The Ends of Four Big Inflations

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Revised May 1981

Working Paper #158

PACS File #2700

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Note: This paper was prepared for a conference on inflation sponsored by the National Bureau of Economic Research. Helpful comments on earlier drafts were made by Preston Miller, John Kennan, Peter Garber, and Gail Makinen. General conversations on the subject with Michael K. Salemi and Neil Wallace have been most helpful. Gail Makinen directed my attention to the unemployment figures for Poland.

Introduction

In the last fifteen years, many western economies have experienced persistent and growing rates of inflation. Some prominent economists and statesmen have become convinced that this inflation has a stubborn, self-sustaining momentum, and that either it simply is not susceptible to cure by conventional measures of monetary and fiscal restraint, or else that in terms of the consequent widespread and sustained unemployment, the cost of eradicating inflation by monetary and fiscal measures would be prohibitively high. It is often claimed that there is an "underlying rate of inflation" which responds slowly, if at all, to restrictive monetary and fiscal measures.[1/] Evidently, this underlying rate of inflation is the rate of inflation that firms and workers have come to expect will prevail in the future. There is momentum in this process because firms and workers supposedly form their expectations by extrapolating past rates of inflation into the future. If this is true, the inflation record of the past fifteen years has left firms and workers with a legacy of high expected rates of inflation which promise to respond only slowly, if at all, to restrictive monetary and fiscal policy actions. According to this view, restrictive monetary and fiscal actions in the first instance cause substantial reductions in output and employment, but have little, if any, effects in reducing the rate of inflation. For the economy of the United States, a widely cited estimate is that for every one percentage point reduction in the annual inflation rate accomplished by restrictive monetary and fiscal measures, 220 billion dollars of annual GNP would be lost. For the 2,500 billion dollar U.S. economy, the cost of achieving zero percent inflation is great, indeed, according to those who believe this estimate.

An alternative "rational expectations" view denies that there is any inherent momentum in the present process of inflation.[2/] On this view, it is

acknowledged that firms and workers have now come to expect high rates of inflation in the future, and that they strike inflationary bargains in light of these expectations.[3/] However, it is held that people expect high rates of inflation in the future precisely because the goverment's current and prospective monetary and fiscal policies warrant those expectations. Further, the current rate of inflation and people's expectations about future rates of inflation may well seem slow to respond to isolated actions of restrictive monetary and fiscal policy that are viewed as temporary departures from what is perceived as a long-term government policy involving high average rates of government deficits and monetary expansion in the future. Thus, inflation only seems to have a momentum of its own, while it is actually the long-term government policy of persistently running large deficits and creating money at high rates which imparts the momentum to the inflation rate. An implication of this view is that inflation can be stopped much more quickly than advocates of the "momentum view" have indicated, and that their estimates of the length of time and the costs of stopping inflation in terms of foregone output (220 billion dollars of GNP for one percentage point in the inflation rate) are erroneous. This is not to say that it would be easy to eradicate inflation. On the contrary, it would require far more than a few temporary restrictive fiscal and monetary actions. Instead, it would require a change in the policy regime: there must be an abrupt change in the continuing government policy or strategy for setting deficits now and in the future that is sufficiently binding as to be widely believed. Economists do not now possess reliable, empirically tried and true models that can enable us to predict precisely how rapidly and with what disruption in terms of lost output and employment such a regime change will work its effects. Undoubtedly, how costly such a move would be in terms of foregone output, and how long it would be in taking effect would depend partly on how resolute and evident the government's commitment was.

This paper describes several dramatic historical experiences which I believe to be consistent with the "rational expectations" view, but which seem difficult to reconcile with the "momentum" model of inflation. The idea is to stand back from our current predicament, and to examine the measures that successfully brought drastic inflations under control in several European countries in the 1920s. I shall describe and interpret events in Austria, Hungary, Germany, and Poland, each of which experienced a dramatic "hyperinflation" in which, after the passage of several months, price indexes assumed astronomical proportions. The basic data to be studied are the price indexes in figures 2-4. These data are recorded in a logarithmic scale, so that they will fit on a page. For all four countries, and especially Germany, the rise in the price level was spectacular. The graphs also reveal that in each case inflation stopped abruptly, rather than gradually. I shall also briefly describe events in Czechoslovakia, a country surrounded by neighbors experiencing hyperinflations, but which successfully achieved a stable currency itself. My reason for studying these episodes is that they are laboratories for the study of regime changes. Within each of Austria, Hungary, Poland, and Germany, there occurred a dramatic change in the fiscal policy regime, which in each instance was associated with the end of a hyperinflation. Further, though it shared some common problems with its four neighbors, Czechoslovakia deliberately adopted a relatively restrictive fiscal policy regime, with the avowed aim of maintaining the value of its currency.

While there are many differences in details among the Austrian, Hungarian, Polish, and German hyperinflations, there are some very important common features. These include the following:

