and only then will an artificial "boom" be created which is doomed to burst in a crisis.[24]

The static-expectations theory of money's impact on the structure of production is also the basis for Strigl's analysis of money hoarding.[25] From his perspective, increasing and decreasing money hoards both disrupt the representation of physical capital through money capital. Decreasing money hoards entail

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[24]The clarification of the role of expectations in Austrian business cycle theory starts with Ludwig von Mises, *Nationalökonomie* (Geneva: Editions Union, 1940), p. 696, and the exchange between Ludwig Lachmann, "The Role of Expectations in Economics as a Social Science," *Economica* 10, no. 37 (1943): 12–23; and Ludwig von Mises, "'Elastic Expectations' and the Austrian Theory of the Business Cycle," *Economica* 10, no. 39 (1943): 251–52.

[25]We leave aside the problem that *all* sums of money are "hoarded." Any given unit of money can therefore not be hoarded more than it is already hoarded, and such fictional increased hoarding cannot be the cause of price changes. What is really at stake is that people choose to delay expenditures or to offer lower money prices in exchange for the goods and services they desire or offer more of their goods and services in exchange for the sums of money they desire. Yet such behavior does not *cause* prices to decrease; rather it is a *manifestation* of price decreases.

an economic upswing when the released money hoards first arrive on the credit markets and thus decrease interest rates below their equilibrium level. Increasing money hoards engender an economic downswing when the hoarded money is sucked out of the credit markets, thus pushing interest rates above their equilibrium level. Any change in money hoards is therefore bound to bring about booms and busts (see pp. 115ff., 140, 148f., 151).

In this analysis of the effects of hoarding Strigl advocated an argument that was prominent with the Wieserian line of Austrian economists. In their eyes, hoarding is inherently disruptive of economic equilibrium since it destroys the "correspondence" between money and the nonmonetary (capital) goods. This correspondence is only given insofar as the monetary economy mimics a barter economy through "complementary transactions."[26]

[26]See in particular Friedrich von Wieser, "Der Geldwert und seine Veränderungen," *Gesammelte Abhandlungen* (Tübingen: Mohr, 1928); F.A. Hayek, *Prices and Production*, pp. 118ff.; Fritz Machlup, *Börsenkredit, Industriekredit und Kapitalbildung*; and J.G. Koopmans, "Zum Problem des 'Neutralen' Geldes," in *Beiträge zur Geldtheorie*, F.A. Hayek, ed. (Vienna: Springer, 1933). Wieser was not the originator of these views, even though he was instrumental in spreading them among the younger Austrian economists. For a German predecessor of Wieser see Wilhelm Roscher, *Die Grundlagen der Nationalökonomie*, 6th ed. (Stuttgart, 1866), p. 446. Since we cannot go into much detail here, let us merely notice that the notion of a correspondence between money and other goods and the notion of compensatory transactions are fictitious stipulations; they have no basis in observed fact or other evidence. In particular, they both rely on the idea that economic calculation could be cast in terms other than in money prices. For only if there were such a *tertium comparationis* would it make sense to assert that a correspondence between money and other goods might or might not exist. However, since adding and subtracting money prices is the very essence of economic calculation (see Mises, *Human Action*, chaps. 11–13, and 26), this assertion is groundless. Moreover, the claim that money prices do not really correspond to the good bought, whereas correspondence always exists in barter transactions, implicitly denies that money is a good. Finally, as we have pointed out before, the success of market participants and, therefore, the equilibrium of the economy, exclusively depend on the correctness of their expectations about the future. These expectations do adapt to changes in conditions (like hoarding) and they can adapt instantaneously, and can even anticipate such changes in the future. It is thus unwarranted to claim that hoarding *inherently* entails a disruption of the equilibrium of the economy. See on this last point, for example, Mises, *Human Action*, p. 578; and Rothbard, *America's Great Depression*, part 1.

For example, suppose that in a barter economy one apple is exchanged against one pear. Here the apple supply is confronted by a corresponding demand in the form of the pear and, inversely, the pear supply is confronted by a corresponding demand in the form of the apple. With the introduction of money, this direct exchange is split up in two monetary exchanges: the apple is exchanged against, say, one ounce of copper and the copper coin is then exchanged against the pear. These two monetary exchanges are complementary transactions in the sense that, together, they bring about a result that had also obtained in the barter economy. Since both the apple and the pear are exchanged against the same sum of money, for the owner of the apple everything is as if he had exchanged the apple against the pear in a barter transaction. So far so good.

The twist in the argument comes from the assumption that monetary exchanges are nothing but a veil layered over an underlying barter economy. Money therefore does not count as a good, and there is no demand for and supply of money per se. Money traded in market exchanges merely represents other goods that it can buy. Only these other goods truly correspond to the goods against which money is exchanged. In our example, when the copper coin is traded for the apple, the coin is not desired as a good. It merely represents the pear. And it is the pear that truly "corresponds" to the apple in this exchange.

