
DAVID E. W. LAIDLER
GEORGE W. STADLER

Monetary Explanations of the Weimar Republic's Hyperinflation: Some Neglected Contributions in Contemporary German Literature

Contemporary analyses of the Weimar hyperinflation, by Hahn, Bortkiewicz, and Mises, have been inadequately appreciated by earlier commentators. They used the quantity theory, supplemented by analysis of inflation expectations, to explain hyperinflation's stylized facts. The latter two treated expectations as forward looking, and raised the fiscal situation, in the spirit of Sargent's later analysis. They also argued that the effects of expectations on price-setting behavior could create a shortfall of money currently in circulation from the demand for it, thus sketching a disequilibrium analysis of hyperinflation that has no exact parallel in modern treatments of the topic.

IT IS GENERALLY BELIEVED that the role of expectations in the monetary dynamics of hyperinflation was not well understood before the appearance of Bresciani-Turroni (1931, tr. 1937), with Phillip Cagan (1956), and later Thomas Sargent (1982), making further substantial advances on the basis of his insights. The Weimar Republic's hyperinflation of 1921–1923 figures prominently in this work, but in this paper we argue that some contemporary German (or at least German-speaking) commentators on this experience, notably Ladislaus (Ludwig) von Bortkiewicz, Ludwig von Mises, and L. Albert Hahn displayed a sophisticated grasp of the role of expectations as well as fiscal and political factors in the inflationary process.¹ We also

Work on this paper began when Laidler was the holder of a Senior Visiting Fellowship at the University of Newcastle-upon-Tyne. Laidler also acknowledges the financial support of the Lynde and Harry Bradley Foundation, and the SSHRCC. All translations from previously untranslated (or poorly translated) German-language sources are due to Stadler. This paper has been presented at a workshop at the University of Western Ontario, at the University of Toronto-York University Workshop on the History of Economic Thought, and at a conference held in honor of Bernard Corry at Queen Mary and Westfield College, London. The comments received on those occasions and the advice of Haim Barkai, Peter Bernholtz, Phillip Cagan, June Flanders, Malte Krüger, Denis O'Brien, Christof Rühl, and an anonymous referee are gratefully acknowledged. Loretta Nott provided capable research assistance.

1. Mises, nowadays still well known, was at this time a Privatdozent at the University of Vienna and economist for the Vienna Chamber of Commerce. In 1926 he founded the Austrian Institute for Business Cycle Research, with which his former student, Friedrich von Hayek, was also associated as a junior staff member. Bortkiewicz, of Polish origin, but educated at the University of St. Petersburg in Mathematics and Physics, is nowadays remembered, if at all, as a critic of the capital theory of Böhm-Bawerk and Marx, as a contributor to the Marxian Theory of relative values and prices and as a statistician who applied the Poisson

DAVID E. W. LAIDLER is *Special Advisor at the Bank of Canada and professor of economics at the University of Western Ontario*. GEORGE W. STADLER is *lecturer in economics at the University of Newcastle-upon-Tyne*.

Journal of Money, Credit, and Banking, Vol. 30, No. 4 (November 1998)
Copyright 1998 by Ohio State University Press

show that the first two of these raised issues that have no parallel in modern work on the hyperinflation, but which may throw extra light on the nature of the “shortage of money” that it appeared to create.²

We begin with a description of the key facts generated by the hyperinflation. Then we discuss the state of monetary economics in Germany before and shortly after the Great War, stressing the antipathy of the majority of German economists to the quantity theory of money, and describe orthodox contemporary explanations of the hyperinflation. Cagan’s analysis and the contributions made by Bortkiewicz, Mises, and Hahn in 1923–24 are discussed in turn, along with the treatment by the latter of fiscal and political factors. We end with a summary of our findings.

1. STYLIZED FACTS AND GERMAN MONETARY ECONOMICS

The German inflation, which culminated in hyperinflation in 1921–23, generated four contentious stylized facts: (1) a phenomenal increase in prices, well in excess of the increase in the money supply from mid-1921 onward; (2) a more rapid rise (depreciation) in the exchange rate than in domestic prices; (3) a widely perceived “shortage of money”; and (4) an extremely large increase in real balances in the wake of the stabilization which brought inflation to an end.³ These facts were seen as incompati-

distribution to the analysis of the frequency of deaths from horse-kicks among Prussian cavalrymen. Hahn was a banker based in Frankfurt am Main, who became well known later in the decade for a particularly lucid exposition of the process of bank credit expansion, and an analysis of the role of the banks in trade cycle. In the post-World War 2 years, he participated prominently in debates about the reconstruction of the German monetary system.

2. A number of interrelated reasons perhaps explain why the work we refer to here has not previously attracted the attention we believe it merits. First, the dominant view of the hyperinflation among German economists of the period, usually characterized as the *Balance of Payments Theory*, was closely associated with the Real Bills Doctrine. As this view became discredited, so too did the whole German literature dealing with the inflation. Second, this work is not kindly treated in the later literature of the interwar years. Howard Ellis (1934) discusses it only briefly (cf. Ellis 1934, p. 217, 280, 294); and Bresciani-Turroni either ignores or misinterprets it: Hahn and Mises are referred to only once each in his book, the latter in a footnote. The third, Bortkiewicz, attracts a full seven pages of commentary (cf. Bresciani-Turroni 1931 tr. 1937, pp. 175–82); but Bresciani-Turroni misleadingly treats him as an opponent of an inflation-expectations augmented version of the quantity theory. Also, as Feldman (1983) has pointed out, most recent research on the hyperinflation has been carried out by non-German economists, who could not reasonably be expected to be familiar with what was, when all is said and done, a minority opinion within the body of German monetary thought. Gerald Merkin (1982) has, however, discussed Bortkiewicz’s contribution, though not those of Hahn or Mises; but here again the interpretation given is open to question. (see footnote 15.)