Figure 1

Wholesale Prices
in Austria

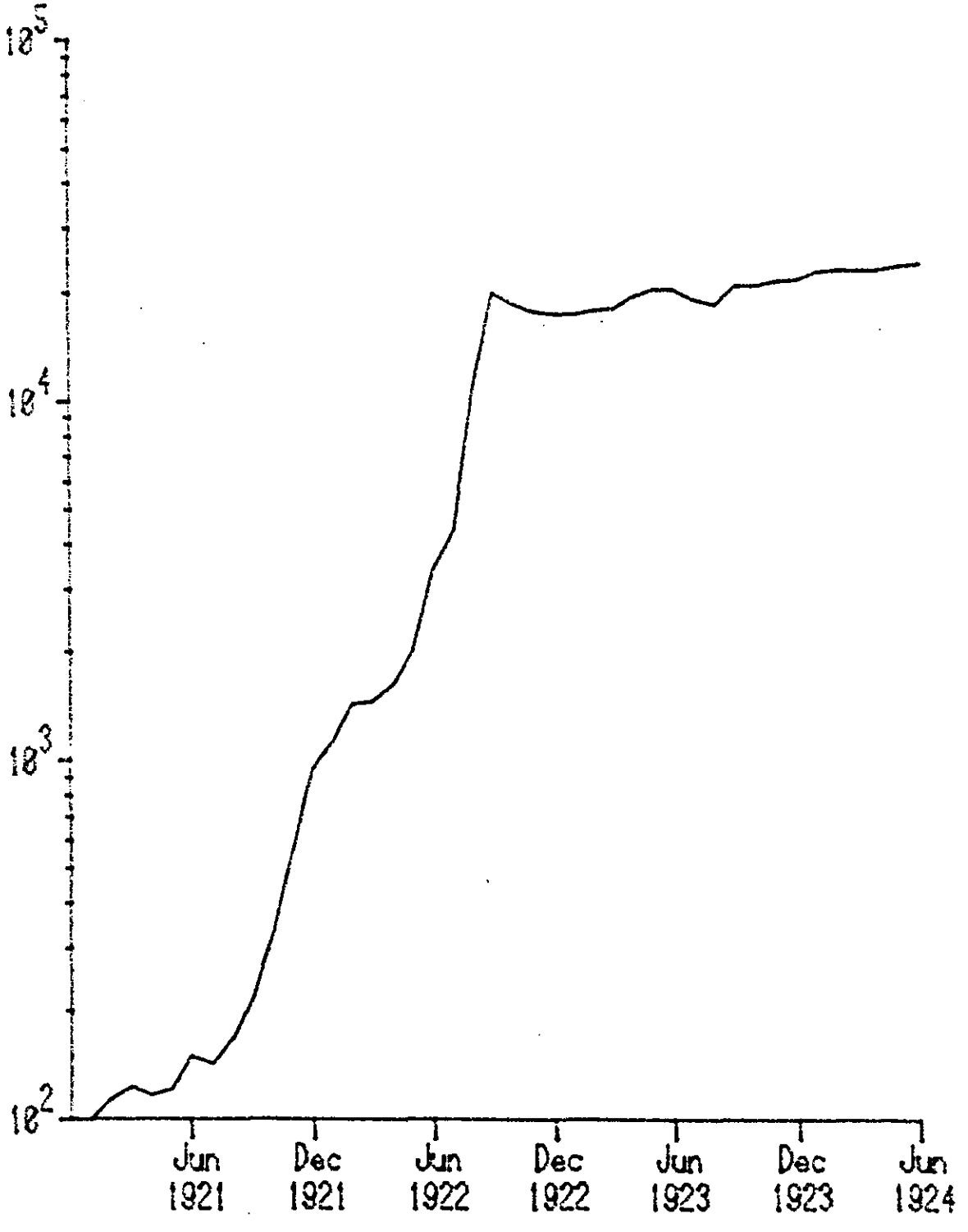


Figure 2

Wholesale Prices
in Hungary

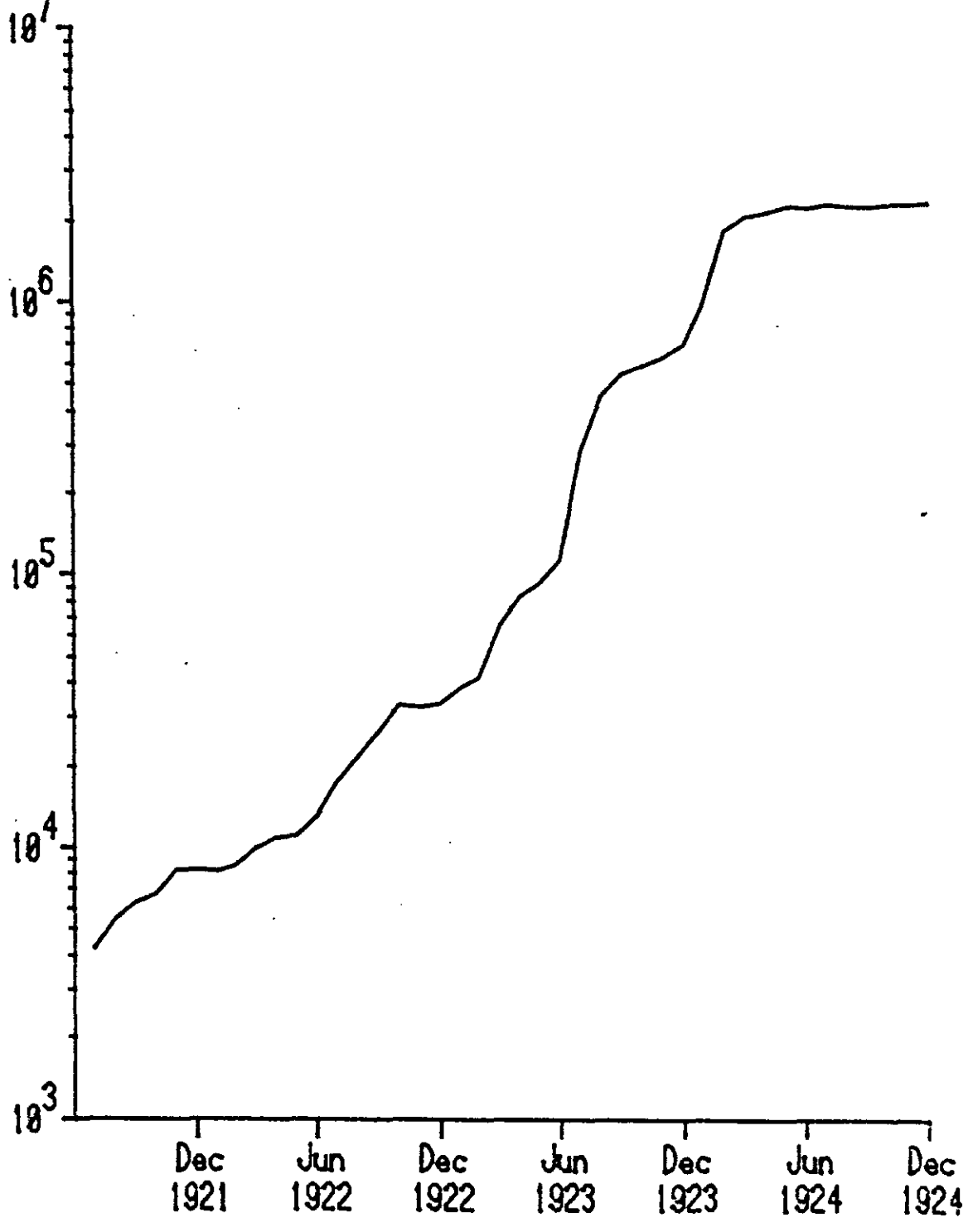


Figure 3

Wholesale Prices
in Poland

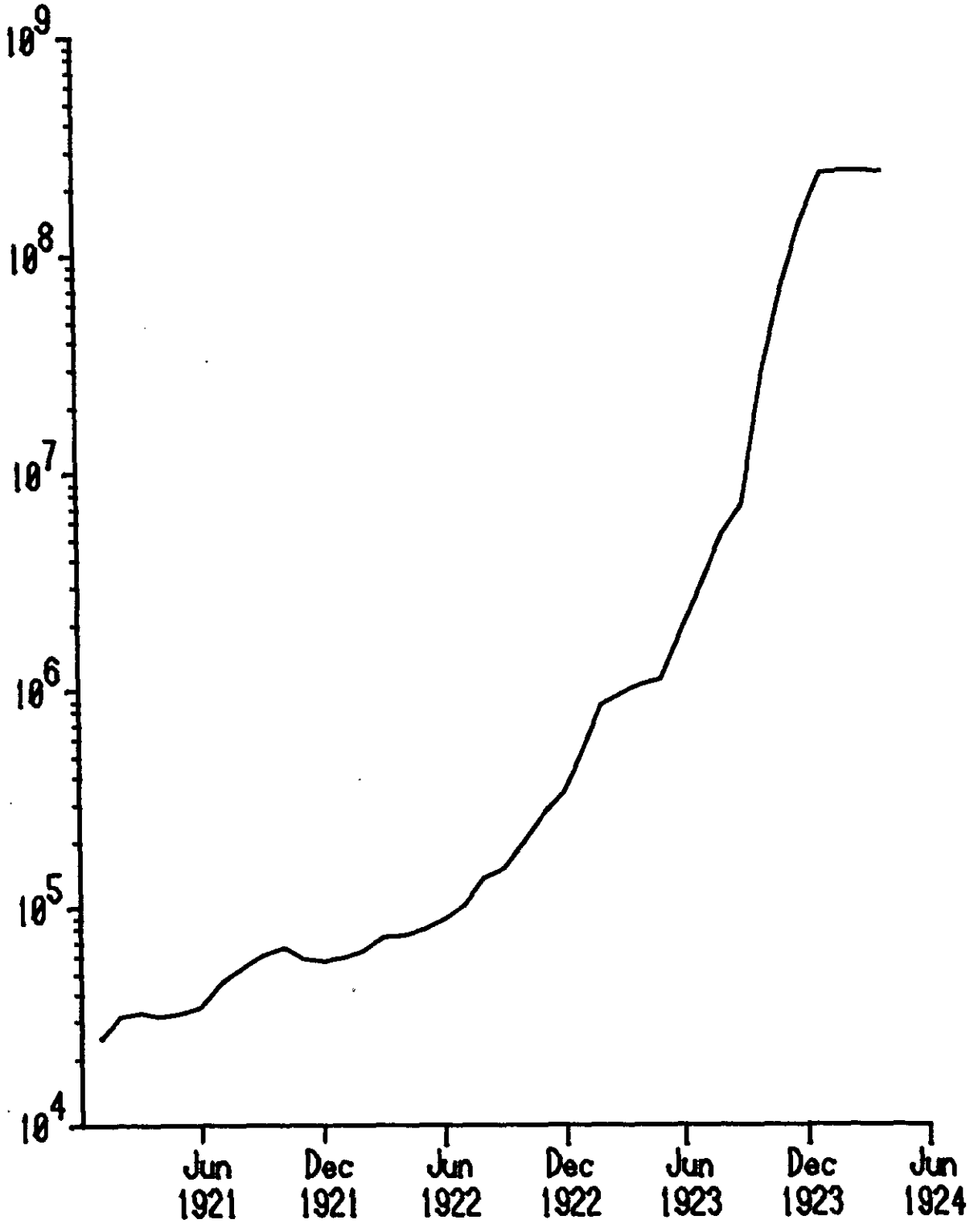
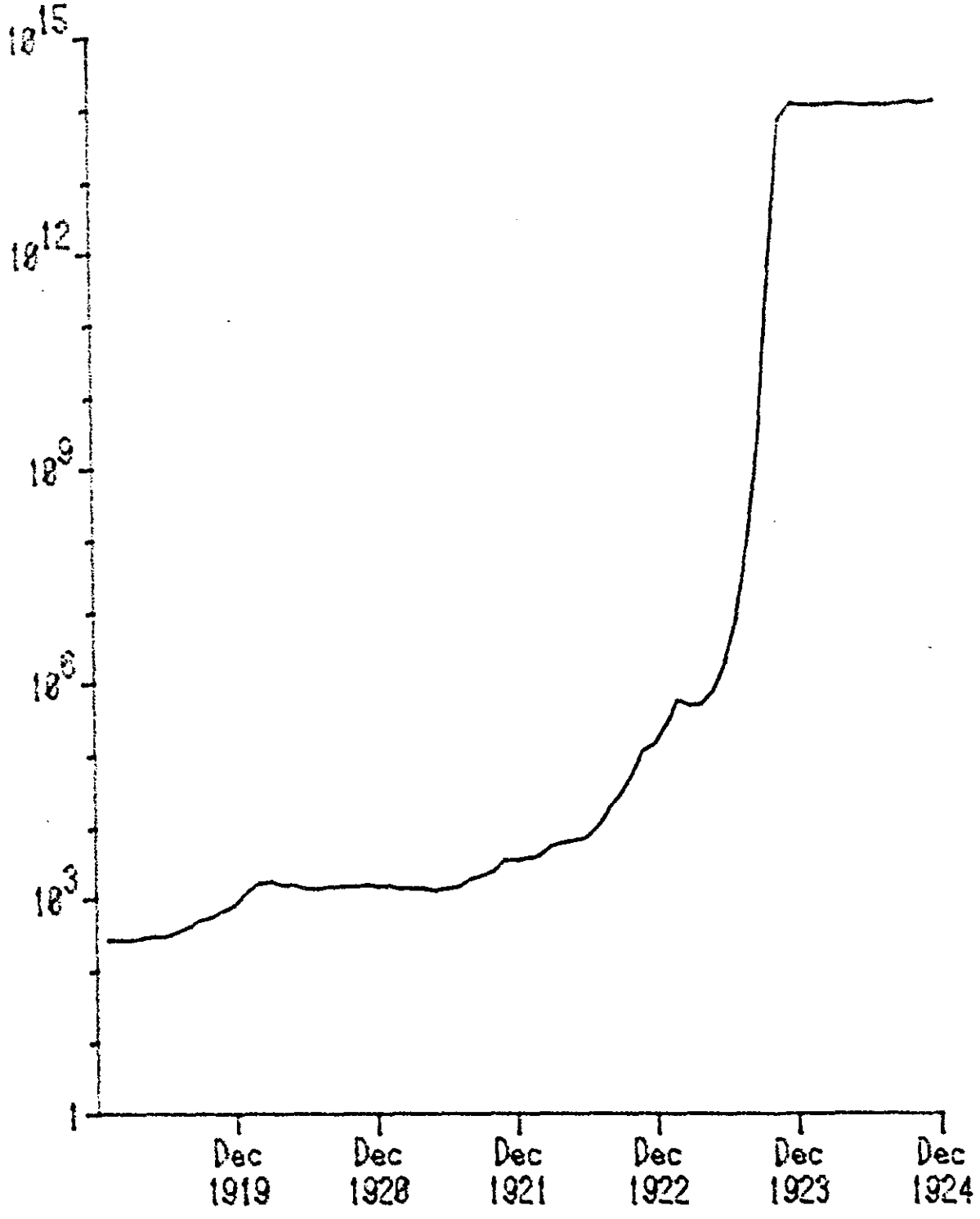


Figure 4

Wholesale Prices
in Germany



(i) The nature of the fiscal policy regime in effect during each of the hyperinflations. Each of the four countries persistently ran enormous budget deficits on current account.

(ii) The nature of the deliberate and drastic fiscal and monetary measures taken to end the hyperinflations.

(iii) The immediacy with which the price level and foreign exchanges suddenly stabilized.[4/]

(iv) The rapid rise in the "high powered" money supply in the months and years after the rapid inflation had ended.

I shall assemble and interpret the facts in the light of a view about the forces which give money value, and about the way the international monetary system worked in the 1920s. Before interpreting the historical facts, I now turn briefly to describe this view.

The Gold Standard

After World War I, the United States was on the gold standard. The U.S. government stood ready to convert a dollar into a specified amount of gold on demand. To understate things, immediately after the World War, Hungary, Austria, Poland, and Germany were not on the gold standard. In practice, their currencies were largely "fiat" or unbacked. The governments of these countries resorted to the printing of new unbacked money to finance government deficits.[5/] This was done on such a scale that it led to depreciation of the currencies of spectacular proportions. In the end, the German mark stabilized at 1,000,000,000,000 paper marks to the pre-war gold mark, the Polish mark at 1,800,000 to the gold zloty, the Austrian crown at 14,400 paper crowns to the pre-war Austro-Hungarian crown, and the Hungarian krone at 14,500 paper crowns to the pre-war Austro-Hungarian crown.[6/]

This paper focuses on the deliberate changes in policy that each of Hungary, Austria, Poland, and Germany made to end its hyperinflation, and the deliberate choice of policy that Czechoslovakia made to avoid inflation in the first place. The hyperinflations were each ended by restoring or virtually restoring convertibility to the dollar or equivalently to gold. For this reason, it is good to keep in mind the nature of the restrictions that adherence to the gold standard imposed on a government. Under the gold standard, a government issued demand notes and longer-term debt which it promised to convert into gold under certain specified conditions, i.e. on demand, for notes. Presumably, people were willing to hold these claims at full value if the government's promise to pay were judged to be good. The government's promise to pay was "backed" only partially by its holding of gold reserves. More important in practice, since usually a government did not hold 100% reserves of gold, a government's notes and debts were backed by the commitment of the government to levy taxes in sufficient amounts, given its expenditures, to make good on its debt. In effect, the notes were backed by the government's pursuit of an appropriate budget policy. During the 1920s, John Maynard Keynes emphasized that the size of a government's gold reserve was not the determinant of whether it could successfully maintain convertibility with gold: its fiscal policy was.[7/] On this view, what mattered was not the contemporary government deficit, but the present value of current and prospective future government deficits. The government was like a firm whose prospective receipts were its future tax collections. The value of the government's debt was, to a first approximation, equal to the present value of current and future government surpluses. So under a gold standard, a government must honor its debts and could not engage in inflationary finance. In order to assign a value to the government's debt, it was necessary to have a view about the fiscal policy regime in place, that is, the rule

determining the government deficit as a function of the state of the economy now and in the future. The public's perception of the fiscal regime influenced the value of government debt through private agents' expectations about the present value of the revenue streams backing that debt.[8] It will be worthwhile to keep this view of the gold standard in mind as we turn to review the events surrounding the ends of four hyperinflations.[9]

However, before we turn to the historical facts, it will be ueful to expand a little more generally on the distinction between the effects of isolated actions taken within the context of a given general strategy, on the one hand, and the effects of choosing among alternative general strategies or rules for repeatedly taking actions. The latter choice I refer to as a choice of regime. The values of government expenditures and tax rates for one particular quarter are examples of actions, while the rules, implicit or explicit, for repeatedly selecting government expenditures and tax rates as functions of the state of the economy are examples of strategies. Recent work in dynamic macroeconomics has discovered the following general principle: whenever there is a change in the government strategy or regime, private economic agents can be expected to change their strategies or rules for choosing consumption rates, investment rates, portfolios, and so on.[10] The reason is that private agents' behavior is selfish, or at least purposeful, so that when the government switches its strategy, private agents usually find it in their best interests to change theirs. One by-product of this principle is that most of the empirical relationships captured in standard econometric models cannot be expected to remain constant across contemplated changes in government policy regimes. For this reason, predictions made by assuming that such relationships will remain constant across regime changes ought not to be believed. The "1 percent reduction in inflation would cost 220 billion dollars of annual GNP" estimate is one example of such a faulty predic-

tion. When an important change in regime occurs, dynamic macroeconomics would predict that the entire pattern of correlations among variables will change in quantitatively important ways.

While the distinction between isolated actions and strategy regimes is clear in principle, it is an admittedly delicate task to interpret whether particular historical episodes reflect isolated actions within the same old "rules of the game" or whether they reflect a new set of rules or government strategies.[11/] All that we have to go on are the recorded actions actually taken, together with the pronouncements of public officials, laws, legislative votes, and sometimes constitutional provisions. Out of this material we are to fashion a view about the government strategy being used. Common sense suggests and technical econometric considerations confirm the difficulties in making such interpretations in general. Having said this, I believe that the examples described below are about as close to being laboratories for studying regime changes as history has provided.

Austria

At the end of World War I, the Austro-Hungarian empire dissolved into a number of successor states, of which Austria was one. After having been the center of an empire of 625,000 sq. kilometers and 50 million inhabitants, the dissolution left Austria a small country of 80,000 sq. kilometers and 6.5 million inhabitants. Having suffered food scarcities during the war that were produced by an effective allied blockade, Austria found herself confronted with new national borders and trade barriers that cut her off from the food sources formerly within her empire. Further, the government of Austria reabsorbed a large number of Austrian imperial bureaucrats who were no longer welcome in the other successor states. Austrians also faced a large scale unemployment problem, stemming from the need to reconvert the economy to peaceful activities, and to adjust to

the new national borders. If this were not enough, as a loser of the war, Austria owed the Reparation Commission sums that for a long time were uncertain in amount, but were presumed eventually to be substantial. The Reparation Commission, in effect, held a blanket mortgage against the assets and revenues of the Austrian government.

The government of Austria responded to these pressing problems by making large expenditures in the form of food relief and payments to the unemployed. In addition, the state railroads and monopolies ran deficits, as taxes and prices were kept relatively low. The government did not collect enough taxes to cover expenditures, and so ran very substantial deficits during the years 1919-1922 (see Table A1). As Table A1 shows, in these years the deficit was typically over 50 percent of the total government expenditures. The government financed these deficits by selling treasury bills to the Austrian section of the Austro-Hungarian bank. The result was a very rapid increase in the volume of "high powered" money, defined as the notes and demand deposit obligations of the central bank (see Table A2). As the figures in Table A2 indicate, between March 1919 and August 1922, the total note circulation in Austria[12/] of the Austro-Hungarian bank increased by a factor of 288 times. This expansion of central bank notes stemmed mainly from the central bank's policy of discounting treasury bills. However, it also resulted partly from the central bank's practice of making loans and discounts to private agents at nominal interest rates of between 6 and 9 percent per annum, rates which by any standard were far too low in the view of the inflation rate, which averaged 10,000 percent per annum from January 1921 to August 1922 (Table A3).[13/]

In response to these government actions and what seemed like prospects for their indefinite continuation, the Austrian crown depreciated internationally and domestic prices rose rapidly (see Tables A3 and A4). While between

January 1921 and August 1922 the note circulation of the central bank increased by a factor of 39, the retail price index increased by a factor of 110 (see Tables A3 and A4) so that the real value of the note circulation diminished during the currency depreciation.[14/] The "flight from the crown" occurred as people chose to hold less of their wealth in the form of the rapidly depreciating crown, attempting instead to hold foreign currencies or real assets.[15/] From the viewpoint of financing its deficit, it was in the interest of the government of Austria to resist the flight from the crown, because it had the effect of diminishing the resources that the government could command by printing money. Therefore, the government established a system of exchange controls administered by an agency called the Devisenzentrale. The essential function of this agency was to increase the amount of Austrian crowns held by Austrians, which it accomplished by adopting measures making it difficult or illegal for Austrians to hold foreign currencies and other substitutes for Austrian crowns.[16/],[17/] Despite these regulations, it is certain that Austrian citizens were holding large amounts of foreign currencies during 1921 and 1922.

Table A4 reveals that the Austrian crown abruptly stabilized in August 1922, while Table A3 indicates that prices abruptly stabilized a month later. This occurred despite the fact that the central bank's note circulation continued to increase rapidly, as Table A1 indicates. Furthermore, there occurred no change in currency units or "currency reform," at least not for another year and a half.

The depreciation of the Austrian crown was suddenly stopped by the intervention of the Council of the League of Nations, and the resulting binding commitment of the government of Austria dramatically to reorder her fiscal and monetary strategies. After her increasingly desparate pleas to the allied governments for international aid had repeatedly been rejected or only partially

fulfilled, in late August 1922 the Council of the League of Nations undertook to enter into serious negotiations to reconstruct the financial system of Austria. These negotiations led to the signing of three protocols on October 2, 1922 which successfully guided the financial reconstruction of Austria. It is remarkable that even before the precise details of the protocols were publicly announced, the fact of the serious deliberations of the Council brought relief to the situation. This can be seen in Tables A3 and A4, and was described by Pasvolsky as follows:

> "The moment the Council of the League decided to take up in earnest the question of Austrian reconstruction, there was immediately a widespread conviction that the solution of the problem was at hand. This conviction communicated itself first of all to that delicately adjusted mechanism, the international exchange market. Nearly two weeks before Chancellor Seipel officially laid the Austrian question before the Council of the League, on August 25, the foreign exchange rate ceased to soar and began to decline, the internal price level following suit three weeks later. The printing presses in Austria were still grinding out new currency; the various ministries were still dispersing this new currency through the countries by means of continuing budgetary deficits. Yet the rate of exchange was slowly declining. The crisis was checked."18/

The first protocol was a declaration signed by Great Britain, France, Italy, Czechoslovakia, and Austria that reaffirmed the political independence and sovereignty of Austria.19/ The second protocol provided conditions for an international loan of 650,000,000 gold crowns to Austria. The third protocol was signed by Austria alone, and laid out a plan for reconstruction of her fiscal and monetary affairs. The Austrian government promised to establish a new independent central bank, to cease running large deficits, and to bind itself not to finance deficits with advances of notes from the central bank. Further, the government of Austria agreed to accept in Austria a Commissioner General, appointed by the Council of the League, who was to be responsible for monitoring the fulfillment of Austria's commitments. The government of Austria also agreed

to furnish security to back the reconstruction loan. At the same time, it was understood that the Reparation Commission would give up or modify its claim on the resources of the government of Austria.

