

Classical Deflation Theory

Thomas M. Humphrey

Deflation, the opposite of inflation, is a situation of falling general prices. It should not be confused with disinflation, which refers to a declining inflation rate that nevertheless remains positive. It was the successful U.S. disinflation of the 1990s, a disinflation that lowered the inflation rate sufficiently to create concern that further downward pressure might push it into negative territory, that spurred recent fears of deflation. These fears have materialized in Japan, where deflation coincides with cyclical recession and stagnant growth. Most famously, deflationary fears became reality in the 1929–1933 Great Contraction in the United States when prices fell by a fourth while output was falling by two-fifths.

Such episodes indicate that dread of deflation stems from its association with unemployment, business failures, and financial stress. Deflation tends to occur in cyclical slumps when collapses in aggregate spending force producers to cut prices continuously in a desperate effort to attract buyers. While these cuts eventually help to revive economic activity, they hardly work instantaneously. In the meantime, output and employment languish. The best alternative, therefore, may be to avoid deflation altogether by deploying monetary and fiscal policies sufficient to maintain economic activity at full capacity levels with low and stable inflation.

Absent in much of the recent worry over falling prices is the recognition that deflation is hardly a new topic or a new event. Classical (circa 1750–1870) monetary theorists, in particular, had much to say about it. Classics, of course, abhorred deflation because, when unanticipated, it occasioned arbitrary and unjust redistributions of income and wealth from debtors to creditors. But classics looked beyond these distributional outcomes involving equal but opposite transfers from losers to gainers to deflation's adverse effects on output and employment. As we will see, classics attributed such adverse effects to

■ E-mail: Tom.Humphrey@rich.frb.org. For valuable comments, I am indebted to Margarida Duarte, Andreas Hornstein, John Walter, and John Weinberg. The views expressed in this article do not necessarily represent the views of the Federal Reserve Bank of Richmond or the Federal Reserve System.

price-wage stickiness; to rising real debt, tax, and cost burdens owing to lags in the adjustment of nominal values of those variables to falling prices; to the hoarding (rather than spending) of cash in anticipation of future deflationary rises in the purchasing power of money; and to other determinants. In general, classicals assumed that deflation was unanticipated, the exception being their analysis of hoarding where they took expectations into account.

Generally, classicals wrote during or following periods of wartime inflation under inconvertible paper currencies. At such times the government had committed itself to return to gold convertibility at the pre-war parity. Such restoration, of course, meant that the price of gold, goods, and foreign exchange—all of which had risen roughly in the same proportion during the war¹—had to fall to their pre-inflation levels. Achieving these price falls, however, required contractions of the money stock and so the level of aggregate nominal spending. Owing to the above-mentioned temporary rigidities in either final product prices or nominal costs of production, these falls in spending would depress output and employment first before they lowered costs and/or prices. With prices sticky, falling expenditure would show up in reductions in the quantity of goods sold. Unsold goods, the difference between production and sales, would pile up in inventories, thus inducing producers to cut back output and lay off workers. And if rigidities lodged in costs instead of prices, a reduction in spending would drive product prices below (inflexible) costs. The resulting losses (negative profits) would force producers to contract their operations. Eventually, however, rigidities would vanish, and prices and costs would fall in proportion to the monetary contraction. When this happened, real activity would return to its natural equilibrium or full-employment level, but not before workers and producers had suffered painful losses of income and employment.

Classicals analyzed these phenomena with a conceptual framework consisting of the quantity theory of money and the assumption of sticky product and/or factor prices. The quantity theory located the source of deflation in contractionary monetary shocks. And the sticky-price assumption explained the temporary adverse output and employment effects of the shocks. Together, these two pillars of the classical model reconciled the short-run nonneutrality with the long-run neutrality of money. In sum, on shocks and their propagation

¹ Classicals reasoned that the long-run equilibrium prices of goods, gold, and foreign exchange rose proportionally through the following causal chain. Inconvertible paper money, via its impact on total spending, determines domestic prices. Domestic prices, given foreign prices, determine the exchange rate so as to equalize, worldwide, the common currency price of goods. The exchange rate between inconvertible paper and gold standard currencies determines the paper price of bullion so as to equalize everywhere the gold price of goods. In symbols, $P = kM$, $P = EP^*$, and $G = EG^*$, where P denotes goods prices, k a constant, M the money stock, E the exchange rate, G the price of gold, and the asterisk* distinguishes foreign-country variables from home-country ones. Normalizing foreign-country variables at 1, converting the expressions into logarithmic form, and taking their derivatives yields $m = p = e = g$, where the lower-case letters represent proportionate rates of change of their upper-case counterparts.

through the economy's impulse-response mechanism, the classicals largely were in agreement.