3. Until the end of the war, prices tended to lag significantly behind the increase in the money supply. From bases of unity in 1913, prices increased to 2.17 by 1918, but the money supply to 3.75. The accepted explanation of this fact rests on the breakdown of credit arrangements during the war that increased the demand for money, the extension of territory over which the Reichsmark was legal tender, an increase in hoarding caused by wartime anxiety, not to mention the influence of price controls. As soon as the war ended, prices and the money supply began to rise significantly, so that by July 1921 both indexes stood at 14.3, and by January 1922 the price index stood at 36.7 and the money index at 20.5. By the end of 1922 the two indexes stood at 1475 and 213.4 respectively, and the tendency for prices to surge ahead of the money supply persisted until stabilization was achieved in November 1923. The exchange rate also rose (that is, the currency depreciated) far more than the money supply, and, until 1923, more than domestic prices too. Furthermore, exchange rate movements after first lagging behind them generally tended to lead movements in domestic price levels as hyperinflation took hold. As to complaints of a shortage of money, these occurred as early as the winter of 1918–19, when prices still lagged somewhat behind the money supply, but at this early stage they probably referred to a shortage of small change. After the Treaty of Versailles became effective in January 1920, such complaints became more frequent, and indeed persisted until stabilization was achieved in 1923. Thereafter, a continuing large rise in the nominal money supply was absorbed with

ble with the quantity theory of money, but consistent with a widely accepted alternative explanation of inflation cast in terms of balance of payment problems.⁴

German monetary economics (and indeed German economics in general) during the first quarter of the twentieth century displayed certain unique characteristics that conditioned the way in which the hyperinflation was usually analyzed. The German language was then used for scientific communication well beyond the borders of Germany itself, but *German* economics was far less cosmopolitan in outlook than *German-language* economics. Within the German Empire, the subject was dominated by the Historical School, whose views were systematically set out in a widely read and immensely influential treatise by Gustav von Schmoller (1900, 1904). This school taught (exactly contrary, for example, to the doctrines of Carl Menger and his Austrian disciples) that there were no universal scientific truths to be discovered within the discipline, and that all economic “laws” were specific to particular historical and institutional settings.

The monetary field was heavily influenced by the Historical School, as Haim Barkai (1989) has shown, and after the first decade of the twentieth century it was dominated by the Chartalist views of Georg-Friedrich Knapp (1905, 3rd ed., 1921, tr. 1924). Knapp regarded money as the creation of law, and argued that the general acceptability of money derived from the legal authority of the state, rather than being, as Menger (1892) had it, the unintended social consequence of individual maximizing behavior. It was a short step from this view to the position that the value of money—a question of secondary importance to Knapp—was also a legal-institutional matter, and his Chartalism was quite antithetical to the quantity theory. The attitude of the majority of German economists, who usually thought of the quantity theory as asserting the proportionality of the price level to the quantity of money, is typified by the following quotation from S. P. Altmann’s (1908) survey of German monetary economics in the nineteenth century.⁵

Nobody today contends that an increase in the money supply has a proportional effect on prices. The concept of changes in the value of money as a historical process is more and more generally accepted, a process that cannot be elucidated by the mechanical juxtaposition of money and goods, but requires the total, complicated organism of the foundation of society to be properly understood. (Altmann 1908, p. 49)

no increase in prices. Throughout the hyperinflation, the Reichsbank’s discount rate remained ludicrously low, being highly negative in real terms. For example, by October 1923 the discount rate stood at 90 percent per annum, but between October 2 and 30, prices rose by a factor of 221.

4. Indeed, this Balance of Payments theory was so widely accepted, particularly at the Reichsbank itself, and in political circles, that it was sometimes characterized as “official.” Thus, referring to it, Bortkiewicz says that “only recently are there signs of a clear rejection of this official and semi-official view of the ruin of our currency” (1924a, p. 267). See also footnote 9.

5. Further evidence of the slight regard in which the quantity theory was held is provided by Howard Ellis and Schumpeter. Ellis (1934) talks of “the traditional anti-quantity theory alignment of German economics” (p. 183), while Schumpeter (1954, p. 1104) also implies that the work of eminent German economists was antithetical to the quantity theory and did not move monetary theory in Germany forward in a way comparable to developments in, say, Britain, America, or Sweden. There was some debate in Germany as to how much responsibility Knapp bore for the hyperinflation. The consensus seems to be that Knapp himself did not advocate inflation, but that his State Theory fostered an antitheoretical climate (see Bortkiewicz 1924b; Melchior Palyi 1924; Felix Somary 1924). However, there is no doubt that some of Knapp’s followers “did indeed advance inflationary measures” (Ellis 1934, p. 19).

Insular though it was, German monetary economics nevertheless found room for one important foreign idea, namely, the “real-bills” doctrine, which argued that a banking system, which confined itself to discounting good-quality short-term securities, would thereby automatically provide only the money needed to facilitate the current volume of trade at current prices, and would run no risk of excessive money creation capable of causing prices to increase. This doctrine had been much discussed in the writings of the British Banking School in the 1840s, and was thence transmitted to the German literature, initially through the writings of Adolph Wagner and Schmoller, and later those of Friedrich Bendixen during the wartime phase of the German Inflation. It was a natural complement to the State Theory of Money, and tailor-made as a defense against quantity-theoretic attacks on any nonmonetary explanation of inflation, for one of its central implications is that monetary expansion is a passively endogenous consequence of rising prices, and in no sense their cause.⁶

In short, before the hyperinflation, conventional German monetary economics offered no clear-cut theory of the price level to replace the quantity theory, but nevertheless argued that any observed relationship between money and prices was the result of “reverse causation.”

2. THE BALANCE OF PAYMENTS EXPLANATION OF HYPERINFLATION

The most prominent exponent of what has come to be called “The Balance of Payments” explanation of the hyperinflation, was Karl Helfferich.⁷ In the final (6th) edition of his book *Das Geld* (Money) (1923) he argued that an adverse balance of payments (resulting from the difficulty of obtaining credit abroad and the need to import raw materials, factors exacerbated by the requirement to make reparations in kind to Belgium and France) had caused the Reichsmark to depreciate on the foreign exchanges. The depreciation, he then argued, had resulted in upward pressure on prices and wages, which in turn had created a shortage of money; in order to avert a complete breakdown in economic relations, the Central Bank had been required to increase the circulating medium to facilitate transactions at the higher prices. He concluded that

6. Wagner (1857) contains an extensive discussion of Peel’s 1844 Bank Charter Act, and the debate that surrounded its introduction. This discussion shows him to have been an admiring partisan of the Banking School, particularly Tooke, and an advocate of the Real Bills Doctrine. See, in particular, pp. 119–29. Schumpeter (1954, p. 707, fn.) says that “the German enthusiasm for Tooke as a theorist was, I think, in great part due to the influence of Adolph Wagner” (emphasis in original). Note that, in addition to being an exponent of Banking School ideas, Bendixen was second only to Knapp as a creator and exponent of the state theory of money. (See Schumpeter 1917/18, tr. 1956, p. 149, fn.) On the role of Banking School ideas in German Monetary Economics, see also Ellis (1934) p. 180 et seq.