The government of Austria and the League both moved swiftly to execute the plan outlined in the protocols. In legislation of November 14, 1922, the Austrian National Bank was formed to replace the old Austrian section of the Austro-Hungarian bank, and it was to take over the assets and functions of the Divesenzentrale. The new bank began operations on January 1, 1923, and was specifically forbidden from lending to the government except on the security of an equal amount of gold and foreign assets. The bank was also required to cover its note issues with certain minimal proportions of gold, foreign earning assets, and commercial bills. Further, once the government's debt to the bank had been reduced to 30,000,000 gold crowns, the bank was obligated to resume convertibility into gold.

The government moved to balance its budget by taking concrete steps in several directions. Expenditures were reduced by discharging thousands of government employees. Under the reconstruction scheme, the government promised gradually to discharge a total of 100,000 state employees. Deficits in government enterprises were reduced by raising prices of government sold goods and services. New taxes and more efficient means of collecting tax and custom revenues were instituted. The results of these measures can be seen by comparing the figures in Table A6 with those in Table A1. Within two years the government was able to balance the budget.

The stabilization of the Austrian crown was not achieved via a currency reform. At the end of 1924 there was introduced a new unit of currency, the schilling, equal to 10,000 paper crowns. The introduction of this new unit of currency occurred long after the exchange rate had been stabilized, and was surely an incidental measure.[20/]

Table A2 reveals that from August 1922, when the exchange rate suddenly stabilized to December 1924, the circulating notes of the Austrian central bank increased by a factor of over six times. The phenomenon of the achievement of price stability in the face of six-fold increase of the stock of "high powered money" was widely regarded by contemporaries as violating the quantity theory of money, and so it seems to do. However, these observations are not at all paradoxical when interpreted in light of a view which distinguishes sharply between "unbacked" or "outside" money, on the one hand, and "backed" or "inside" money, on the other hand. In particular, the balance sheet of the central bank and the nature of its open market operations changed dramatically after the carrying out of the League's protocols, with the consequence that the proper intrepretation of the figures on the total note obligations of the central bank changes substantially. Before the protocols, the liabilities of the central bank were "backed" mainly by government treasury bills, that is, they were not backed at all, since treasury bills signified no commitment to raise revenues through future tax collections. After the execution of the protocols, the liabilities of the central bank became backed by gold, foreign assets, and commercial paper, and ultimately by the power of the government to collect taxes. At the margin, central bank liabilities were backed 100% by gold, foreign assets, and commercial paper as notes and the deposits were created through open market operations in those assets (see Table A5). The value of the crown was backed by the commitment of the government to run a fiscal policy compatible with maintaining the convertibility of its liabilities into dollars. Given such a fiscal regime, to a first approximation, the intermediating activities of the central bank did not affect the value of the crown, so long as the assets purchased by the bank were sufficiently valuable. Thus, the six-fold increase in the liabilities of the central bank after the protocols ought not to be regarded as "inflationary." The wil-

lingness of Austrians to convert hoards of foreign exchange into crowns, which is reflected in Table A5, is not surprising since the stabilization of the crown made it a much more desirable asset to hold relative to foreign exchange.[21/,22/]

The available figures on unemployment indicate that the stabilization of the crown was attended by a substantial increase in the unemployment rate, though unemloyment had begun to climb well before stabilization was achieved (see Table A7). The number of recipients of state unemployment benefits gradually climbed from a low of 8,700 in December 1921 to 83,000 in December 1922. It climbed to 167,000 by March 1923, and then receded to 76,000 in November 1923.[23/] How much of this unemployment was due to the achievement of currency stabilization, and how much was due to the real dislocations affecting the Austrian economy cannot be determined. However, it is true that currency stabilization was achieved in Austria very suddenly, and with a cost in terms of increased unemployment and foregone output that was minor when compared with the "1 percentage point inflation reduction costs 220 billion dollars lost GNP" tradeoff that has figured in contemporary discussions in the United States.

Hungary

Like its old partner in the dual Habsburg monarchy, Hungary emerged from World War I as a country much reduced in land, population, and power. It retained only 25 percent of its territory (down from 325,000 sq. kilometers to 92,000) and only 37 percent of its population (down from 21 million to about 8 million). Its financial and economic life was disrupted by the newly erected national borders separating it from peoples and economic institutions formerly within the domain of the Habsburg dual monarchy.

At the end of the war, Hungary experienced political turmoil as the Habsburg King Charles was replaced by the government of Prince Karolyi. In March

1919, the Karolyi government was overthrown by the Bolsheviks under Bela Kun. The regime of Bela Kun lasted only four months, as Romania invaded Hungary, occupied it for a few weeks, and then withdrew. A new repressive right wing regime under Admiral Horthy then took power. The "white terror" against leftists carried out by supporters of Horthy took even more lives than the "red terror" that had occurred under Bela Kun.

At the end of the war, the currency of Hungary consisted of the notes of the Austro-Hungarian bank. By the provisions of the Treaties of Peace of Trainon and St. Germain, the successor states to the Austro-Hungarian empire were required to stamp the notes of the Austro-Hungarian bank that were held by their residents, in effect, thereby recognizing those notes as debts of the respective new states. Before Hungary executed this provision of the Treaty of Trainon, the currency situation grew more complicated, for the Bolshevik regime had access to the plates for printing one and two crown Austro-Hungarian bank notes and it used them to print more notes. The Bolshevik government also issued new so-called "white notes." Each of these Bolshevik-issued currencies was honored by the subsequent government.

The Austro-Hungarian bank was liquidated at the end of 1919, and it was replaced by an Austrian section and a Hungarian section. The functions of the Hungarian section of the old bank were assumed in August 1921 by a State Note Institute which was under the control of the Minister of Finance. In August 1921, the Note Institute issued its own notes, the Hungarian krone, in exchange for Hungarian stamped notes of the Austro-Hungarian bank, and several other classes of notes, including those that had been issued by the Bolshevik regime.

As a loser of the war, Hungary owed reparations according to the Treaty of Trainon. The Reparation Commission had a lien on the resources of the government of Hungary. However, neither the total amount owed nor a schedule of pay-

ments was fixed for years after the war. This circumstance alone created serious obstacles in terms of achieving a stable value for Hungary's currency and other debts, since the unclear reparations obligations made uncertain the nature of the resources which backed those debts.

From 1919 until 1924 the government of Hungary ran substantial budget deficits. The government's budget estimates in Table H1 are reported by Pasvolsky substantially to understate the size of the deficits.[24/] These deficits were financed by borrowing from the State Note Institute, and were a major cause of a rapid increase in the note and deposit liabilities of the State Note Institute. An additional cause of the increase in liabilities of the Note Institute was the increasing volume of loans and discounts that it made to private agents (see Table H2). These loans were made at a very low interest rate, in view of the rapid rate of price appreciation, and to a large extent amounted to simple gifts from the Note Institute to those lucky enough to receive loans on such generous terms. These private loans account for a much larger increase in high powered money in the Hungarian than in the other three hyperinflations we shall study.

As Table H3 shows, the Hungarian krone depreciated rapidly on foreign exchange markets, and domestic prices rose rapidly. Between January 1922 and April 1924, the price index increased by a factor of 263 times. In the same period, the total notes and deposit liabilities of the Note Institute increased by a factor of 85 times, so that the real value of the liabilities of the Note Institute decreased substantially. As in the case of Austria, this decrease is symptomatic of a "flight from the krone," as residents of Hungary attempted to economize on their holdings of krones and instead to hold assets dominated in more stable currencies. As in the case of Austria, the government of Hungary resisted this force by establishing in August 1922 a Hungarian Devisenzentrale within the State Note Institute.

Table H3 indicates that in March 1924, the rise in prices and the depreciation of the krone internationally both abruptly halted. The stabilization occurred in the face of continued expansion in the liabilities of the central bank, which increased by a factor of 3.15 between March 1924 and January 1925 (see Table H2). This pattern parallels what occurred in Austria, and has a similar explanation.

As in Austria, the financial reconstruction of Hungary was accomplished with the intervention of the League of Nations. Together with the Reparation Commission and the government of Hungary, the League devised a plan which reduced and clarified the reparations commitment of Hungary, arranged for an international loan that would help finance government expenditures, and committed Hungary to establish a balanced budget and a central bank legally bound to refuse any government demand for unbacked credit. On February 21, 1924, the Reparation Commission agreed to give up its lien on Hungary's resources, so that these could be used to secure a reconstruction loan. A variety of western nations also agreed to give up their liens on Hungary so that the new loan could successfully be floated.

The League's reconstruction plan was embodied in two protocols. The first was signed by Great Britain, France, Italy, Czechoslovakia, Romania, and Hungary, and guaranteed the "political independence, territorial integrity, and sovereignty of Hungary." The second protocol outlined the terms of the reconstruction plan, and committed Hungary to balance its budget and form a central bank truly independent of the Finance Ministry. The government was also obligated to accept in Hungary a Commissioner General, responsible to the League, to monitor and supervise the government's fulfillment of its commitment to fiscal and monetary reform.

A reconstruction loan of 250,000,000 gold krones was successfully placed abroad in July 1924. The loan was secured by receipts from customs duties

and sugar taxes, and revenues from the salt and tobacco monopolies. The purpose of the loan was to give the government a concrete means of converting future tax promises to tax into current resources while avoiding the need to place its debt domestically.

By a law of April 26, 1924, the Hungarian National Bank was established, and it began operations on June 24. The bank assumed the assets and liabilities of the Institute of Note Issue, and also took over the functions of the foreign exchange control office, the Devisenzentrale. The bank was prohibited from making any additional loans or advances to the government, except upon full security of gold or foreign bills. The bank was also required to hold gold reserves of certain specified percentages behind its liabilities.

The government of Hungary also moved toward establishing a balanced budget. Both by cutting expenditures and raising tax collections, the government was successful in moving quickly to a balanced budget (see figure H4). Indeed, the proceeds of the reconstruction loan were used appreciably more slowly than had been anticipated in the reconstruction plan.

As Table H2 confirms, the stabilization of the krone was accompanied by a substantial <u>increase</u> in the total liabilities of the central bank. But as with Austria, the drastic shift in the fiscal policy regime that occasioned the stabilization also changed the appropriate interpretation of these figures. As Table H2 indicates, and as the regulations governing the bank required, after the League's intervention the notes and deposits liabilities of the central bank became backed, 100% at the margin, by holdings of gold, foreign exchange, and commercial paper. In effect, the central bank's liabilities represented "fiat money" before the League's plan was in place; after that plan was in place, they represented more or less "backed" claims on British Sterling,[25/] the foreign currency to which Hungary pegged its exchange as a condition for British participation in the reconstruction loan.

Figures on unemployment in Hungary are reported in Table H5, and unfortunately begin only immediately after the price stabilization had already occurred. All that can be inferred from these figures is that immediately after the stabilization, unemployment was not any higher than it was one or two years later. This is consistent either with the hypothesis of the absence of much adverse effect of the stabilization process on unemployment, or with the hypothesis that the adverse effect was so long-lasting that no recovery occurred within the time span of the figures recorded. The former hypothesis seems more plausible to me.

Poland

The new nation of Poland came into existence at the end of World War I, and was formed from territories formerly belonging to Germany, Austro-Hungary, and Russia. At the time of her formation, she possessed a varied currency consisting of Russian rubles, crowns of the Austro-Hungarian bank, German marks, and Polish marks issued by the Polish State Loan Bank which had been established by Germany to control the currency in the part of Poland occupied by Germany during the war. For Poland, the armistice of 1918 did not bring peace, a costly war with Soviet Russia being waged until the fall of 1920. Poland was devastated by the fighting, and by Germany's practice of stripping her machinery and materials during World War I.[26/]

The new government of Poland ran very large deficits up to 1924 (see Table P1). These deficits were financed by government borrowing from the Polish State Loan Bank, an institution which the new government took over from the Germans. From January 1922 to December 1923, the outstanding notes of the Polish State Loan Bureau increased by a factor of 523 times (Table P2). Over the same period, the price index increased by a factor of 2,402 times while the dollar exchange rate decreased by a factor of 1,397 times (see Tables P3 and P4). As in the other inflations, we have studied, the real value of the note circulation decreased as people engaged in a "flight from the mark." Extensive government exchange controls were imposed to resist this force.

Tables P2 and P3 indicate that the rapid inflation and exchange depreciation both suddenly stopped in January 1924. Unlike the cases of Austria and Hungary, the initial stabilization was achieved without foreign loans or intervention, although later in 1927, after currency depreciation threatened to renew, a substantial foreign loan was arranged.[27/] But in terms of the substantial fiscal and monetary regime changes that accompanied the end of the inflation, there is

much similarity to the Austrian and Hungarian experiences. The two interrelated changes were a dramatic move toward a balanced government budget, and the establishment of an independent central bank that was prohibited from making additional unsecured loans to the government. In January 1924, the Minister of Finance was granted broad powers to effect monetary and fiscal reform. The Minister immediately initiated the establishment of the Bank of Poland, which was to assume the functions of the Polish State Loan Bank. The eventual goal was to restore convertibility with gold. The bank was required to hold a 30% reserve behind its notes, to consist of gold, and foreign paper assets or denominated in stable currencies. Beyond this reserve, the bank's notes had to be secured by private bills of exchange and silver. A maximum credit to the government of 50,000,000 zlotys was permitted. The government also moved swiftly to balance the budget (see Table P1).

In January 1924, a new currency unit became effective, the gold zloty, worth 1,800,000 paper marks. The zloty was equal in gold content to 19.29 cents.

Table P2 reveals that from January 1924 to December 1924, the note circulation of the central bank increased by a factor of 3.2, in the face of relative stability of the price level and the exchange rate (see Tables P3 and P4). This phenomenon matches what occurred in Austria and Hungary and has a similar explanation. As Table P2 reveals, the increased note circulation during this period was effectively backed 100% by gold, foreign exchange, and private paper.