It follows that by looking at a single monetary transaction (apple against an ounce of copper) one cannot tell whether the apple supply has a corresponding demand. One has to wait until it comes to a complementary transaction. However, whereas in a barter economy demand and supply always and necessarily correspond to one another, such a correspondence may not exist in a monetary economy. Suppose for example that the seller of the apple does not proceed to exchange his ounce of copper against a pear, but instead hoards it. In this case, according to the Wieserian monetary economists, there exists a money-induced disequilibrium. As Hayek said:

> the identity of demand and supply, which must necessarily exist in the case of barter, ceases to exist as soon as money becomes the intermediary of the exchange transactions. [Problems will arise] when after the division of the barter

transaction into two separate transactions, one of these takes place without the other complementary transaction. In this sense demand without corresponding supply, and supply without a corresponding demand, evidently seem to occur in the first instance when money is spent out of hoards (i.e., when cash balances are reduced), when money received is not immediately spent, when additional money comes on the market, or when money is destroyed.[27]

This is the basis for Hayek's assertion that "any change in the velocity of circulation would have to be compensated by a reciprocal change in the amount of money in circulation if money is to remain neutral towards prices."[28]

Strigl pushes this theory to its ultimate conclusion when he makes the case for the existence of business cycles on the free market (see pp. 147ff.). During the bust phase of the business cycle money hoards are built up, and at the end of this phase these hoards are dissolved and return into circulation, thereby upsetting the representation of physical capital in monetary calculation. A new boom ensues, which is however doomed to end up in another bust, and so the free market goes on, oscillating mechanically between upswings and downswings.

These views about the significance of money hoarding explain why Strigl did not share Ludwig von Mises's categorical rejection of "additional credit," that is, credit created by banks in the form of money titles that are not backed by money actually saved.[29] Strigl points out that additional credit *can* involve a "credit expansion" which pushes interest rates below their equilibrium level and thus brings about a boom-bust cycle (pp. 114ff.). However, he thinks that additional credit *can also* have the

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[27]Hayek, *Prices and Production*, p. 130.

[28]Ibid., p. 124.

[29]Mises, *Theorie des Geldes und der Umlaufsmittel*, called this type of credit "Zirkulationskredit" (circulation credit or fiduciary credit) and rejected it in this and in all of his later writings, even though it was only in the 1940s that he thoroughly explained why there could be no such thing as a "compensatory credit." See Joseph T. Salerno, "Mises and Hayek Dehomogenized," *Review of Austrian Economics* 6, no. 2 (1993): 113–48 on this development of Mises's monetary thought.

healthy and even necessary function of compensating for those changes in monetary circulation that stem from money hoarding (pp. 117f.). These "compensatory credits" make the volume of credits "elastic" and thus help assure monetary equilibrium.[30]

One implication of these views on money and credit is that there is a scope for anticyclical economic policy, which would include creating compensatory credit. Strigl affirms this implication. However, he hastens to point out that such a policy is not much more than a mere theoretical possibility since the obstacles to the creation of compensatory credit are formidable. In particular, he mentions the knowledge problem of the monetary authorities (see pp. 152ff.). Thus, although he disagrees with Mises and later writers who denied the very possibility of anticyclical policy, Strigl is quite close to these thinkers when it comes to the political applications of his theory.

VII

The purpose of the foregoing comments was to highlight some rather subtle aspects of Strigl's analysis of capital, prices, and production. It goes without saying that his rich analysis cannot be exhaustively presented in our introduction. Students of capital-based macroeconomics will have to become thoroughly acquainted with it on their own. The rewards will be great, though, as *Capital and Production* is a timeless classic of economic literature.

Thanks are due to those who made the English translation even more beautiful and useful than the German original: to Professor and Mrs. Hoppe for the translation, to Mr. Jeffrey Tucker and Professor Larry Sechrest for careful revisions of the whole

[30]Very similar views are still maintained today, for example, in the works of George Selgin, *The Theory of Free Banking* (Totowa, N.J.: Rowman and Littlefield, 1988); and Leland B. Yeager, *The Fluttering Veil* (Indianapolis, Ind.: Liberty Fund, 1997). Selgin is in fact the present-day intellectual heir to the Wieserian approach to the analysis of money and banking. His main thesis is that banking systems without a central bank are best suited to adjust the supply of money to the demand thereof. For criticisms of this thesis see J.G. Hülsmann, "Banks Cannot Create Money," *Independent Review* 5, no. 1 (2000): 101–10 and the literature quoted there.

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