7. Helfferich had been a student of Knapp, but he was not an exponent of the State Theory of money, but Theodore Gregory remarked in his Introduction to the 1927 translation of *Money* (Helfferich 1923, tr. 1927), that “Helfferich’s . . . attitude is perhaps at times more coloured by Knapp’s terminology and opinions than he was himself aware of.” (Gregory 1927, p. viii) Helfferich was Secretary to the Treasury and Secretary of the Interior during the First World War, and a Reichstag deputy from 1920 until his death in 1924. As Haim Barkai and an anonymous referee have reminded us, he was thus an important architect of the wartime policies of deficit finance and price controls which ensured that, in 1919, the German monetary system would be subject to enormous latent inflationary pressures, pressures that could only be exacerbated by the Reichsbank’s discount rate policy. He was, therefore, by no means a disinterested observer of the hyperinflation. The referee suggests, indeed, that it was the debt overhang created by the war, in part by policies for which Helfferich himself was responsible, that lay at the root of postwar inflation.

because the currency had depreciated by a far greater factor than the money supply had risen, “the collapse of the German exchanges will be seen to be in no way related to the increase of the note circulation” (1923, tr. 1927, p. 599).

The appeal of the Balance of Payments Theory lay in its apparent ability to explain the four contentious stylized facts mentioned earlier. In Helfferich’s words:

First came the depreciation of the German currency by the overburdening of Germany with international liabilities and by the French policy of violence. Thence followed a rise in the prices of all imported commodities. This led to a general rise in prices and wages, which in turn led to a greater demand for currency by the public and by the financial authorities of the Reich; and finally, the greater calls upon the Reichsbank from the public and the financial administration of the Reich led to an increase in the note issue. In contrast, therefore, to the widely held view, it is not “inflation” [of the currency] but the depreciation of the currency which is the first link in this chain of cause and effect. Inflation [of the currency] is not the cause of the rise in prices and of the depreciated currency, but the latter is the cause of the higher prices and of the greater volume in the issue of paper money. (Helfferich 1923, tr. 1927, p. 601)⁸

Moreover, it was not just data generated while inflation was rising that seemed to Helfferich to confirm his view. The simultaneous, but short-lived, appreciation of the mark and the large increase in the nominal money supply, that took place between February and April 1923, just as Helfferich was completing the final edition of his book, provided further support for his position:

It is scarcely possible more clearly to prove that prices are independent of the quantitative factor of increase in circulation, and to demonstrate their dependence upon the course of the exchanges than by noting the fall in the level of prices and in the rates of exchange while the note issue was increasing in excess of anything previously known. (Helfferich 1923, tr. 1927, p. 602)

Now balance of payments considerations must figure prominently in any account of the German inflation. Such commentators as Graham (1930), Feldman (1993) and Kindleberger (1994) provide ample evidence that the hyperinflation was at least as much a sociopolitical as an economic phenomenon, and that the dislocation of Germany’s export capacity associated with the war and its aftermath, not to mention the prospective burden of meeting punitive reparations obligations imposed at Versailles, put important economic and political limits on the Weimar Government’s room for maneuver in economic policy. But Helfferich’s position is just as far removed in one direction from the kind of balanced eclecticism that we find in this historical literature as would be a simple mono-causal application of a naive, exogenous money, version of the quantity theory. He really did argue that:

In considering the monetary conditions in Germany, the view widely held, especially abroad, is based on the pure quantity theory, and accordingly regards the increase in the

8. We insert the phrase [of the currency] in the foregoing quotation because the use of the word “inflation” to refer to rising prices is fairly recent. The *Concise Oxford Dictionary*, 5th ed. 1967, defines inflation as “an undue increase in the quantity of money in relation to goods available for purchase.” This is the sense in which Helfferich and his contemporaries usually used the term. We add similar clarifying phrases to a number of quotations below.

As an anonymous referee has pointed out to us, the Helfferich’s description of the “facts” in this quotation is not accurate. The mark began to depreciate even before the war ended (see Feldman, p. 93, Table 4).

circulation of paper currency in Germany as the cause of the rise in the level of German prices and of the depreciation of the currency. On closer examination, however, we find that cause and effect are here interchanged, and that the increase in the amount of paper money circulating in Germany is not in fact the cause but the result of the fall of the German exchanges and of the consequential rise in wages and prices. (Helfferich 1923, tr. 1927, p. 598)

The prime evidence he cited to support this position was the disproportion among changes in the exchange rate, the price level, and the money supply.⁹

3. CAGAN'S QUANTITY THEORETIC MODEL OF HYPERINFLATION

Now to a modern reader, the evidence that so impressed and indeed, in the opinion of many, misled many contemporary commentators on the German hyperinflation into rejecting any causative role for the quantity of money is easily dealt with: it is only necessary to refer to the effects of inflationary expectations on the demand for real balances. Even before the event, Marshall (1899) and Pigou (1917) had noted from time to time that desired cash balances would be smaller if the currency was "liable to discredit," and closely related comments are to be found in Fisher's (for example, 1911) writings as well. After the War, both Cannan (1921) and, of course, Keynes (1923) to whom Bresciani-Turroni paid particular attention, also discussed this phenomenon.

Even so it was only with Cagan's (1956) "Monetary Dynamics of Hyperinflation" that *precise* analysis of these phenomena based on the postulate of a *stable and continuous functional relationship* between the demand for real money balances and the expected inflation rate appeared.

Cagan's model may be written

$$m_t - p_t = \alpha (E_t p_{t+1} - p_t) + \gamma \quad (1)$$

$$E_t p_{t+1} - E_{t-1} p_t = \beta (E_{t-1} p_t - p_t), \quad (2)$$

where m is the logarithm of the money supply, p is the logarithm of the price level, and E the expectations operator.¹⁰ In this system the higher is actual, and eventually there-

9. Helfferich was by no means alone in drawing attention to this evidence. For example, the American economist Allyn Young, having served as the principal economic advisor to the American delegation at Versailles, was familiar enough with the German situation to see that government debt problems, rather than balance of payments issues per se lay at the heart of her economic problems, and he was no exponent of the real bills doctrine. Nevertheless, in 1923, with reference to Europe in general he wrote that the sequence of cause and effect, particularly in the period following the war, has not been inflation [of the note issue], unbalanced budgets, disordered exchanges, but unbalanced budgets, disordered exchanges, inflation (Young 1923, p. 402). In the specific case of Germany he cited the same phenomena as did Helfferich, concluding that, "In large measure inflation [of the note issue] has been the result rather than the cause of the depreciation of the value of the currency" (Young 1923, p. 403). See Mehrling (1996) for a comprehensive account of Young's monetary economics.