The available figures on unemployment are summarized in Table P5. The stabilization of the price level in January 1924 is accompanied by an abrupt rise in the number of unemployed. Another rise occurs in July of 1924. While the figures indicate substantial unemployment in late 1924, unemployment is not an order of magnitude worse than before the stabilization, and certainly not anywhere nearly as bad as would be predicted by application of the same method of

analysis that was used to fabricate the prediction for the contemporary United States that each percentage point reduction in inflation would require a reduction of $220 billion in real GNP.

The Polish zloty depreciated internationally from late 1925 onward, but stabilized in autumn of 1926 at around 72% of its level of January 1924. At the same time, the domestic price level stabilized at about 50% above its level of January 1924. The threatened renewal of inflation has been attributed to the government's premature relaxation of exchange controls, and the tendency of the central bank to make private loans at insufficient interest rates.[28/]

Germany

After World War I, Germany owed staggering reparations to the allied countries. This fact dominated Germany's public finance from 1919 until 1923, and was a most important force for hyperinflation.

At the conclusion of the war, Germany experienced a political revolution and established a republican government. The early post-war governments were dominated by moderate Socialists, who for a variety of reasons reached accommodations with centers of military and industrial power of the pre-war regime.[29] They exerted limits on the willingness and capability of the government to meets its admittedly staggering revenue needs through explicit taxation.

Of the four countries that we have studied, Germany's hyperinflation was the most spectacular, as the figures on wholesale prices and exchange rates in Tables G1 and G2 reveal. The inflation became most severe after the military occupation of the Ruhr by the French in January 1923. The German government was determined to fight the French occupation by a policy of "passive resistance," making direct payments to striking workers, which it financed by discounting treasury bills with the Reichsbank.

Table G3 reports estimates of the current account budget of Germany from 1920 to 1923.[30] The table reveals that, except for 1923, the budget would not have been badly out of balance except for the massive reparations payments made. The disruption caused to Germany's finances by the reparations situation is surely understated by examining the figures in reparations payments actually made. For one thing, considerably larger sums were initially expected of Germany than it ever was eventually able to pay. For another thing, the extent of Germany's total obligation and the required schedule of payments was for a long time uncertain and under negotiation. From the viewpoint that the value of a state's currency and other debt depends intimately on the fiscal policy it

intends to run, the uncertainty about the reparations owed by the German government necessarily cast a long shadow over her prospects for a stable currency.

As Table G4 reveals, the note circulation of the Reichsbank increased dramatically from 1921 to 1923, especially in the several months before November 1923. As pointed out by Young [36], at the end of October 1923, over 99 percent of outstanding Reichsbank notes had been placed in circulation within the previous 30 days.[31/] Figure G4 reveals the extent to which the Reichsbank note circulation was "backed" by discounted treasury bills. During 1923, the Reichsbank also began discounting large volumes of commercial bills. Since these loans were made at nominal rates of interest far below the rate of inflation, they amounted virtually to government transfer payments to the recipients of the loans.

Especially during the great inflation of 1923, a force came into play which was also present in the other hyperinflations we have studied. Given the method of assessing taxes in nominal terms, lags between the time when taxes were levied and collected led to reduced revenues as the government evidently repeatedly underestimated the prospective rate of inflation, and as the rapid inflation gave people a large incentive to delay paying their taxes. This effect probably partially accounts for the reduced tax revenues collected during the first nine months of 1923. The French occupation of the Ruhr also helps explain it.

In response to the inflationary public finance, and despite the efforts of the government to impose exchange controls, there occurred a flight from the German mark in which the real value of Reichsmark notes decreased dramatically. The figures in Tables G1 indicate that between January 1922 and July 1923, wholesale prices increased by a factor of 2,038 times, while Reichsbank notes increased by a factor of 378 times. Between January 1922 and August 1923,

wholesale prices increased by a factor of 25,723 times while Reichsbank notes circulating increased by a factor of 5,748. The fact that prices increased proportionately many times more than did the Reichsbank note circulation is symptomatic of the efforts of Germans to economize on their holdings of rapidly depreciating German marks. Toward the end of the hyperinflation, Germans made every effort to avoid holding marks, and held large quantities of foreign exchange for purposes of conducting transactions. By October 1923, it has been roughly estimated that the real value of foreign currencies circulating in Germany was at least equal and perhaps several times the real value of Reichsbank notes circulating.[32/]

The figures in Tables G1 and G2 show that prices suddenly stopped rising and the mark stopped depreciating in late November 1923. The event of stabilization was attended by a "monetary reform," in which on October 15, 1923 a new currency unit called the Rentenmark was declared equivalent to 1,000,000,000,000 paper marks. While great psychological significance has sometimes been assigned to this unit change, it is difficult to attribute any substantial effects to what was in itself only a cosmetic measure.[33/] The substantive aspect of the decree of October 15 was the establishing of a Rentenbank to take over the note issue functions of the Reichbank. The decree put binding limits both upon the total volume of Rentenmarks that could be issued, 3,200,000,000 marks, and the maximum amount which could be issued to the government, 1,200,000,000 marks. This limitation on the amount of credit that could be extended to the government was announced at a time when the government was financing virtually 100 percent of its expenditures by means of note issue.[34/] In December 1923, the management of the Rentenbank was tested by the government, and effectively made clear its intent to meet its obligation to limit government borrowing within the amount decreed.

Simultaneously and abruptly three things happened: additional government borrowing from the central bank stopped, the government budget swung into balance, and inflation stopped. Table G5 shows the dramatic progress toward a balanced budget that was made in the months after the Rentenbank decree.

The government moved to balance the budget by taking a series of deliberate, permanent actions to raise taxes and eliminate expenditures. Young reports that "By the personnel decree of October 27, 1923, the number of government employees was cut by 25 percent; all temporary employees were to be discharged; all above the age of 65 years were to be retired. An additional 10 percent of the civil servants were to be discharged by January 1924. The railways, overstaffed as a result of post-war demobilization, discharged 120,000 men during 1923 and 60,000 more during 1924. The postal administration reduced its staff by 65,000 men; the Reichsbank itself which had increased the number of its employees from 13,316 at the close of 1922 to 22,909 at the close of 1923, began the discharge of its superfluous force in December, as soon as the effects of stabilization became manifest."[35/]

Substantially aiding the fiscal situation, Germany also obtained relief from her reparation obligations. Reparation payments were temporarily suspended, and the Dawes plan assigned Germany a much more manageable schedule of payments.

Table G4 documents a pattern that we have seen in the three other hyperinflations: the substantial growth of central bank note and demand deposit liabilities in the months <u>after</u> the currency was stabilized. As in the other cases that we have studied, the best explanation for this is that at the margin the post-inflation increase in notes was no longer "backed" by government debt. Instead, in the German case, it was largely backed by discounted commercial bills. The nature of the system of promises and claims behind the cental bank's

liabilities changed, when after the Rentenbank decree the central bank no longer offered additional credit for the government. So once again the interpretation of the time series on central bank notes and deposits must undergo a very substantial change.

By all available measures, the stabilization of the German mark was accompanied by increases in output and employment and decreases in unemployment.[36/] While 1924 was not a good year for German business, it was much better than 1923. Table G6 is representative of the figures assembled by Graham, and shows that 1924 suffers in comparison with 1922, but that 1925 was a good year. In these figures one cannot find much convincing evidence of a favorable tradeoff between inflation and output, since the year of spectacular inflation of 1923 was a very bad year for unemployment and physical production. Certainly a large part of the poor performance in 1923 was due to the French occupation of the Ruhr and the policy of passive resistance.

Despite the evident absence of a "Phillips curve" trade-off between inflation and real output in the figures in Tables G6 and G1, there is ample evidence that the German inflation was far from "neutral," and that there were important "real effects." Graham [7] describes evidence that the inflation and the associated reduction in real rates of return to high-powered money and other government debt were accompanied by real overinvestment in many kinds of capital goods.[37/] There is little doubt that the "irrational" structure of capital with which Germany found itself after stabilization led to subsequent problems of adjustment in labor and other markets.

Czechoslovakia

After World War I, the new nation of Czechoslovakia was formed out of territories formerly belonging to Austria and Hungary. Under the leadership of a distinguished Minister of Finance, Dr. Alois Rasin, immediately after the war

Czechoslovakia adopted the conservative fiscal and monetary policies which its neighbors did only after their currencies had depreciated radically. As a result, Czechoslovakia avoided the hyperinflation experienced by its neighbors.

Under Rasin's leadership, Czechoslovakia early on showed that it was serious about attaining a stable currency. Even before the peace treaties required it, Czechoslovakia stamped the Austro-Hungarian notes then circulating within her border with the Czechoslovakian stamp, thereby recognizing them as its own debt. There was considerable drama associated with this event, as the National Assembly passed the plans for stamping in secret sessions on February

25, 1919. From February 26 to March 9, the frontiers of the country were unexpectedly closed, and foreign mail service was closed. Only Austro-Hungarian notes circulating within the country could be presented for stamping. As part of the stamping process, the government retained part of the notes in the form of a forced loan.[38/] About 8,000,000,000 crowns were stamped.

A banking office in the Ministry of Finance took over the affairs of the old Austro-Hungarian bank. Czechoslovakia moved quickly to limit by statute the total government note circulation, and to prevent inflationary government finance. A law of April 10, 1919 strictly limited the fiduciary or unbacked note circulation of the banking office to about 7,000,000,000 crowns. This law was obeyed, and forced the government to finance its expenditures by levying taxes, or else issuing debt, which because of the statutory restriction on government note issues, were interpreted as promises to tax in the future.

From 1920 on, Czechoslovakia ran only modest deficits on current account (see Table C1). Among other taxes, Czechoslovakia imposed a progressive capital levy on property, which raised a cumulative amount of about 11,000,000,000 crowns by 1925. It also imposed an "increment tax" on the increased wealth individuals had obtained during the war.

Table C2 shows the note and deposit liabilities of the banking office. The government's abstention from inflationary finance shows up in these figures.

Table C3 shows the path of exchange rates, and how after declining to November 1921 the Czechoslovakian crown rapidly gained to about 3 U.S. cents.

Table C4 shows the price level. From 1922 to 1923, Czechoslovakia actually experienced a deflation. Indeed, Rasin's initial plan had been to restore the Czechoslovakia crown to the pre-war gold par value of the old Austro-Hungarian crown. Following Rasin's assassination, this plan was abandoned, and the crown was stabilized at about 2.96 cents.

Conclusion

The essential measures in ending hyperinflation in each of Germany, Austria, Hungary, and Poland were, first, the creation of an independent central bank that was legally committed to refuse the government's demand for additional unsecured credit, and, second, a simultaneous alteration in the fiscal policy regime.[39] These measures were interrelated and coordinated. They had the effect of binding the government to place its debt with private parties and foreign governments who would value that debt according to whether it was backed by sufficiently large prospective taxes relative to public expenditures. In each case that we have studied, once it became widely understood that the government would not rely on the central bank for its finances, the inflation terminated and the exchanges stabilized. We have further seen that it was not simply the increasing quantity of central bank notes that caused the hyperinflation, since in each case the note circulation continued to grow rapidly after the exchange rate and price level had been stabilized. Rather, it was the growth of fiat currency which was unbacked, or backed only by government bills, which there never was a prospect to retire through taxation.

The changes which ended the hyperinflations were not isolated restrictive actions within a given set of "rules of the game" or general policy. Earlier attempts to stabilize the exchanges in Hungary under Hegedus[40], and also in Germany, failed precisely because they did not change the rules of the game under which fiscal policy had to be conducted.[41]

In discussing this subject with people, I have encountered the view that the events described here are so extreme and bizarre that they do not bear on the subject of inflation in the contemporary United States. On the contrary, it is precisely because the events were so extreme that they are relevant. The four incidents we have studied are akin to laboratory experiments in which the

elemental forces that cause and can be used to stop inflation are easiest to spot. I believe that these incidents are full of lessons about our own, less drastic predicament with inflation, if only we interpret them correctly.

Footnotes

1/ "Most economists believe that the underlying inflation rate--roughly defined as wage costs less productivity gains--now stands at 9 to 10 percent, and that only a long period of restraint can reduce that rate significantly." Newsweek, May 19, 1980, p. 59.

2/ Paul Samuelson has aptly summarized the rational expectations view: "I should report that there is a new school, the so-called 'rational expectationists.' They are optimistic that inflation can be wiped out with little pain if only the government makes credible its determination to do so. But neither history nor reason tempt one to bet their way." (Newsweek, April 28, 1980). The second sentence of this quote is probably as shrewd a summary of the rational expectations view as can be made in a single sentence. However, it is difficult to agree with the third sentence: as for "reason," no one denies that logically coherent and well-reasoned models underly the claims of the "rational expectationists." As for history, the evidence summarized in this paper is surely relevant.

3/ There is actually no such thing as a "rational expectations school" in the sense of a collection of economists with an agreed upon model of the economy and view about optimal monetary and fiscal policy. In fact, among economists who use the assumption of rational expectations there is wide disagreement about these matters. What characterizes adherents of the notion of rational expectations is their intention to build models by assuming that private agents understand the dynamic environment in which they operate approximately as well as do government policymakers. Adherence to this notion leaves ample room for substantial diversity about the many other details of a model. For some examples of rational expectations models with

diverse implications, see Lucas [21], Barro [2], Wallace [35], Townsend [34], and Sargent and Wallace [30]. Despite their diversity, it is true that all of these models impel us to think about optimal government policy in substantially different ways than were standard in macroeconomics before the advent of the doctrine of rational expectations in the early 1970s.

4/ Bresciani-Turroni wrote: "Whoever studies the recent economic history of Europe is struck by a most surprising fact: the rapid monetary restoration of some countries where for several years paper money had continually depreciated. In some cases the stabilization of the exchange was not obtained by a continuous effort, prolonged over a period of years, whose effects would show themselves slowly in the progressive economic and financial restoration of the country, as occurred before the War in several well-known cases of monetary reform. Instead, the passing from a period of tempestuous depreciation of the currency to an almost complete stability of the exchange was very sudden." (The Economics of Inflation, p. 334.) Compare these remarks with the opinion of Samuelson cited in footnote 2.

5/ The notes were "backed" mainly by treasury bills which, in those times, could not be expected to be paid off by levying taxes, but only by printing more notes or treasury bills.

6/ The Course and Control of Inflation, League of Nations, 1946, p. 101.

7/ Keynes wrote: "It is not lack of gold but the absence of other internal adjustments which prevents the leading European countries from returning to a pre-war gold standard. Most of them have plenty of gold for the purpose as soon as the other conditions favorable to the restoration of a gold standard have returned." (Keynes [11, p. 132]. Writing about Germany in 1923, Keynes said: "The government cannot introduce a sound money, because, in the absence of other revenue, the printing of an unsound money is the only way by which it can live." Keynes [10, p. 67].

8/ This view can be expressed more precisely by referring to the technical literature of optimum economic growth. I am recommending that a good first model of the gold standard or other commodity money is a real equilibrium growth model in which a government issues debt, makes expenditures, and collects taxes. Examples of these models were studied by Arrow and Kurz [1]. In such models, government debt is valued according to the same economic considerations that give private debt value, namely the prospective net revenue stream of the institution issuing the debt. A real equilibrium growth model of this kind can also be used to provide a formal rationalization of my claim below that open market operations in private securities, foreign exchange, and gold should have no effect on the price level, i.e. the value of government demand debt.

9/ It is relatively straightforward to produce a variety of workable theoretical models of a commodity money or gold standard, along the lines of footnote 8. It is considerably more difficult to produce a model of a fiat money, which is costless to produce, inconvertible, and of no utility except in exchange. Kareken and Wallace [9], Wallace [35], and Townsend [34] describe some of the ramifications of this observation. The workable models of fiat money that we do have, for example, those of Townsend [34] and Wallace [35], immediately raise the question of whether voluntarily held fiat money can continue to be valued at all in the face of substantial budget deficits of the order of magnitude studied in this paper. Such models lead one to assign an important role to government restrictions, particularly on foreign exchange transactions, in maintaining a valued, if involuntarily held, fiat money. Keynes [10] and Nichols [24] also emphasized the role of such restrictions.

10/ The sweeping implications of this principle for standard ways of formulating and using econometric models were first described by Lucas [19]. The principle itself has emerged in a variety of contexts involving economic dynamics. For some examples, see Lucas [20], and Sargent and Wallace [30].

11/ Sargent and Wallace [31] describe a sense in which it might be difficult to imagine that a regime change can occur. As Sargent and Wallace discovered, thinking about regime changes in the context of rational expectations models soon leads one to issues of free will.

12/ The Treaty of St. Germain, signed in September of 1919, required the successor states of the Austro-Hungarian empire to stamp their share of the notes of the Austro-Hungarian bank. The stamp converted those notes to the currency, i.e. debt, of the new states. The Austrian section of the old Austro-Hungarian bank functioned as the central bank of Austria for several years after the war.

13/ Needless to say, the central bank encountered a strong demand for loans at this rate and had to ration credit.

14/ At the time, some commentators argued that since the real value of currency had decreased and so in a sense currency was scarce, the increased note issue of the central bank was not the prime cause of the inflation. Some even argued that money was "tight," and that the central bank was valiantly struggling to meet the shortage of currency by adding printing presses and employees. This argument is now widely regarded as fallacious by macroeconomists. Disturbingly, however, one hears the very same argument in the contemporary U.S.

15/ "In Vienna, during the period of collapse, mushroom exchange banks sprang up at every street corner, where you could change your krone into Zurich francs within a few minutes of receiving them, and so avoid the risk of loss during

the time it would take you to reach your usual bank. It became a reasonable criticism to allege that a prudent man at a cafe ordering a bock of beer should order a second bock at the same time, even at the expense of drinking it tepid, lest the price should rise meanwhile." (Keynes [10, p. 51].)

16/ See Young [33, Vol. II, p. 16].

17/ That a government might want to adopt such measures if it were using inflationary finance was pointed out by Donald Nichols [8].

18/ Pasvolsky [25, p. 116].

19/ The content of this protocol is highly sensible when it is remembered that the value of a state's currency and other debt, at least under the gold standard, is determined by its ability to "back" that debt with an appropriate fiscal policy. In this respect, its situation is no different from that of a firm. In 1922, there was widespread concern within and without Austria that her sovereignty was at risk. (See the desperate note delivered by the Austrian Minister to the Supreme Council of the allied governments quoted by Pasvolsky [25, p. 115].) The first protocol aimed to clarify the extent to which Austria remained a political and economic entity capable of backing its debts. A similar protocol was signed at the inception of Hungary's financial reconstruction.

20/ It should be noted that for two years the new bank vigorously exercised its authority to control transactions in foreign currency. Only after March 1925 were restrictions on trading foreign exchange removed.

21/ This explanation is consistent with the argument advanced by Fama [6].

22/ There is an alternative explanation of these observations that neglects the distinction between inside and outside money, and that interprets the observations in terms of a demand function for the total quantity of "money." For instance, Phillip Cagan [4] posited the demand schedule for money of the form

$$(1) \quad M_t - P_t = \alpha(E_t P_{t+1} - P_t) \qquad ,\alpha < 0$$

where P_t is the logarithm of the price level, M_t is the logarithm of the money supply, and $E_t P_{t+1}$ is people's expectation of the log of price next period. There is always a problem in defining an empirical counterpart to M_t, but it is often taken to be the note and deposit liabilities of the Central Bank or "high powered money." The money demand schedule or "portfolio balance" schedule incorporates the idea that people want to hold less wealth in the form of real balances the faster the currency is expected to depreciate. Equation (1) can be solved to give an expression for the equlibrium price level of the form

$$(2) \quad P_t = \frac{1}{1-\alpha} \sum_{i=0}^{\infty} \left(\frac{\alpha}{\alpha-1}\right)^i E_t M_{t+i} \quad ,$$

where $E_t M_{t+i}$ is what at time t people expect the money supply to be at time t+i.

Consider the following two experiments. First, suppose that the government engages in a policy, which everyone knows in advance, of making the money supply grow at the constant but high rate $\mu > 0$ from time 0 to time T-1, and then at the rate zero from time T onward. In this case, the inflation rate would follow the path depicted in figure 1.

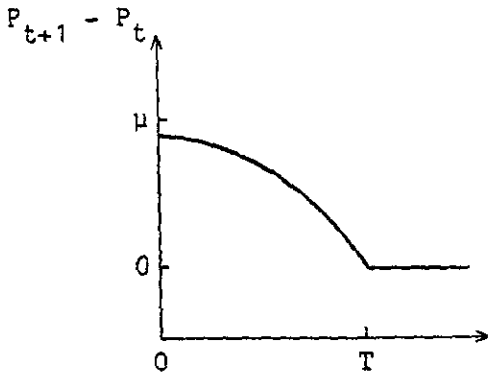


Figure 1

Inflation path with an expected decrease in money supply growth from μ to 0 at time T.

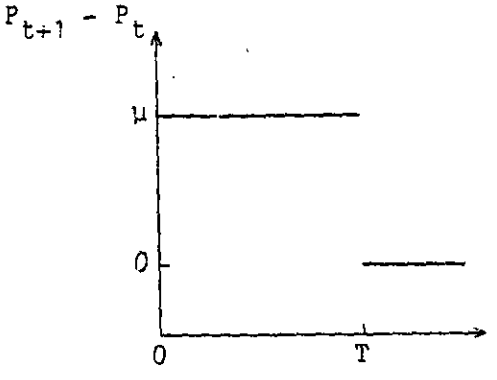


Figure 2

Inflation path with a previously unexpected decrease in money supply growth from μ to 0 at time T.

For the second experiment, suppose that initially everyone expected the money supply to increase at the constant rate μ forever, but that at time T it becomes known that henceforth the money supply will increase at the rate 0 forever. In this case, the inflation rate takes a sudden drop at time T, as shown by the path in figure 2. Now since the inflation and the expected inflation rate experience a sudden drop at T in this case, it follows from equation (1) that real balances must increase at T. This will require a sudden once and for all drop in the price level at T.

This second example of a previously unexpected decrease in the inflation rate provides the material for an explanation of the growth of the money supplies after currency stabilization. In the face of a previously unexpected, sudden and permanent drop in the rate of money creation, the only way to avoid a sudden drop in the price level would be to accompany the decrease in the rate of money creation with a once and for all increase in the money supply. In order to stabilize the price level in the face of a decreased rate of change of money, the level of the money supply must jump upward once and for all.

What actually occurred in the four countries studied here was not a once and for all jump, but a gradual increase in the money supply over many months. This could be reconciled with the observations within the model (1) if people were assumed only gradually to catch on to the fact of stabilization and decrease the rate of inflation that they expected as the currency stabilization continued to hold. I find this explanation hard to accept, but it is a possibility.

An alternative way to reconcile the preceding explanation with the gradual upward movement of high-powered money after the stabilizations is to add adjustment lags to the portfolio balance schedule (1). For example, consider replacing (1) with

$$(1') \quad (M_t - P_t) = \alpha(E_t P_{t+1} - P_t) + \lambda(M_{t-1} - P_{t-1})$$
$$\alpha < 0, \; 0 < \lambda < 1.$$

In this case, an abrupt stabilization of expected inflation induces only a gradual adjustment of real balances upward at the rate of $(1-\lambda)$ per period. My own preference at this point is for an explanation that stresses the distinction between backed and unbacked money.

23/ See Pasvolsky [25, p. 161].

24/ See Pasvolsky [25, p. 298].

25/ Within a year and a half, these became a claim on gold as Britain returned to the gold standard.

26/ Unlike Austria, Hungary, and Germany, Poland did not owe war reparations.

27/ The Course and Control of Inflation [13, p. 111].

28/ The Course and Control of Inflation [13, p. 108].

29/ See the account in Paxton [26, pp. 146-150].

30/ Also see Graham [7, pp. 40-41].

31/ Keynes wrote, "A government can live for a long time, even the German government or the Russian government, by printing paper money . . . A government can live by this means when it can live by no other." Keynes [10, p. 47].

32/ See Young [36, Vol. I, p. 402] and Bresciani-Turroni [3, p. 345].

33/ After reading an earlier draft of this paper, John Kennan directed me to the following passage in Constance Reid's biography of the mathematician Hilbert: "In 1923 the inflation ended abruptly through the creation of a new unit of currency called the Rentenmark. Although Hilbert remarked sceptically, 'One cannot solve a problem by changing the name of the independent variable,' the stability of conditions was gradually restored." Reid [27, pp. 162-3].

34/ Young [36, Vol. I, p. 421].

35/ Young [36, Vol. I, p. 422].

36/ See Graham [7, Ch. XII].

37/ Theoretical models of money along the lines proposed by Samuelson [29] predict that too much capital will be accumulated when the government fiscal policy is so profligate that money becomes valueless. See Samuelson [29] and Wallace [35].

38/ The frontiers were closed to prevent notes from Austria and Hungary from entering the country. The Treaty of St. Germain, signed September 10, 1919, provided that the successor states should stamp the Austro-Hungarian notes, signifying their assumption of the debt.

39/ Of inflationary finance, Keynes wrote: "It is common to speak as though, when a government pays its way by inflation, the people of the country avoid taxation. We have seen this is not so. What is raised by printing notes is just as much taken from the public as is beer-duty or an income-tax. What a

government spends the public pay for. There is no such thing as an uncovered deficit. But in some countries it seems possible to please and content the public, for a time at least, by giving them, in return for the taxes they pay, finely engraved acknowledgments on water-marked paper. The income tax receipts, which we in England receive from the surveyor, we throw into the wastepaper basket; in Germany they call them bank-notes and put them into their pocketbooks; in France they are termed Rentes and are locked up in the family safe." Keynes [10, pp. 68-69].

40/ See Pasvolsky [25, pp. 304-307].

41/ A deep objection to the interpretation in this paragraph can be constructed along the lines of Sargent and Wallace [30], who argue that for a single economy it is impossible to conceive of a rational expectations model in which there can occur a change in regime. In particular, the substantial changes in ways of formulating monetary and fiscal policy associated with the ends of the four inflations studied here can themselves be considered to have been caused by the economic events preceding them. On this interpretation, what we have interpreted as changes in the regime were really only the realization of events and human responses under a single, more complicated regime. This more complicated regime would have to be described in a considerably more involved and "state contingent" way than the simple regimes we have described. I believe that the data of this paper could be described using this view, but that it would substantially complicate the language and require extensive qualifications, without altering the main practical implications.

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Table A1
Austrian Budgets, 1919-1922
(In millions of paper crowns)

Period	Receipts	Expenditures	Deficit	Percentage of Expenditures Covered by New Issues of Paper Money
January 1--June 30, 1919.	1,339	4,043	2,704	67
July 1, 1919--June 30, 1920	6,295	16,873	10,578	63
July 1, 1920--June 30, 1921	29,483	70,601	41,118	58
January 1--December 31, 1922	209,763	347,533	137,770	40

Source: Pasvolsky [25, p. 102].

Table A2
Total Note Circulation of Austrian Crowns
(thousands of crowns)

1919—	January	—
	February	—
	March	4,687,056
	April	5,577,851
	May	5,960,003
	June	7,397,692
	July	8,391,405
	August	9,241,135
	September	9,781,112
	October	10,819,310
	November	11,193,670
	December	12,134,474
1920—	January	13,266,878
	February	14,292,809
	March	15,457,749
	April	15,523,832
	May	15,793,805
	June	16,971,344
	July	18,721,495
	August	20,050,281
	September	22,271,686
	October	25,120,385
	November	28,072,331
	December	30,645,658
1921—	January	34,525,634
	February	38,352,648
	March	41,067,299
	April	45,036,723
	May	45,583,194
	June	49,685,140
	July	54,107,281
	August	58,533,766
	September	70,170,798
1922—	January	227,015,925
	February	259,931,138
	March	304,063,642
	April	346,697,776
	May	397,829,313
	June	549,915,678
	July	786,225,601
	August	1,353,403,632
	September	2,277,677,738
	October	2,970,916,607
	November	3,417,786,498
	December	4,080,177,238
1923—	January	4,110,551,163
	February	4,207,991,722
	March	4,459,117,216
	April	4,577,382,333
	May	4,837,042,081
	June	5,432,619,312
	July	5,684,133,721
	August	5,894,786,367
	September	6,225,109,352
	October	6,607,839,105
	November	6,577,616,341
	December	7,125,755,190
1924—	January	6,735,109,000
	February	7,364,441,000
	March	7,144,901,000
	April	7,135,471,000
	May	7,552,620,000
	June	7,774,958,000
	July	7,995,647,000
	August	5,894,786,367
	September	7,998,509,000
	October	8,213,003,000
	November	8,072,021,000
	December	8,387,767,000
1925—	January	7,902,217,000
	February	7,957,242,000
	March	7,897,792,000
	April	7,976,420,000

Source: Young, [36, Vol. II, p. 292].

Table A3

Austria—Retail prices, 1921-1924

Month	Retail price index, 52 commodities
1921—Jaunary	100
February	114
March	122
April	116
May	121
June	150
July	143
August	167
September	215
October	333
November	566
December	942
1922—January	1,142
February	1,428
March	1,457
April	1,619
May	2,028
June	3,431
July	4,830
August	11,046
September	20,090
October	18,567
November	17,681
December	17,409
1923—January	17,526
February	17,851
March	18,205
April	19,428
May	20,450
June	20,482
July	19,368
August	18,511
September	20,955
October	21,166
November	21,479
December	21,849
1924—January	22,941
February	23,336
March	23,336
April	23,361
May	23,797
June	24,267

Source: Young [36, vol. II, p.293]

Table A4

Austria—Exchange rates, Austrian crowns per U.S. dollar in New York market

	1919	1920	1921	1922	1923	1924
January	17.09	271.43	654.00	7,375.00	71,500.00	70,760.00
February	20.72	250.00	722.50	6,350.00	71,150.00	70,760.00
March	25.85	206.66	676.00	7,487.50	71,000.00	70,760.00
April	26.03	200.00	661.00	7,937.50	70,850.00	70,760.00
May	24.75	155.83	604.00	11,100.00	70,800.00	70,760.00
June	29.63	145.00	720.00	18,900.00	70,800.00	70,760.00
July	37.24	165.00	957.00	42,350.00	70,760.00	70,760.00
August	42.50	237.14	1,081.50	77,300.00	70,760.00	70,760.00
September	68.50	255.00	2,520.00	74,210.00	70,760.00	70,760.00
October	99.50	358.33	4,355.00	73,550.00	70,760.00	70,760.00
November	130.00	493.66	8,520.00	71,400.00	70,760.00	70,760.00
December	155.00	659.40	5,275.00	70,925.00	70,760.00	70,760.00

Source: Young [36, vol. II, p.294].