10. Cagan's system is dynamically stable if $\alpha\beta < 1$, a condition which data generated by the German hyperinflation (among others) seem to satisfy. Though Cagan's (1956) point estimates for $\alpha\beta$ exceeded unity for Germany and the Soviet Union's hyperinflations, Khan (1975) found that correcting for residual serial

fore expected, inflation, the lower is the quantity of real balances demanded. Hence, it easily accounts for one of the two stylized facts to which, in the 1920s, German adherents of the real bills doctrine pointed as being allegedly inconsistent with the Quantity Theory, namely, that the German price level (and implicitly also the foreign exchange value of the Reichsmark) moved ahead of the quantity of money as inflation gathered speed.

The Cagan model leaves something to be desired, however, when it comes to explaining the “shortage of money” phenomenon. There are pitfalls inherent in asking people what they think rather than observing what they do; but, although remarks about the extra costs associated with managing a smaller, but still equilibrium, cash balance might be expected in Cagan’s world, the frequency of references to “shortages” of money during the Weimar inflation suggest that agents often found themselves in possession of less cash than they wanted. Their complaints are easier to square with the existence of disequilibrium in the monetary system, with the supply of money (nominal and real) falling short of the demand for it, than with a simple voluntary and successfully executed decision to make do with a smaller inventory of cash.¹¹ As we shall see, some contemporary German commentary addressed this issue.

4. CONTEMPORARY EXPONENTS OF THE QUANTITY THEORY

There was some discussion of the quantity theory in the German language literature before the onset of hyperinflation. It had, for example, a prominent place in Wicksell (1898), Ludwig von Mises (1912) and in Joseph Schumpeter (1917/18), a paper written “from the conviction . . . that currency policy is a field in which there is no sense

correlation results in point estimates of $\alpha\beta$ of less than one for all the seven hyperinflations studied by Cagan. Cagan (1991) has revisited his study recently, and makes the following remark:

While the use of adaptive measures of expected price changes in estimating the money-demand function in hyperinflation does not appear far from reality, a more serious problem . . . is that the money stock cannot be treated as exogenous. A plausible way to endogenize the money stock is to model the revenue needs of the government for an inflation tax. Unfortunately, no one has successfully shown how to express those needs and their realization as a function of independent variables.” (Cagan 1991, p. 559, fn.)

The main thrust of this paper is to show that adaptive expectations perform well in a demand for money function, relative to rational expectations, as exemplified by Frenkel’s (1977) use of the ratio of the forward exchange rate of the Reichsmark to its concurrent spot rate. Cagan interprets this result as the consequence of “rational learning” in the face of a major, initially unperceived, long-run shock to the time path of inflation.

11. We are aware of the logical possibility that, in an economy in which the aggregate demand and supply for money are in equilibrium, some individual agents may find themselves with excessive cash balances, and some may experience a shortage. However, in a monetary system in which idiosyncratic shocks can have such effects, it is also possible that an economy-wide disturbance can push the majority of agents “off” their functions in the same direction. Since the monetary disturbances associated with hyperinflation are predominantly economy wide, and since we are unaware of any evidence of complaints of cash surpluses that might counterbalance the complaints of shortages to which we here call attention, we do not find the above-mentioned logical possibility of zero aggregate excess demand for money a compelling explanation of these complaints. Hence, we suggest that the “shortages” in question were indeed an aggregate phenomenon whose explanation along the lines we discuss here is worth taking seriously.

whatever in approaching practical problems before we have become clear on the fundamental questions of money” (Schumpeter 1917/18, tr. 1956, p. 149).¹²

Even so, while the hyperinflation was in progress, only a few German-speaking, and even fewer German, economists argued that its root cause was excessive creation of money. Perhaps the best known of these nowadays is Walter Eucken (1923), who emphasized the monetization of budget deficits as the driving force in the inflation. Eucken, however, did not discuss a potential role for expectations in the inflationary process, and hence had difficulty in coping with some of the hyperinflation’s salient empirical characteristics, as Ellis (1934, pp. 224–30) noted. Some exponents of a monetary explanation of the hyperinflation, notably Hahn, Borkiewicz, and Mises did, however, rely on an analysis of inflation expectations to reconcile that explanation with the facts, including the “shortage” of money. All three attended the 1924 meeting, dedicated to a discussion of the hyperinflation, of the *Verein für Sozialpolitik*, an organization of German-speaking economists similar to the American Economic Association, but founded earlier, in 1872. Borkiewicz presented a paper at this meeting, while Hahn and Mises made important contributions to the discussions which took place there, based on their recent writings (Mises 1923, Hahn 1924a).¹³

Confidence in the currency or, more precisely, expectations of changes in its value, were repeatedly stressed by these economists as central to an analysis of the inflation. Hahn (1924a, 1924b) in particular emphasized the effect on the demand for money of expected inflation. For him, “confidence,” what he sometimes called “the qualitative factor” affecting the value of a currency, depended on the value of goods that currency could buy in the future, and thus on expected price inflation. Furthermore, expected future price movements, though they had effects on the desirability of money holding similar to interest rate changes, were likely to be more important.

Hopes of a rise or fear of a fall in the value of money means that a positive or negative premium is added to the real value of money. The effect is therefore principally the same as that of a rise or fall in the interest rate. However, there are two differences. Firstly, the effect of variations in confidence in the currency are usually much stronger, because they concern far larger margins, than for regular interest rate changes. For example, a currency depreciation of some magnitude is usually not only equivalent to a fall in the interest rate to zero, but is equivalent to a negative interest rate. (Hahn 1924a, p. 305)

12. In the light of the dominance of the Historical School within Germany, it is not accidental that none of these contributions came from German economists. Note that the 1912 edition of Mises’ work remains untranslated. The second edition (Mises 1924, tr. 1934), a considerably extended and revised work, is available in English. It is worth noting, as Denis O’Brien has pointed out to us, that Mises became increasingly hostile to the quantity theory, and particularly its emphasis on the concept of an aggregate price level, as his career progressed. For Mises, even in 1924, the critical consequence of monetary expansion was its effect on the relative price of capital and consumption goods. However, in 1923–24, his antipathy to the quantity theory was far less intense than it would later become.

13. Unlike the other contributions discussed here, Mises’ 1923 paper has been previously translated into English under the title “On the Manipulation of Money and Credit.” See Mises (1923, tr. 1977). We prefer to use our own translation, however, because this translation has been re-edited, with, for example, section headings inserted that are not in the original paper. It also misses the subtlety of Mises’ meaning in several places as readers will see if they compare some of our translated passages to those of this version. In fairness to its translator, this 1977 version was clearly aimed at a general contemporary audience rather than at specialist historians of thought.