Table A5

Austrian National Bank Balance Sheet

[End of month; in millions of crowns]

Month	Gold	Foreign exchange and currency	Loans and discounts	Treaasury bills	Notes in circulation	Deposits
1923						
January	49,304	1,058,244	731,046	2,556,848	4,110,551	279,092
February	83,438	1,029,134	728,884	2,552,682	4,207,992	178,752
March	86,097	1,336,385	821,397	2,550,159	4,459,117	329,109
April	73,270	1,439,999	741,858	2,550,159	4,577,382	226,273
May	73,391	1,682,209	875,942	2,550,159	4,837,042	343,339
June	73,391	2,532,316	730,848	2,547,212	5,432,619	362,237
July	73,391	2,947,216	658,966	2,539,777	5,684,134	535,121
August	73,391	3,050,085	647,936	2,538,719	5,894,786	413,383
September	73,391	3,126,599	863,317	2,537,661	6,225,109	373,673
October	62,117	3,356,232	1,069,340	2,536,604	6,607,839	414,882
November	62,117	3,504,652	1,094,620	2,535,547	6,577,616	617,321
December	83,177	3,832,132	1,325,380	2,534,490	7,125,755	649,424
1924						
January	91,274	3,811,148	1,253,110	2,533,434	6,735,109	536,982
February	105,536	3,921,594	1,737,334	2,532,379	7,364,441	558,800
March	106,663	3,953,872	1,733,400	2,295,428	7,144,901	752,814
April	107,059	3,669,333	2,131,984	2,294,471	7,315,471	696,141
May	107,443	3,344,337	2,660,449	2,259,839	7,554,620	641,001
June	107,762	3,178,339	3,092,470	2,237,794	7,774,958	741,400
July	108,342	3,254,477	3,304,876	2,231,173	7,995,647	896,032
August	108,256	3,453,177	3,226,962	2,219,459	8,002,142	997,677
September	108,950	3,724,916	2,852,688	2,210,527	7,998,509	890,537
October	109,327	4,032,485	2,379,700	2,202,106	8,213,003	502,579
November	110,643	4,312,355	1,945,627	2,196,181	8,072,021	484,750
December	110,890	4,770,548	1,881,593	2,178,185	8,387,767	533,450
1925						
January	111,314	3,337,911	1,545,295	2,172,491	7,902,217	438,390
February	111,474	3,310,032	1,285,158	2,150,151	7,957,242	315,771
March	111,649	3,202,802	1,047,719	2,107,949	7,897,792	295,498
April	112,168	3,474,672	1,059,069	2,088,777	7,976,420	236,957

Source: Young [33, Vol. II, p. 291].

Table A6

The Austrian Budget, 1923-25

(In millions of schillings)*/

Item	1923 Closed Accounts	1924 Closed Accounts	1925 Closed Accounts
Total revenue	697.4	900.6	908.5
Current expenditures	779.6	810.0	741.4
Deficit (-) or Surplus (+)	-82.2	+90.6	+167.1
Capital expenditures	76.0	103.6	90.6
Total balance	-158.2	-13.0	+76.5

*/ 1 schilling = 10,000 paper crowns.

Source: Pasvolsky [25, p. 127].

Table A7

Austria

Number of Unemployed in Receipt of Relief
(in thousands)

Beginning of	1922	1923	1924	1925	1926
January	17	117	98	154	208
April	42	153	107	176	202
July	33	93	64	118	151
October	38	79	78	119	148

Source: The Financial Reconstruction of Austria, [14, p. 87].

Table H1

Hungary
Budget Estimates, 1920-1924

(In millions of paper crowns)

Year	Revenue	Expenditures	Deficit	Percentage of Expenditures Covered by Issues of Paper Money
1920-21	10,520	20,210	9,690	47.9
1921-22	20,296	26,764	6,468	24.1
1922-23	152,802	193,455	40,653	21.0
1923-24	2,168,140	3,307,099	1,138,959	34.4

Source: Pasvolsky [25, p. 299]

Table H2

HUNGARY

Balance Sheet of Central Bank or State Note Institute

(Prior to June, 1924, figures are of the State Note Institute. The Hungarian National Bank opened June 24, 1924, and took over the affairs of the Institute. 000,000 ommitted).

Month	Gold coin and bullion	Silver coin	Foreign currency and exchange	Bills discounted	Advances on securities	Advances to treasury	Notes in circulation	Current accounts and deposits
1921	Kronen	Kronen	Kronen	Kronen	Kronen	Kronen	Kronen	Kronen
January	——	——	——	10,924	195	——	15,206	3,851
February	——	——	——	13,202	162	——	15,571	5,531
March	——	——	——	12,862	160	——	15,650	5,246
April	——	——	——	12,178	110	——	13,114	6,802
May	——	——	——	11,847	111	——	13,686	5,760
June	——	——	——	11,893	108	——	18,096	1,162
July	——	——	——	11,787	107	——	15,799	3,532
August	4	1	——	17,799	1,199	——	17,326	2,975
September	5	1	——	20,994	1,194	——	20,845	2,407
October	12	1	——	22,403	1,185	900	23,643	2,154
November	12	1	——	23,650	1,176	1,000	24,742	2,353
December	12	1	——	23,859	1,158	900	25,175	2,240
1922								
January	13	1	——	24,195	1,147	1,300	25,680	2,488
February	13	1	——	23,952	1,304	1,900	26,758	2,354
March	13	1	——	24,574	1,365	3,000	29,327	2,224
April	13	1	——	25,126	1,565	4,100	30,580	2,901
May	13	1	——	25,326	1,560	5,500	31,930	3,289
June	13	1	——	25,445	1,556	6,900	33,600	3,741
July	13	1	——	28,783	1,546	7,200	38,357	3,929
August	13	1	——	37,817	1,773	7,600	46,242	5,417
September	14	1	——	46,963	1,848	8,900	58,458	5,928
October	14	1	——	51,631	1,728	12,000	70,005	5,189
November	15	1	——	49,246	1,861	12,500	72,016	6,408
December	16	1	——	50,702	2,016	16,500	75,887	4,761
1923								
January	14	1	——	54,516	2,007	20,000	73,717	5,888
February	23	1	——	58,358	2,013	24,000	75,135	6,600
March	23	1	——	71,284	2,584	29,000	82,205	11,152
April	23	1	——	83,800	2,817	37,000	100,101	9,793
May	23	1	——	93,396	1,763	47,200	119,285	10,609
June	23	1	——	120,608	2,490	59,700	154,996	12,742
July	22	1	——	165,927	1,762	79,700	226,285	21,977
August	22	1	——	273,605	1,789	143,000	399,487	23,829
September	22	1	——	380,454	1,776	243,000	588,810	80,246
October	23	1	——	494,501	1,863	269,000	744,926	80,176
November	23	1	——	531,403	1,047	306,000	853,989	74,970
December	23	1	——	582,117	935	401,000	931,337	84,791
1924								
January	24	1	——	654,294	9,348	528,000	1,084,677	105,481
February	23	1	——	746,471	34,023	699,000	1,278,437	164,838
March	24	1	——	802,756	6,598	824,000	1,606,875	253,935
April	24	1	——	1,125,898	12,456	944,000	2,098,091	308,121
May	24	1	——	1,420,385	13,437	1,034,000	2,486,257	527,137
June[1]	246,947	9,323	881,288	1,192,317	17,566	1,980,000	2,893,719	1,135,710
July	441,832	13,545	1,110,926	1,237,597	——	1,980,000	3,277,943	1,424,578
August	449,945	13,558	1,382,885	1,438,454	——	1,978,130	3,650,737	1,473,231
September	540,425	13,560	1,385,880	1,756,636	——	1,977,306	4,115,925	1,416,400
October	503,377	13,301	1,858,874	1,872,383	——	1,976,455	4,635,090	1,465,356
November	508,411	13,301	1,816,102	1,884,540	——	1,975,631	4,442,844	1,929,734
December	532,842	13,299	1,933,356	1,976,888	——	1,974,781	4,513,980	2,069,488
1925								
January	509,848	12,373	1,967,314	1,848,820	——	1,973,930	4,449,650	2,138,629
February	598,334	12,374	1,989,096	1,676,594	——	1,973,163	4,237,985	2,542,282
March	669,107	12,374	1,984,006	1,514,532	——	1,969,809	4,270,086	2,552,762
April	653,534	12,136	2,081,998	1,485,898	——	1,968,987	4,526,216	2,470,507

[1] After this date gold and silver holdings are shown in terms of paper crowns. Other changes were also made in the presentation of accounts after the opening of the new Hungarian National Bank in June.

Source: Young [36, vol. II, p.321]

Table H3

Hungarian Price and Exchange Rate

Month	Hungarian index of prices	cents per crown in New York
1921		
July	4,200	0.3323
August	5,400	.2629
September	6,250	.1944
October	6,750	.1432
November	8,300	.1078
December	8,250	.1512
1922		
January	8,100	.1525
February	8,500	.1497
March	9,900	.1256
April	10,750	.1258
May	11,000	.1261
June	12,900	.1079
July	17,400	.0760
August	21,400	.0595
September	26,600	.0423
October	32,900	.0402
November	32,600	.0413
December	33,400	.0430
1923		
January	38,500	.0392
February	41,800	.0395
March	66,000	.0289
April	83,500	.0217
May	94,000	.0191
June	144,500	.0140
July	286,000	.0097
August	462,500	.0056
September	554,000	.0055
October	587,000	.0054
November	635,000	.0054
December	714,000	.0052
1924		
January	1,026,000	.0039
February	1,839,100	.0033
March	2,076,700	.0015
April	2,134,600	.0014
May	2,269,600	.0012
June	2,207,800	.0011
July	2,294,500	.0012
August	2,242,000	.0013
September	2,236,600	.0013
October	2,285,200	.0013
November	2,309,500	.0013
December	2,346,600	.0013
1925		
January	2,307,500	.0014
February	2,218,700	.0014
March	2,117,800	.0014

Source: Young [36, vol. II, p.323]

Table H4

Hungarian Budget, 1924-25
(In millions of gold crowns)

Period	Preliminary Treasury Accounts			Reconstruction Scheme		
	Receipts	Expenditures	Surplus (+) or Deficit (-)	Receipts	Expenditures	Surplus (+) or Deficit (-)
July-Dec. 1924	208.0	205.9	+ 2.1	143.8	186.3	- 42.5
Jan.-June 1925	245.1	216.9	+28.2	150.0	207.6	- 57.6
Fiscal Year 1924-25	453.1	422.8	+30.3	293.8	393.9	-100.1

Source: Pasvolsky [25, p.322]

Table H5

Number of Unemployed in Hungary
(Figures relate only to members of Union of Socialist Workers in thousands of workers)

End of	1924	1925	1926
January		37	28
February		37	29
March		37	29
April	22	36	26
May	23	30	28
June	25	34	26
July	31	32	
August	30	27	
September	20	25	
October	30	23	
November	31	26	
December	33	27	

Source: Financial Reconstruction of Hungary, [15, p. 50].

Table P1

Poland—Receipts and expenditures

[Converted from marks to zloty on following basis: 1921, 1 zloty=303.75 marks. First quarter 1922, 1 zloty=513.52 marks; second quarter, 691.49 marks; third quarter, 1,024.97 marks; and fourth quarter, 1,933.87 marks. (in thousands of zlotys)]

	1921	1922	1923	1924	1925
RECEIPTS					
Administration	261,676	467,979	—	—	1,491,743
State Enterprises	11,413	14,556	—	—	133,530
Monopolies	72,222	47,893	—	—	356,611
Total	345,311	530,428	426,000	1,703,000	1,981,884
EXPENDITURES					
Administration	765,263	734,310	—	—	1,830,231
State Enterprises	115,589	145,003	—	—	106,343
Monopolies	—	—	—	—	45,019
Total	880,852	879,313	1,119,800	1,629,000	1,981,593
Deficit	535,541	348,885	692,000	—	—
Surplus	—	—	—	74,000	251

Source: Young [36, Vol. II, p. 183].

Table P2

Balance Sheet of
Bank of Poland--1918-1925
(Polish State Loan Bank prior to May 1924)

[End of month; 000,000 omitted.]