Hahn argued repeatedly that confidence in the future value of the currency determined the demand for it, and thus the velocity of money. As demand for money fell, and people began to economize on money balances, so prices, exchange rates, not to mention the bank money multiplier, would begin to rise, along with velocity:

The individual transaction detained cash balances for a shorter time period than previously. The phenomenon of a progressive depreciation in the value of money, causing reduction of cash balances—known from previous inflationary periods—manifested itself. This has the consequence that the quantity and velocity of bank money circulating in the economy can rise—and therewith the price level and foreign exchange rate—even if the quantity of banknotes in circulation does not rise accordingly, in other words, that prices and exchange rates rise faster than the quantity of notes in circulation. . . .

The reason for the manifestation of a rise in velocity of money is well known. On the expectation of continued losses associated with every kind of money holding, everyone attempted to exchange money, that until now he had been accustomed to retaining for longer or shorter periods, as quickly as possible—be it against commodities or foreign exchange—in order to transfer the loss involved onto the next recipient. A mentality developed toward the German mark that one can most succinctly describe as “playing a game of *Schwarzer Peter*.” (Hahn 1924a, p. 295)¹⁴

Thus Hahn, whose analysis is in this respect similar to that of Cagan, and of Bresciani-Turroni, too, saw the rise in velocity as the consequence of a dramatic decline in demand for money as the inflation progressed.

The position taken by Bortkiewicz (1924a) was rather different. He argued that expectations of future note issues had a *direct* impact on current prices, which in turn required money to turn over more rapidly to finance current transactions:¹⁵

I readily admit that such a rise in the velocity of money occurs in reality. In addition I believe that mistrust in the currency plays a role in this; but I envisage the chain of causation in question differently to most authors who have recently approached this question. For I am of the opinion that mistrust in the currency, the expectation of further issues [of money] and the consequent fall in the value of money has an immediate impact on the price level, so directly strengthening the impact of an increased money supply. That the price level rises proportionally more than the money supply in this manner now causes a shortage of money, which one attempts to overcome by changing payments practices accordingly, and thereby, in one way or another, raising the velocity of money. This process of adjustment can eventually lead to a very considerable rise in the velocity of money. According to this, the rise in the velocity of circulation of money is not the cause of the sharper depreciation of money, but a consequence of the latter, a kind of adaptation to changed circumstances. (Bortkiewicz 1924a, p. 266)

14. In the German card game *Schwarzer Peter* the objective is to rid oneself of a particular card by passing it on to other players. The player holding it when the game ends is the loser. Merkin (1982, pp. 28–30) refers to the *Schwarzer Peter Theorie* of hyperinflation, without, however, citing Hahn’s work.

15. Merkin (1982, p. 30) also quotes the bulk of the following three passages, albeit with minor differences in translation, but his discussion stresses Bortkiewicz’s comments about “mistrust” (“lack of confidence” in his translation) of the currency, and not his view of the source of this mistrust as being “the expectation of further issues of money” which strengthens the effects of “an increased money supply” (“quantity of money” in Merkin’s translation). Hence Merkin treats Bortkiewicz’s views as being further removed from the quantity theory than we believe can be justified. He argues that Bortkiewicz’s final insistence on the prime importance of an increasing money supply as the factor undermining confidence, contained in the fourth passage quoted below, is inconsistent with what preceded it. We disagree. (See Merkin 1982, pp. 30–32, p. 45.)

Furthermore, Bortkiewicz saw the exchange rate adjusting faster than domestic prices and pulling domestic prices up behind it:

The foreign valuation of the currency of a country pursuing a policy of inflation [of the note issue] can manifest itself as a factor that drives up the domestic price level, especially if it is less favorable than is justified by the actual volume or tempo of issues of money. At a certain stage of the inflation [of the note issue] it is the external value of the currency that determines the internal value, and not the other way round. (Bortkiewicz 1924a, p. 266).

And, he went on,

the true chain of causality is thus in my opinion: mistrust, resulting in a disproportionately large rise in exchange rates, consequently domestic prices and wages that have no relationship to the actual rise in the money supply, wherefrom—a further link in the causal chain—a shortage of money arises that then results in a rise in the velocity of circulation in one way or another. (Bortkiewicz 1924a, p. 267)

This sounds suspiciously like a concession to the Balance of Payments theorists, and indeed this is precisely the misleading interpretation that Bresciani-Turroni (1931, tr. 1937, p. 176) was later to give to Bortkiewicz's theory. However, and crucially, Bortkiewicz explicitly criticized Helfferich for

overlooking the fact that it is in the final judgment inflation [of the note issue] that stands at the beginning of the chain of causation. For how does lack of confidence, the unfavorable foreign valuation of the money of a paper-currency country arise, if not through an excessively large increase in its money supply? (Bortkiewicz 1924a, p. 267)

By giving a central role to the impact of expectations of the future level of the money supply on exchange rates and prices, Bortkiewicz could thus explain the disproportionate rise in exchange rates and prices, as well as the shortage of money; and the lag in prices behind exchange rates also followed naturally in this chain of causation. Bortkiewicz therefore explicitly concluded that one did not have to reject the quantity theory of money in order to explain the hyperinflation:

One does not have to stand the Quantity Theory on its head in order to understand the disproportionality between the rise in the money supply and the rise in the price level that occurs at a particular phase of the inflation. It is far more valid to shape it into a version that takes account of the fact that the level of the value of money does not exclusively depend on the quantity of the actual note issue, but simultaneously *on the expected volume of future issues*. The expectations of the public with respect to the shaping of monetary circumstances in the future play a role here. Confidence or lack of confidence becomes relevant as an independent factor besides the actual quantity of money (Bortkiewicz 1924a, pp. 167–68, our emphasis)

Although his argument was not couched in the mathematical rigor of the present day, the use of forward-looking expectations about money creation surely represented a considerable insight on Bortkiewicz's part. If equation (1) above is solved forward in the spirit of rational expectations theorizing, one obtains

$$P_t = \frac{1}{1-\alpha} \sum_{i=1}^{\infty} \left(\frac{\alpha}{\alpha-1} \right)^i (E_t m_{t+i} - \gamma), \quad (3)$$

and prices today are seen to depend on the entire future time path of the money stock. To this extent Bortkiewicz's analysis was closer in spirit to that of Sargent (1982) than

of Cagan, though unlike either of them, and unlike Hahn, he saw inflation as a disequilibrium phenomenon where “the expectation of further issues . . . has an immediate impact on the price level,” so that prevailing prices do not necessarily bear any relationship to the *current* quantity of money.¹⁶

Mises (1923) took a similar position. He too treated the expected time path of the money supply as exerting an influence on the current behavior of the price level, over and above that of the quantity of money currently in circulation.