Month	Gold[1]	Silver[1] (including base coin)	Balances with foreign banks	Discounts	Advances		Note Circulation
					Commercial	Government	
1918	Marks	Marks	Marks	Marks	Marks	Marks	Marks
October	---	---	---	7.0	180.8	---	880.2
November	---	---	---	7.0	184.0	13.9	930.5
December	---	---	---	6.4	183.7	117.8	1,023.8
1919							
January	---	---	---	5.0	194.7	209.9	1,098.1
February	---	---	---	4.2	196.4	315.0	1,160.0
March	3.7	4.2	3.9	3.5	189.7	400.0	1,223.2
April	3.7	4.4	9.4	2.5	192.8	575.0	1,346.0
May	3.7	6.9	5.8	1.8	193.2	925.0	1,548.3
June	4.9	14.8	14.6	1.3	185.9	1,125.0	1,784.6
July	5.7	20.1	13.3	1.1	193.9	1925.0	2,087.9
August	6.1	20.5	20.3	.7	107.4	2,525.0	2,466.6
September	6.3	21.6	69.8	.1	218.9	3,225.0	2,964.7
October	6.5	24.3	91.0	.3	242.4	4,375.0	3,723.6
November	6.6	24.6	151.6	3.4	270.2	5,375.0	4,236.2
December	6.8	25.3	344.8	3.9	243.8	6,825.0	5,316.3
1920							
January	6.6	25.5	244.1	3.7	278.5	8,275.0	6,719.9
February	6.8	25.9	565.7	6.4	303.0	10,775.0	8,300.3
March	6.8	25.9	685.4	8.2	319.1	14,775.0	10,690.6
April	6.8	25.9	685.5	14.8	316.7	19,375.0	16,027.9
May	6.8	25.9	565.7	47.2	320.9	22,375.0	17,934.7
June	6.9	25.9	894.7	161.4	488.2	27,625.0	21,730.1
July	6.8	25.9	1,130.9	325.9	847.5	33,375.0	26,311.4
August	9.0	33.8	1,273.4	465.8	1,466.1	39,625.0	31,085.8
September	9.1	34.1	174.9	333.9	1,862.9	40,625.0	33,203.5
October	9.5	34.4	236.7	259.1	2,527.0	46,925.0	38,456.8
November	10.1	35.4	203.8	396.0	3,278.4	49,625.0	43,236.2
December	12.4	37.8	80.7	611.6	3,999.2	59,625.0	43,236.2
December	12.4	37.8	80.7	611.6	3,999.2	59,625.0	49,361.5
1921							
January	12.7	39.2	205.8	1,040.2	4,100.2	65,625.0	55,079.5
February	12.8	39.2	476.0	955.1	4,143.5	77,125.0	62,560.4
March	13.1	39.8	908.5	781.0	4,745.7	93,625.0	74,087.4
April	13.4	40.3	870.7	927.0	4,994.4	106,625.0	86,755.3
May	13.5	40.1	536.5	1,395.2	4,979.0	117,625.0	94,575.8
June	14.3	41.1	498.3	1,557.3	5,306.5	130,625.0	102,697.3
July	19.1	41.5	601.3	2,504.2	6,291.5	140,625.0	115,242.3
August	19.2	42.0	368.7	3,885.4	7,776.9	158,000.0	133,734.2
September	19.4	42.5	1,217.5	6,237.3	9,878.6	178,000.0	152,792.1
October	20.2	42.9	2,341.3	9,529.5	12,022.3	198,500.0	182,777.3
November	22.6	43.5	7,040.1	14,347.2	15,144.3	214,000.0	207,029.0
December	24.9	43.9	12,707.9	15,324.4	19,300.0	221,000.0	229,537.6
1922							
January	26.3	44.2	13,614.2	15,951.6	21,776.9	227,350.0	239,615.3
February	28.3	44.4	14,207.7	19,535.0	22,327.7	230,600.0	247,209.5
March	29.0	44.7	1,156.4	25,451.1	25,473.3	232,100.0	250,665.5
April	29.5	45.2	7,388.0	28,888.8	29,063.7	220,000.0	260,533.8
May	30.1	45.3	23,073.4	34,555.0	26,067.0	217,000.0	276,001.1
June	30.9	45.3	20,521.4	46,629.8	24,499.5	235,000.0	300,101.1
July	31.5	45.4	21,741.0	47,661.2	24,054.4	260,000.0	335,426.6
August	31.6	45.4	51,747.2	56,366.6	21,079.9	285,000.0	385,787.5
September	32.4	45.4	67,384.1	64,093.0	22,239.4	342,000.0	463,706.0
October	33.5	45.4	64,060.9	81,781.9	26,576.5	453,500.0	579,972.7
November	33.8	45.4	78,959.0	107,120.1	41,278.1	519,500.0	661,092.4
December	41.0	45.4	48,580.4	133,400.8	47,904.1	675,600.0	793,437.5

[1]Gold at par; silver coin at face value.

Source: Young [33, Vol. II, p. 348].

Table P2 (Continued)

Bank of Poland, 1918-1925
(Polish State Loan Bank prior to May 1924)

Month	Gold[1]	Silver[1] (including base coin)	Balances with foreign banks	Discounts	Advances		Note Circulation
					Commercial	Government	
1923	Marks	Marks	Marks	Marks	Marks	Marks	Marks
January	41.1	44.1	34,721.8	174,950.1	51,899.9	799,500.0	909,160.3
February	41.4	44.1	71,883.7	219,610.7	61,037.1	1,085,000.0	1,177,300.8
March	41.7	44.2	29,868.7	274,657.8	85,323.2	1,752,000.0	1,841,205.6
April	41.9	44.2	50,851.9	304,725.4	158,815.4	2,161,500.0	2,332,398.8
May	41.9	44.3	43,900.7	449,440.7	217,162.3	2,377,000.0	2,733,794.1
June	43.9	39.8	276,506.3	627,339.5	310,862.7	2,996,500.0	3,566,649.1
July	46.9	34.8	384,375.1	758,112.8	390,850.9	4,190,500.0	4,478,709.0
August	48.0	32.9	340,354.4	1,372,150.9	637,268.2	6,473,000.0	6,871,776.5
September	53.2	20.7	857,084.5	2,077,128.6	670,019.6	10,265,500.0	11,197,737.8
October	54.2	19.1	1,510,794.3	3,540,434.4	1,836,712.7	19,080,500.0	23,080,402.2
November	54.3	19.5	6,499,791.5	8,467,033.7	3,951,781.9	42,854,000.0	53,217,494.6
December	54.9	19.6	57,499,741.7	20,588,037.9	28,065,396.8	111,332,000.0	125,371,955.3
1924							
January	66.2	19.8	91,533,085.2	43,916,802.8	54,181,445.2	238,200,000.0	313,659,830.0
February	66.7	19.8	172,626,128.8	67,216,289.7	83,829,440.5	291,700,000.0	528,913,418.7
March	68.0	20.3	220,658,210.7	138,649,934.8	81,231,988.5	291,700,000.0	596,244,205.6
April	55.7	21.1	277,340,925.7	199,248,956.4	60,589,081.0	291,700,000.0	570,697,550.5
After Conversion of State Loan Bank into Bank of Poland							
[Figures in gold zlotys; no ciphers omitted; 1 zloty = 19.3 cents]							
May		[2]11,684,963	214,191,336	126,522,908	1,801,936	---	244,977,010
June		[2]83,392,914	256,972,386	138,862,243	5,826,971	---	334,405,730
July		[2]93,683,430	272,137,898	166,713,469	8,236,693	---	394,262,550
August		[2]98,288,324	266,390,583	199,710,736	8,224,610	---	430,263,045
September		[2]99,909,015	233,646,582	233,788,177	9,230,850	---	460,383,770
October	100,686,634	16,521,223	241,894,738	245,054,984	12,374,342	---	503,701,830
November	102,809,285	21,951,828	247,034,974	249,560,999	12,371,166	---	497,600,470
December	103,362,870	27,543,698	289,045,551	256,954,853	23,897,766	---	550,873,980
1925							
January	104,249,258	27,658,749	242,115,258	270,423,615	23,468,829	---	553,174,980
February	107,032,735	27,481,871	208,317,320	286,229,180	28,467,930	18,222,212	549,637,420
March	116,619,825	28,158,597	259,392,902	306,562,690	25,477,638	403,354	563,171,945
April	117,428,697	28,358,000	216,114,621	294,632,508	27,319,944	35,977,630	567,178,830

[1] Gold at par; silver coin at face value

[2] Gold and silver

Source: Young [36, Vol. II, p. 348].

Table P3

Statistical Tables--Poland

Poland--Index numbers of wholesale prices, 1921-1925

Year	Month	Wholesale price index	Year	Month	Wholesale price index
1921--	January	25,139	1923--	March	988,500
	February	31,827		April	1,058,920
	March	32,882		May	1,125,350
	April	31,710		June	1,881,410
	May	32,639		July	3,069,970
	June	35,392		August	5,294,680
	July	45,654		September	7,302,200
	August	53,100		October	27,380,680
	September	60,203		November	67,943,700
	October	65,539		December	142,300,700
	November	58,583			
	December	57,046			
1922--	January	59,231	1924--	January	242,167,700
	February	63,445		February	248,429,600
	March	73,465		March	245,277,900
	April	75,106		April	242,321,800
	May	78,634		May	---
	June	87,694		June	---
	July	101,587		July	---
	August	135,786		August	---
	September	152,365		September	---
	October	201,326		October	---
	November	275,647		November	---
	December	346,353		December	---
1923--	January	544,690	1925--	January	---
	February	859,110		February	---
				March	---
				April	---
				May	---

Source Young [36, Vol II., p. 349].

Table P4

European Currency and Finance

Poland--Exchange Rates, 1919-1925

Year	Month	Cents per Polish mark	Year	Month	Cents per Polish mark
1919--	July	6.88	1922--	August	0.0135
	August	5.63		September	.0127
	September	3.88		October	.0095
	October	3.08		November	.0065
	November	1.88		December	.0057
	December	1.29			
1920--	January	.70	1923--	January	.0043
	February	.68		February	.0025
	March	.67		March	.0024
	April	.60		April	.0023
	May	.51		May	.0021
	June	.59		June	.0013
	July	.61		July	.0007
	August	.47		August	.0004
	September	.45		September	.00035
	October	.37		October	.0001113
	November	.26		November	.0000502
	December	.16		December	.0000234
1921--	January	.145	1924--	January	.0000116
	February	.130		February	.0000109
	March	.132		March	.0000113
	April	.130		April	.0000114
	May	.124		May	---
	June	.082			Cents per zloty
	July	.0516			
	August	.0489		June	10.29
	September	.0256		July	19.25
	October	.0212		August	19.23
	November	.0290		September	19.22
	December	.0313		October	19.22
				November	19.21
				December	19.20
1922--	January	.0327	1925--	January	19.18
	February	.0286		February	19.18
	March	.0236		March	19.18
	April	.0262		April	19.18
	May	.0249		May	19.19
	June	.0237		June	19.19
	July	.0185			

Source: Young [36, Vol. II, p. 350].

Table P5

Poland
Number of Unemployed

1921	
January	74,000
February	90,000
March	80,000
April	88,000
May	130,000
June	115,000
July	95,000
August	65,000
September	70,000
October	78,000
November	120,000
December	173,000

1922	
January	221,444
February	206,442
March	170,125
April	148,625
May	128,916
June	98,581
July	85,240
August	69,692
September	68,000
October	61,000
November	62,000
December	75,000

1923	
January	81,184
February	106,729
March	114,576
April	112,755
May	93,731
June	76,397
July	64,563
August	56,515
September	—
October	—
November	—
December	67,581

1924	
January	100,580
February	110,737
March	112,583
April	109,000
May	84,000
June	97,870
July	149,097
August	159,820
September	155,245
October	147,065
November	150,180
December	159,060

Source: Statistiches Jahrbuch fur das Deutsche Reich, 1924/25.

Table G1

Germany, Wholesale Prices, 1914-1924

Year	Month	price index	Year	Month	price index
1914--	January	96	1919--	July	339
	February	96		August	422
	March	96		September	493
	April	95		October	562
	May	97		November	678
	June	99		December	803
	July	99	1920--	January	1,260
	August	109		February	1,690
	September	111		March	1,710
	October	118		April	1,570
	November	123		May	1,510
	December	125		June	1,380
1915--	January	126		July	1,370
	February	133		August	1,450
	March	139		September	1,500
	April	142		October	1,470
	May	139		November	1,510
	June	139		December	1,440
	July	150	1921--	January	1,440
	August	146		February	1,380
	September	145		March	1,340
	October	147		April	1,330
	November	147		May	1,310
	December	148		June	1,370
1916--	January	150		July	1,430
	February	151		August	1,920
	March	148		September	2,070
	April	149		October	2,460
	May	151		November	3,420
	June	152		December	3,490
	July	161	1922--	January	3,670
	August	159		February	4,100
	September	154		March	5,430
	October	153		April	6,360
	November	151		May	6,460
	December	151		June	7,030
1917--	January	156		July	10,160
	February	158		August	19,200
	March	159		September	28,700
	April	163		October	56,600
	May	163		November	115,100
	June	165		December	147,480
	July	172	1923--	January	278,500
	August	203		February	588,500
	September	199		March	488,800
	October	201		April	521,200
	November	203		May	817,000
	December	203		June	1,938,500
1918--	January	204		July	7,478,700
	February	198		August	94,404,100
	March	198		September	2,394,889,300
	April	204		October	709,480,000,000
	May	203		November	72,570,000,000,000
	June	209		December	126,160,000,000,000
	July	208	1924--	January	117,320,000,000,000
	August	235		February	116,170,000,000,000
	September	230		March	120,670,000,000,000
	October	234		April	124,050,000,000,000
	November	234		May	122,460,000,000,000
	December	245		June	115,900,000,000,000
1919--	January	262		July	[1] 115
	February	270		August	[1] 120
	March	274		September	[1] 127
	April	286		October	[1] 131
	May	297		November	[1] 129
	June	308		December	[1] 131

[1] On basis of prices in terms of reichsmarks. (1 reichsmark--1,000,000,000,000 former marks.)

Source: Young [36, Vol. I, p. 530].

Table G2
Germany--Exchange Rates, 1914-1925

Year	Month	Cents Per Mark
1920--	January	1.69
	February	1.05
	March	1.26
	April	1.67
	May	2.19
	June	2.56
	July	2.53
	August	2.10
	September	1.72
	Octrober	1.48
	November	1.32
	December	1.37
1921--	January	1.60
	February	1.64
	March	1.60
	April	1.57
	May	1.63
	June	1.44
	July	1.30
	August	1.19
	September	.96
	October	.68
	November	.39
	December	.53
1922--	January	.52
	February	.48
	March	.36
	April	.35
	May	.34
	June	.32
	July	.20
	August	.10
	September	.07
	October	.03
	November	.01
	December	.01
1923--	January	.007
	February	.004
	March	.005
	April	.004
	May	.002
	June	.001
	July	.000,3
	August	.000,033,9
	September	.000,001,88
	October	.000,000,068
	November	.000,000,000,043
	December	.000,000,000,022,7
1924[1]--	January	22.6
	February	21.8
	March	22.0
	April	22.0
	May	22.3
	June	23.4
	July	23.9
	August	23.8
	September	23.8
	October	23.8
	November	23.8
	December	23.8
1925[1]--	January	23.8

[1]Cents per rentenmark, and (after October, 1924) per reichsmark. One rentenmark is equivalent to one reichsmark or 1,000,000,000 former paper marks. The reichsmark is the equivalent of the gold mark worth 23.82 cents.

Source: Young [36, Vol. I, p. 532].

Table G3

Germany--Real Revenues and Expenditures--Calculated on the Basis of the Cost-of-Living Index

(In millions of gold marks)

	Revenue				Expenditures					
	Taxes	Sundries	Deficit covered by loan transactions	Total	Repayment of floating debt	Interest on floating debt	Subsidies to railroads	Execution of Versailles Treaty	Sundries	Total
1920-21	4,090.8	132.9	7,041.9	11,265.6	821.7	---	---	---	---	11,265.6
1921-22	5,235.7	100.5	6,627.4	11,963.6	1,039.5	811.6	1,114.4	5,110.6	5,738.4	11,963.4
1922-23	3,529.1	51.4	6,384.5	9,965.0	81.0	344.4	1,685.5	3,600.0	4,254.1	9,965.0
1923-24 (first 9 months)	1,496.1	180.6	11,836.5	13,513.2		931.0	3,725.0		---	13,513.2

Source: Young [36, Vol. II, p. 393].

Table G6
Balance Sheet of
German Reichsbank, 1914-1924

(End of month, thousands of current marks; since January 1924, thousands of rentenmarks or reichsmarks. One rentenmark is equivalent to one reichsmark or 1,000,000,000,000 former paper marks. The reichsmark is the equivalent of the gold mark worth 23.82 cents.)

	Discounted bills						Demand deposits			
	Treasury bills	Commercial bills	Total discounted treasury and commercial bills	Advances	Securities	Notes in circulation	Public	Other	Total demand deposits	Due to the Rentenbank
1921										
January	50,594,540	2,742,406	53,336,946	8,881	147,126	66,620,804	4,055,904	11,778,060	15,833,964	---
February	53,690,612	2,760,927	56,451,339	11,522	185,788	67,426,959	7,291,052	10,066,036	17,357,088	---
March	64,533,894	2,268,745	66,802,639	2,805	217,049	69,417,228	15,206,381	12,836,292	28,042,673	---
April	58,841,630	2,032,099	60,803,729	9,238	225,777	70,839,725	11,395,618	9,260,271	20,855,889	---
May	62,953,604	1,809,936	64,763,540	16,264	258,664	71,838,866	3,548,492	10,545,201	14,093,693	---
June	79,607,790	1,565,906	81,173,196	6,079	282,716	75,321,095	5,607,805	14,744,903	20,392,708	---
July	79,581,967	1,135,529	81,117,496	10,686	283,381	77,390,853	4,810,026	11,014,130	15,824,156	---
August	80,043,891	1,002,497	85,046,388	7,704	258,319	80,072,721	4,850,843	8,798,756	13,649,599	---
September	98,422,137	1,102,218	99,560,355	3,289	277,977	86,384,286	4,618,087	15,362,208	19,980,295	---
October	98,704,768	881,674	99,586,242	47,775	282,179	91,527,679	5,239,628	13,063,035	18,302,663	---
November	110,023,417	1,445,667	113,469,084	90,370	287,699	100,963,632	5,149,615	20,168,499	25,313,114	---
December	132,380,906	1,061,754	133,392,660	8,476	195,912	113,639,464	7,591,343	25,314,330	32,905,673	---
1922										
January	126,160,402	1,592,416	127,752,818	20,548	198,725	115,375,766	5,286,950	18,125,502	23,421,452	---
February	134,251,808	1,856,936	136,108,744	62,305	215,362	120,026,387	5,806,922	20,719,150	26,526,072	---
March	146,331,247	2,151,677	148,482,924	20,688	205,936	130,671,352	7,763,735	25,614,597	33,358,332	---
April	135,617,524	2,403,044	138,020,568	136,314	229,262	140,420,037	7,577,862	24,038,306	31,616,168	---
May	167,793,922	3,376,599	171,170,521	34,361	199,314	151,949,179	7,711,279	25,416,711	33,127,990	---
June	186,125,747	4,731,748	190,877,495	58,994	307,364	169,211,792	10,125,837	27,047,908	37,173,745	---
July	207,858,232	8,122,066	215,980,298	141,276	313,488	189,794,722	9,197,727	30,778,489	39,976,216	---
August	249,765,773	21,704,341	271,470,114	172,966	291,162	238,147,160	13,708,213	42,416,241	56,124,454	---
September	349,169,650	50,236,410	400,004,060	61,516	416,193	316,869,799	30,034,309	79,978,068	110,012,377	---
October	477,201,494	101,155,267	578,356,761	626,368	502,348	469,436,818	36,270,926	106,508,333	140,779,259	---
November	672,222,197	246,948,596	919,170,793	[3]1,425,030	381,068	734,086,109	50,353,945	190,615,514	240,969,459	---
December	1,184,464,359	422,233,296	1,606,699,655	773,974	469,972	1,280,094,831	153,190,991	377,335,296	530,526,287	---
1923										
January	1,609,081,121	697,216,424	2,306,297,545	93,316,552	483,318	1,984,496,369	157,058,537	605,205,692	762,264,229	---
February	2,947,363,994	1,829,341,080	4,776,705,074	27,422,282	1,209,935	3,512,787,777	253,915,266	1,329,065,770	1,582,981,036	---
March	4,552,011,661	2,372,101,757	6,924,113,418	2,132,906	1,690,011	5,317,919,651	368,550,293	1,903,533,291	2,272,083,584	---
April	6,228,899,348	2,986,116,724	9,211,016,072	20,466,948	1,207,103	6,345,984,355	454,603,079	3,399,871,714	3,854,274,793	---
May	8,021,904,840	4,014,693,720	12,036,598,560	61,030,322	697,611	8,363,789,470	632,573,366	4,430,496,865	5,063,070,231	---
June	[4]18,338	[4]6,910,198,630	25,252,198,630	188,348,574	344,819	[4]17,291	1,648,110,327	8,304,602,339	9,952,716,666	---
July	[4]53,752	[4]18,314	[4]72,066	2,553,177,397	1,422,291	[4]43,595	3,779,235,298	[4]24,078	[4]27,857	---
August	[4]987,219	[4]164,644	[4]1,151,863	[4]25,261	15,539,853	[4]663,200	[4]206,168	[4]384,912	[4]591,080	---
September	[4]65,216,228	[4]3,660,094	[4]68,876,318	[4]98,522	1,801,579,570	[4]28,228,815	[4]8,186,467	[4]8,781,150	[4]16,966,617	---
October	[4]6,578,650,939	[4]1,058,129,855	[4]7,636,780,794	[4]41,787,332	[4]9,336,953	[4]2,496,822,909	[4]606,660,673	[4]3,261,424,030	[4]3,868,085,703	---
November, 15	[4]189,801,968,187	[4]39,529,577,254	[4]229,331,045,441	[4]535,714,637	[4]8,901,695	[4]92,849,720,743	[4]72,457,230,513	[4]57,095,366,904	[4]129,552,597,417	---
November, 30	[4]96,874,330,250	[4]347,301,037,776	[4]444,175,368,026	[4]7,472,665,263	[4]336,695,629	[4]400,267,640,307	[4]120,478,936,906	[4]253,497,803,653	[4]373,976,740,559	---
December	[5]	[4]322,724,948,986	[4]322,724,948,986	[4]268,325,819,530	[4]65,791,383	[4]496,507,424,772	[4]303,114,560,004	[4]244,906,637,001	[4]548,021,197,005	---
1924[6]										
January	---	---	735,866	336,520	12	483,675	492,983	281,320	281,303	200,000
February	---	---	1,165,649	306,618	25	587,873	367,351	282,958	650,309	400,000
March	---	---	1,767,443	143,102	533	689,864	352,360	352,334	704,694	800,000
April	---	---	1,916,969	156,362	91,984	776,949	474,411	330,561	804,972	800,000
May	---	---	1,954,930	128,397	80,011	926,874	545,252	259,203	804,455	800,000
June	---	---	1,897,959	108,789	76,378	1,097,309	493,083	280,884	773,927	800,000
July	---	---	1,798,097	62,489	76,509	1,211,038	452,597	290,390	742,987	800,000
August	---	---	1,860,843	59,983	76,331	1,391,895	264,064	297,791	561,855	800,000
September	---	---	2,169,684	54,424	78,305	1,520,511	307,515	362,581	670,096	800,000
October, 15[9]	---	---	2,133,943	15,947	77,517	1,396,748	---	---	828,511	800,000
October, 31	---	---	2,339,616	33,443	77,699	1,780,930	---	---	708,728	800,000
November	---	---	2,290,166	18,628	77,808	1,863,200	---	---	703,938	684,660
December	---	---	2,060,094	16,960	77,999	1,961,440	---	---	820,865	456,508

[3]The large increase of advances at the close of November, 1922 was due to the fact that the Reichsbank had to take over temporarily the financing of food supplies from the loan bureaus (Darlehuskassen), as the latter were unable to extend the needed accommodation, their outstanding notes having reached the maximum amount permitted by law.

[4]000,000,000 omitted.

[5]According to decree of November 15, 1923, further discounting of treasury bills by the Reichsbank was discontinued.

[6]Since January 1924, figures are shown in thousands of rentenmarks or reichsmarks. One rentenmark is equivalent to one reichsmark or 1,000,000,000,000 former paper marks. The reichsmark is the equivalent of the gold mark worth 23.82 cents.

[9]Date of first statement of reorganized Reichsbank.

Source: Young [33, Vol. I, pp. 528-529].

Table G5

Ordinary revenues and expenditures of the Federal Government, by months, November 1923-October 1924

[Source: Wirtschift and Statistik, issued by the Statistisches Reichsamt]

[In millions of gold marks]

	Ordinary revenue		Ordinary expend-itures	Excess of revenue (+) or ex-penditure (-)
	Total	Of which taxes yielded		
1923				
November	68.1	63.2	---	---
December	333.9	312.3	668.7	-334.8
1924				
January	520.6	503.5	396.5	+124.1
February	445.0	418.0	462.8	-17.8
March	632.4	595.3	498.6	133.8
April	579.5	523.8	523.5	+56.0
May	566.7	518.7	459.1	+107.6
June	529.7	472.3	504.5	+25.2
July	622.2	583.1	535.1	+86.9
August	618.2	592.0	597.6	+20.6
September	665.6	609.2	581.6	+84.0
October	714.3	686.7	693.0	+21.3

Source: Young [36, Vol. I, p. 422].

Table G6

Index of Physical Volume
of Production Per Capita in Germany

Year	Index of Production
1920	61
1921	77
1922	86
1923	54
1924	77
1925	90
1926	86
1927	111

Source: Graham [7, p. 287].

Table C1
Czechoslovakia--Receipts and Expenditures, 1919-1925
(Exclusive of expenditures for capital improvements covered by loans)

	1919		1920		1922		1922	
	Estimated	Actual	Estimated	Actual	Estimated	Actual	Estimated	Actual
Revenue:								
Ordinary	2,614	—	7,950	—	15,923	—	17,291	—
Extraordinary	1,096	—	2,477	—	1,376	—	1,593	—
Total	3,710	—	10,427	13,455	17,299	21,894	18,884	17,733
Expenditure:								
Ordinary	2,610	—	7,175	—	10.672	—	13,289	—
Extraordinary	6,005	—	8,103	—	7,354	—	6,524	—
Total	8,615	7,450	15,278	13,931	18,026	18,558	19,813	18,663
Deficit	4,905	—	4,851	476	727	—	929	930
Surplus	—	—	—	—	—	3,336	—	—

	1923		1924		1925	
	Estimated	Actual	Estimated	Actual	Estimated	Actual
Revenue:						
Ordinary	17,961	—	15,987	—	—	—
Extraordinary	851	—	404	—	—	—
Total	18,812	15,664	16,391	—	15,702	—
Ordinary:						
Ordinary	13,605	—	12,200	—	—	—
Extraordinary	5,773	—	4,703	—	—	—
Total	19,378	16,540	16,993	—	15,974	—
Deficit	565	876	603	—	272	—
Surplus	—	—	—	—	—	—

Source: Young [36, Vol. II, p. 71].

Table C2
CZECHOSLOVAKIA
Note Issue of Banking Office of Czechoslovakia, 1919-1924
(in thousands of Czech crowns)

	Month	State Notes in Circulation
1919	April	—
	May	—
	June	—
	July	161,106
	August	664,997
	September	1,443,570
	October	2,512,199
	November	3,513,405
	December	4,723,303
1920	January	5,574,688
	February	6,462,825
	March	7,216,438
	April	7,216,438
	May	8,268,695
	June	9,729,233
	July	9,267,874
	August	9,814,920
	September	10,310,228
	October	10,920,514
	November	10,946,653
	December	11,288,512
1921	January	10,888,319
	February	10,914,786
	March	10,921,956
	April	10,928,560
	May	10,851,403
	June	11,167,515
	July	11,134,327
	August	11,455,175
	September	11,570,881
	October	12,327,159
	November	11,871,647
	December	12,129,573
1922	January	11,230,065
	February	10,743,958
	March	10,323,069
	April	10,075,757
	May	9,717,750
	June	9,838,205
	July	9,916,077
	August	10,171,383
	September	10,196,880
	October	10,139,366
	November	9,996,550
	December	10,064,049
1923	January	9,222,434
	February	8,947,988
	March	9,157,407
	April	9,567,369
	May	9,327,676
	June	9,375,991
	July	9,448,086
	August	9,218,475
	September	9,311,378
	October	9,278,999
	November	9,250,688
	December	9,598,903
1924	January	8,820,093
	February	8,506,467
	March	8,280,390
	April	8,198,653
	May	9,078,418
	June	8,081,106
	July	8,090,034
	August	9,139,792
	September	8,222,658
	October	8,585,847
	November	8,500,942
	December	8,810,357
1925	January	7,916,540
	February	7,727,880
	March	7,680,867
	April	7,525,934

Source: Young [36, Vol. II, pp. 305-306].

Table C3

Czechoslovakia—Exchange Rates, 1919-1924

Month		Cents per crown	Month		Cents per crown
1919—	January	——	1922—	April	1.960
	February	——		May	1.921
	March	——		June	1.924
	April	6.135		July	2.185
	May	——		August	2.902
	June	——		September	3.231
	July	5.625		October	3.285
	August	4.575		November	3.176
	September	4.575		December	3.097
	October	3.100	1923—	January	2.856
	November	1.950		February	2.958
	December	1.900		March	2.969
1920—	January	1.425		April	2.978
	February	.975		May	2.979
	March	1.275		June	2.993
	April	1.530		July	2.997
	May	2.195		August	2.934
	June	2.335		September	2.995
	July	2.195		October	2.971
	August	1.810		November	2.906
	September	1.535		December	2.925
	October	1.245	1924—	January	2.898
	November	1.165		February	2.902
	December	1.190		March	2.902
1921—	January	1.300		April	2.957
	February	1.290		May	2.939
	March	1.307		June	2.936
	April	1.365		July	2.953
	May	1.460		August	2.979
	June	1.420		September	2.993
	July	1.312		October	2.981
	August	1.225		November	2.989
	September	1.160		December	3.018
	October	1.049	1925—	January	3.00
	November	1.038		February	2.96
	December	1.249		March	2.97
1922—	January	1.732		April	2.96
	February	1.855		May	2.96
	March	1.733		June	2.96

Source: Young [36, vol. II, p. 307]

Table C4

Czechoslovakia—Wholesale prices, 1922-1924

Month		Wholesale price index
1922—	January	1,675
	February	1,520
	March	1,552
	April	1,491
	May	1,471
	June	1,471
	July	1,464
	August	1,386
	September	1,155
	October	1,059
	November	1,017
	December	999
1923—	January	1,003
	February	1,019
	March	1,028
	April	1,031
	May	1,030
	June	1,001
	July	968
	August	958
	September	957
	October	973
	November	965
	December	984
1924—	January	974
	February	999
	March	1,021
	April	1,008
	May	1,015
	June	981
	July	953
	August	986
	September	982
	October	999
	November	1,013
	December	1,024
1925—	January	1,045
	February	1,048
	March	1,034
	April	1,019
	May	1,006

Source: Young [36, vol. II. p. 307]