If the future path of the value of money is judged to be unfavorable, then, in anticipation of its expected decline in value, it will be valued at less today than would accord with the actual circumstances of money demand and supply. Prices will be *set and paid* that do not correspond to the present quantity of money in circulation and not to the present state of demand for money, but to future conditions. (Mises 1923, p. 6, our emphasis)

Hence, Mises saw both buyers and sellers as willing to transact at prices that depended on expected, not actual, monetary conditions, and was thus able to explain the shortage of money:

There is not enough money available at the moment to pay for prices that correspond to the expected future supply and demand for money. Hence trade begins to suffer from a shortage of notes: there is insufficient currency on hand for the completion of agreed transactions. The market mechanism, that brings about equality between aggregate demand and aggregate supply, no longer operates to create the exchange relationships that exist between money and other economic goods. One could see this clearly in the late Fall of 1921 in Austria. The completion of business transactions suffered severely from a shortage of money. (Mises 1923, p. 7)

In such circumstances increasing the money supply further would only make matters worse and further fuel the inflation:¹⁷

Were one, as some people suggest, to increase the note issue even further, the situation would only deteriorate further. Because, in this case, the panic would increase further, the disproportionality between the depreciation of money and the quantity in circulation would become intensified. (Mises 1923, p. 7)

5. CURRENCY STABILIZATION AND THE VELOCITY OF MONEY

Bortkiewicz, Hahn, and Mises all realized that stabilization of the currency would reduce the velocity of money significantly. During a deflation, said Bortkiewicz, the

16. The *Verein* proceedings of 1924 record a rather futile debate between Bortkiewicz and Hahn, which seems to have arisen because neither author appreciated this difference between their points of view. In the paper he presented to the *Verein*, Bortkiewicz considered a simple numerical example which later attracted unfavorable attention from Bresciani-Turroni (1931, tr. 1937, pp. 175 et seq.). It was aimed at Hahn, and purported to demonstrate that the mere fact of consumers spending money more quickly would not necessarily alter velocity; the money might instead simply stay longer in the tills of producers, and it would require a reduction in the period between income payments before velocity rose (Bortkiewicz 1924a, p. 263). Hahn replied that this example was unrealistic: during a time when money was losing its value, producers would be no more willing to hold extra balances than consumers, and velocity must rise (Hahn, 1924b, p. 303). Furthermore, Hahn (1924b, pp. 303–304) argued that if lack of confidence in the currency was seen to bid up prices independently of changes in the money supply or its velocity, then this would violate the quantity theory. Hahn did not admit the possibility that P could rise unless MV rose simultaneously to permit higher prices. He missed the point that, for Bortkiewicz, hyperinflation was not an equilibrium process, that prices could be set in anticipation of a continuing rise in the money supply, and, crucially, that the volume of transactions might be reduced as a consequence of a resulting shortage of money.

17. Mises expresses himself in a remarkably similar vein in the second edition of *The Theory of Money and Credit*, which appeared a year after his *Verein* paper. Indeed, he seems to have lifted passages from the *Verein* paper almost verbatim. See particularly, pp. 228–29 of Mises (1924, tr. 1934).

velocity of money would tend to fall as people increased their cash balances. This was not only a possibility in the case of an actual deflation, “but also applicable in the case of stabilization of the currency without shutting down the note-printing press, for which Austria provides an example. In this case a rise in the price level is avoided by the start of an intensive savings process” (Bortkiewicz 1924a, p. 273). Mises (1924) also discussed recent Austrian experience.

The fact that the circulation of notes has grown considerably in the past year without rendering the maintenance of the actual convertibility of notes [into dollars] impossible for the Bank shows that today the economy needs more Austrian currency again; foreign money, which in the summer of 1922 had already satisfied a significant, possibly even the greater part of the Austrian demand for money, has, now that confidence in Austrian monetary policy has returned, been replaced by Austrian money. (Mises 1924, p. 279)

Referring to events in Germany during the period February to April 1923, when prices remained roughly constant, the currency appreciated, but the money stock doubled, events which Helfferich had treated as incompatible with the quantity theory, Hahn commented that “this requires no further explanation. The phenomenon rested on the fact that as a result of the return of a certain confidence in the mark, the velocity of circulation of bank deposits as well as of currency was reduced” (Hahn 1924a, p. 295). Hahn also discussed the stabilization programme proper, which began in November 1923. He described its effect on money balances as follows:

If the velocity of bank deposits declines in consequence of a rise in confidence in the currency, so no alleviation [of the shortage of money] will initially occur—insofar as the reduction in velocity follows a maximum level—because the money base [*Reichsbanksgeld*] will also change its velocity . . .

A striking illustration of the case described here is provided by the unusual situation in the money market after the introduction of the *Rentenmark*. Because of the spontaneous reduction in the velocity of money from a maximum, no relief of the strain on the money market occurred for the time being, and money remained incredibly short [*unerhört knapp*]. First of all the cash boxes and cash registers filled themselves. Only when the cash registers and pocket book balances had acquired a normal level did money again take on the form of deposits with the banks, whereupon a quite extraordinarily strong relief of the situation in the money market certainly occurred, compared to the time before the introduction of the *Rentenmark*. (Hahn 1924a, pp. 310–11)

Thus, like Sargent (1982), the German quantity theorists saw a rise in confidence in the currency as increasing the demand for money, so reversing the process that had led to such a dramatic decline in real cash balances during the hyperinflation. Unlike Sargent, however, they did not view the disproportionate rise in the nominal money supply relative to prices after stabilization as a fact that might seem to be “violating the quantity theory of money” (Sargent 1982, p. 54).

6. FISCAL POLICY AND SOCIOPOLITICAL FACTORS

Sargent (1982) argues that a necessary condition for ending hyperinflation is a fiscal policy reform that obviates the need for inflationary finance. Examining the great inflations that occurred in Austria, Hungary, Germany, and Poland after the First

World War, he concludes that it was not merely a change in monetary policy per se, but the coordination of fiscal and monetary reform that ended these inflations, and that a mere commitment to price stability by the Central Bank would not have been credible in the absence of a fiscal reform. The economists whose work we have discussed in this paper were also well aware of the role of government finances in the inflation though they did not integrate it into their analysis of inflation expectations with the same systematic thoroughness.¹⁸

Hahn argued that price stability can be maintained in the face of changes in the velocity of money provided the money supply can be altered to offset such changes. Problems only began to arise when

it is not possible to stop the increase in notes from entering circulation and to withdraw notes from circulation. This is particularly the case when the state begins to cover its expenditures with the help of the Central Bank rather than through taxation or issuing bonds. For in this case, the Central Bank does not have the opportunity to withdraw banknotes from circulation, because the debtor, the State, is normally not in a position to meet its obligations. As a general rule, the financial plight of the State is the cause why it, instead of financing its expenditures through taxes or borrowing, looks for access to the Central Bank that can cover its financial needs through ad hoc newly created purchasing power, usually provided in exchange for Treasury Bills. (Hahn 1924a, pp. 313–14)

Furthermore, the best way of preventing inflation and currency depreciation was “increasing the economic strength of the state through fiscal policies so that it can repay its floating debt.” For, “if there are no more government bonds in circulation, they cannot be encashed at the Central Bank” (Hahn 1924a, p. 314). Even so, Hahn did not view a fiscal reform as the sine qua non of ending inflation. He went on to say that if fiscal reform is impossible, an alternative solution might be to return to the gold standard, which would restore confidence in the currency.

Bortkiewicz also argued (1924c) that it was fiscal mismanagement that initially gives rise to inflation, and suggested that the circumstance underlying such mismanagement is invariably a war, regardless of its outcome. Indeed, in his view, the extreme fragility of Germany’s sociopolitical fabric in the wake of World War I may well have made inflation the most appropriate policy for the authorities to follow.

In monetary and in Central Bank policy one cannot separate the political from the economic factors and cannot overlook social factors either. It is no doubt proper to mention a remark by Privy Counsellor Harms here, who has generously abstained from speaking: the inflation saved us from a social revolution. I subscribe to this opinion, naturally without identifying myself with all the measures taken in the area of money and credit during the war and postwar period. (Bortkiewicz 1924c, p. 321)

Mises too conceded that, given the sociopolitical conditions prevalent in Germany in the early 1920s, inflating the currency to defray reparations payments had been unavoidable:

18. Eucken (1923) was also aware of these issues. See above. Note that, in general, the German quantity theorists saw the root of the inflation as lying in the financing of the Great War, because the government had to an extent resorted to the printing press for this purpose. However, they differed as to whether inflation of the money supply had been essential to finance the war. See, for example, Georg Bernhard (1924, pp. 281–82).

The German government has no alternative way of covering its reparations obligations. It would have no success if it tried to raise the sums demanded by issuing bonds or raising taxes. Given the way matters currently stand with the German people, a policy of compliance could not count on the consent of the majority if its economic consequences were clearly understood and they were not deceived as to its costs. Public opinion would turn with elemental force against any government that were to try to fulfill the obligations undertaken toward the Allied Powers completely. (Mises 1923, p. 31)

He thus suggested that the hyperinflation was the best response available to the German government in the face of politically unsupportable demands for reparations.¹⁹

7. CONCLUSIONS

In this paper we have shown that there were economists in Germany, albeit a small minority, who, at the time of the Weimar hyperinflation, favored a monetary explanation of the phenomenon, understood that expectations of inflation would cause veloc-

19. Mises was, of course, always a strong advocate of sound money, and the view quoted in the text stemmed from a political judgment, which receives some support from other sources. In his classic study of the German inflation, Frank Graham says that

the will to check depreciation in Germany was much weaker than in other countries since the Germans were convinced, by no means without justification, that improvement in the public finances would lead to still more severe exactions on the part of the victors in the war. (Graham 1930, pp. 4–5)

It would be wrong, however, to assume the hyperinflation was the result of a cynical calculation by the German government. It was a time of “frequent changes of government, but also of repeated putschist efforts, political violence and assassinations” (Feldman 1993, p. 310). Feldman concludes that

Germany’s leaders certainly did not plan either the inflation or the hyperinflation. In the face of extreme domestic and international constraint, however, they either found it necessary or chose to exploit inflationary opportunities at crucial points, especially in the fall of 1922, and failed to take appropriate measures to control the avalanche.” (Feldman 1993, p. 838)

The view, that the fiscal and monetary authorities of the countries vanquished in the First World War were simply overwhelmed by the sociopolitical consequences of their defeat, was echoed by Baron Alexander von Spitzmüller at the 1924 *Verein* meeting. He had been governor of the Austrian Central Bank throughout the Austrian hyperinflation, which had ended in September 1922, more than a year before that of Germany, and he confessed that, in theory at least, he had had the power to stop the note-printing presses.

During the war the Austro-Hungarian bank was led by two people of impeccable gold standard credentials . . . They, and also especially the Hungarian Finance Minister at the time, Teleszky, made the greatest effort to contain the inflation during the war, but without success. I think that this failure can be traced back to the process that Herr Goldscheid today called “being forced to accommodate to existing political imperatives.” [*Zwangs Anpassung an bestehende politische Machtverhältnisse.*] To a certain extent this was also true in the postwar period, when I functioned as Bank governor. I believe that the social conditions in Austria after the collapse [of the Empire in late 1918] were such that one could not have managed without inflation [of the money supply]. This shred of land that remained after the appalling wreckage, experienced social circumstances which, if one had also added restrictive monetary conditions, would undoubtedly have led to social collapse. I was the first to try to work against the inflationary tendency by stopping note issues; but that was out of the question. Then I pointed to my legal rights—that were, mind you, empty of any content, although I did in fact assert them—and declared that I could shut down the note-printing press any day. Thereupon I was told: Quite right, you will then create complete economic chaos [*ein wirtschaftliches Tohuwabohu*] for a week and then we will establish a state banking department, like they have in Czechoslovakia and Hungary. In other words, by shutting down the printing press I would have accomplished an act of futile heroics [*herostratisch*], without altering the long-term course of events in the slightest. (Spitzmüller 1924, p. 312)

ity to rise as inflation rose, and to fall again as stabilization took hold, had no difficulty in reconciling the behavior of the exchange rate with a monetary explanation of inflation, and did not find the "shortage of money" phenomenon puzzling. We have also shown that they paid attention to the fiscal situation of the Weimar government, and to its political vulnerability, as factors affecting confidence in the currency. Furthermore, two of them, Borkiewicz and Mises, advanced a disequilibrium analysis of the effects of expectations about the future course of monetary policy on current price-setting behavior and on velocity that seems to have no exact parallel in modern work. It may be that, upon further investigation, the line of enquiry which they opened up would prove to be flawed. We intend to take no position on this matter when we suggest that such further investigation would nevertheless be worthwhile, and that the very fact that the literature we have here discussed contains these novel ideas makes it more than a historical curiosity.

LITERATURE CITED

- Altmann, S. P. "Zur deutschen Geldlehre des 19. Jahrhunderts." In Festgabe für Schmoller: *Die Entwicklung der deutschen Volkswirtschaftslehre im 19. Jahrhundert*. Leipzig, vol. 1, sec. 6 (1908), pp. 1–67.
- Barkai, Haim. "The Old Historical School: Roscher on Money and Monetary Issues." *History of Political Economy* 21 (Summer 1989), 179–200.
- Bernhard, Georg. "Discussion." *Verein für Sozialpolitik: Schriften* 170 (1924), 280–87.
- Borkiewicz, Ladislaus von. "Die Ursachen einer potenzierten Wirkung des vermehrten Geldumlaufs auf das Preisniveau." *Verein für Sozialpolitik: Schriften* 170 (1924a), 256–74.
- _____. "Discussion." *Verein für Sozialpolitik: Schriften* 170 (1924b), 290–91.
- _____. "Schlusswort." *Verein für Sozialpolitik: Schriften* 170 (1924c), 317–21.
- Bresciani-Turroni, C. *The Economics of Inflation*, 1931. As translated by M. E. Sayers, 1937, reprinted, New York: Augustus Kelley, 1968.
- Cagan, P. "The Monetary Dynamics of Hyperinflation." In *Studies in the Quantity Theory of Money*, edited by M. Friedman. Chicago: University of Chicago Press, 1956.
- _____. "Expectations in the German Hyperinflation Reconsidered." *Journal of International Money and Finance* 10 (December 1991), 552–60.
- Cannan, E. "The Application of the Theoretical Apparatus of Supply and Demand to Units of Currency." *Economic Journal* 31 (1921), 453–61.
- Ellis, H. *German Monetary Theory, 1905–1933*. Cambridge, Mass.: Harvard University Press, 1934.
- Eucken, Walter. *Kritische Betrachtungen zum Deutschen Geldproblem*. Jena: Gustav Fischer, 1923.
- Feldman, Gerald D. "The Historian and the German Inflation." In *Inflation through the Ages: Economic, Social, Psychological, and Historical Aspects*, edited by Nathan Schmukler and Edward Markus. New York: Brooklyn College Press, 1983.
- _____. *The Great Disorder: Politics, Economics, and Society in the German Inflation, 1914–1924*. Oxford: Oxford University Press, 1993.
- Fisher, Irving. *The Purchasing Power of Money*. New York: Macmillan, 1911.
- Frenkel, J. "The Forward Exchange Rate, Expectations, and the Demand for Money: The German Hyperinflation." *American Economic Review* 67 (September 1977), 653–70.

- Graham, Frank D. *Exchange, Prices, and Production in Hyper-Inflation: Germany, 1920–1923*. New York: Russell and Russell, 1930.
- Gregory, T. E. "Introduction" to Helfferich, 1923, translated 1927.
- Hahn, L. Albert. "Zur Frage des sogenannten `Vertrauens in die Wahrung.'" *Archiv fur Sozialwissenschaft und Sozialpolitik* 52:2 (1924a), 289–316.
- _____. "Discussion." *Verein fur Sozialpolitik: Schriften* 170 (1924b), 301–306.
- Helfferich, Karl. *Money*, 6th ed. (1923). Translated by L. Linfield, Adelphi. New York, 1927.
- Keynes, J. M. *A Tract on Monetary Reform*. London: Macmillan, 1923.
- Khan, Moshin S. "The Monetary Dynamics of Hyperinflation: A Note." *Journal of Monetary Economics* (1975), 337–60.
- Kindleberger, Charles P. "The Great Disorder: A Review." *Journal of Economic Literature* 32:3 (September 1994), 1216–25.
- Knapp, G. F. *Die Staatliche Theorie des Geldes*, 1905. 3rd 1921 ed. abridged and translated as *The State Theory of Money* by H. M. Lucas and J. Bonar, London, 1924.
- Marshall, A. "Evidence to the Indian Currency Commission" (1899). Reprinted in *Official Papers of Alfred Marshall*, edited by J. M. Keynes. London: Macmillan, 1926.
- Mehrling, P. "The Monetary Thought of Allyn Abbott Young." *History of Political Economy* 28 (Winter 1996), 607–32.
- Menger, Carl. "On the Origin of Money." *Economic Journal* 2 (June 1892), 239–55.
- Merkin, Gerald. "Towards a Theory of the German Inflation: Some Preliminary Observations." In *The German Inflation Reconsidered: A Preliminary Balance*, edited by Gerald D. Feldman, Carl-Ludwig Holtfrerich, Gerhard A. Ritter, and Peter-Christian Witte. Berlin and New York: Walter de Gruyter, 1982.
- Mises, Ludwig von. *Theorie des Geldes und der Umlaufmittel*, 1st ed. Munich, 1912.
- _____. "Die Geldtheoretische Seite des Stabilisierungsproblems." *Verein fur Sozialpolitik: Schriften* 164 (1923), 1–37, translated as *On the Manipulation of Money and Credit*. Dodds Ferry, N. Y.: Free Market books (tr. and ed. Percy L. Greaves, Jr.)
- _____. "Discussion." *Verein fur Sozialpolitik: Schriften* 170 (1924), 275–80.
- _____. *The Theory of Money and Credit*, 1924. 2d ed., English tr. by H. E. Batson. London: Jonathon Cape, 1934.
- Palyi, Melchior. "Schlusswort." *Verein fur Sozialpolitik: Schriften* 170 (1924), 320–23.
- Pigou, A. C. "The Value of Money." *Quarterly Journal of Economics* 32 (1917), 38–65.
- Sargent, T. J. "The Ends of Four Big Inflations." In *Inflation: Causes and Effects*, edited by R. E. Hall. Chicago: University of Chicago Press, 1982.
- Schmoller, Gustav von. *Grundriss der Allgemeinen Volkswirtschaftslehre* (2 vols.). Leipzig und Munchen: Dunker und Humblot, 1900/04.
- Schumpeter, Joseph. "Das Sozialprodukt und die Rechenpfennige." *Archiv fur Sozialwissenschaft und Sozialpolitik* 44 (1917/18), 627–715. Tr. 1956 by Arthur Marget as "Money and the Social Product." *International Economic Papers*, no. 6. London: Macmillan, pp. 148–211.
- _____. *History of Economic Analysis*. New York: Oxford University Press, 1954.
- Somary, Felix. "Schlusswort." *Verein fur Sozialpolitik: Schriften* 170 (1924), 323–25.
- Spitzmuller, Alexander Baron von. "Discussion." *Verein fur Sozialpolitik: Schriften* 170 (1924), 310–13.
- Wagner, Adolph. *Beitrage zur Lehre von den Banken*. Leipzig: Leopold Voss, 1857.
- Wicksell, K. *Geldzins und Guterpreise*, 1898. (*Interest and Prices*, tr. R. F. Kahn, London: Macmillan, for the Royal Economic Society, 1936.)
- Young, A. A. "War Debts, External and Internal." *Foreign Affairs* 2 (Part B) (1923), 397–409.