Agreement did not extend to policies, however. Far from it. The classicals' quantity theory framework told them that the way to avoid deflation was to refrain from monetary contraction. But support of or opposition to that prescription varied with the policy objectives of the individual classical economist. Those preferring full employment at any cost endorsed the prescription even though it implied accepting the high prices established during the preceding inflation. Should the prescription conflict with the gold standard, so much the worse for the latter. Full-employment proponents were prepared to abandon metallic standards for a well-managed fiat paper standard and flexible exchange rates. On the other hand, those who favored restoring gold convertibility at the pre-war par were willing to countenance money-stock contraction, albeit at a gradual pace so as to minimize the costs of deflation.

The foregoing classical contributions have never been given their due recognition. To the best of this observer's knowledge, no systematic survey of classical deflation theory exists. Instead, one sees references to the neoclassical (circa 1870–1936) literature featuring contributions such as Irving Fisher's debt-deflation theory, his distinction between real and nominal interest rates, Knut Wicksell's notion of a painless fully-expected deflation, and Willard Thorp's empirical finding (see Laidler 1999, 187, 217, 223) of a relationship between secular deflation and the frequency, severity, and duration of cyclical depressions. According to Thorp, hard times were more likely to occur along a falling price trend than along a flat or gently rising one. While these and other concepts of the neoclassical literature are well known, the classical literature, by contrast, is largely ignored. This article is an attempt to repair this deficiency. It shows that the speculations of six leading classical monetary theorists—namely David Hume, Pehr Niclas Christiernin, Henry Thornton, David Ricardo, Thomas Attwood, and Robert Torrens—constitute a rich and coherent body of deflation theory, the constituent components of which survive today even as they are often wrongly attributed to neoclassical writers. To be sure, these six economists were not the only classicals to write on deflation. Nevertheless, they stand out as the seminal and influential ones. Their writings represent classical deflation theory at its best.

1. DAVID HUME (1711–1776)

Classical deflation theory begins with David Hume. Contrary to other classicals, he drew his inspiration not from the topical problem of the resumption of convertibility, but rather from an episode that occurred more than a hundred years before he wrote, namely the economic stagnation associated with the efflux of silver from Spain's colonies in the New World between 1560 and 1650. Hume's work is important because it established key features of the classical

theory. These included the assumptions that shocks are predominantly monetary, that deflation is partly unanticipated or unperceived owing to agents' lack of information on money supply variations, that prices lag behind prior changes in the money stock, and that monetary contractions therefore have nonneutral effects on real variables in the short-run if not the long. Most of all, his work demonstrates both the painfulness of deflation when prices are sticky and its painlessness when prices are flexible.

In his 1752 essay, "Of Money," Hume stresses the inertia of sluggish prices as the channel through which deflationary monetary contraction temporarily reduces output and employment. Sticky prices, which Hume attributes to the incomplete information price-setters possess on monetary changes and their resulting failure to act upon the changes, imply that deflationary pressure falls on real quantities first before it lowers prices. That is, from the equation of exchange $MV = PQ$ where M denotes the money stock, V its turnover velocity of circulation, P the price level, and Q the quantity of real output, it follows that with V constant (as Hume always assumed it to be) and P sticky, a fall in M must, by reducing aggregate demand MV , result in a corresponding temporary oversupply of goods that induces producers to cut output Q and lay off workers before they begin to lower prices. Money stock shrinkages, Hume wrote, "are not immediately attended with proportionable alterations in the price of commodities. There is always an interval before matters be adjusted to their new situation; and this interval is . . . pernicious to industry, when gold and silver are diminishing . . ." (Hume [1752] 1970, 40). Here is the source of the classical recognition of aggregate real effects of deflation, as opposed to purely distributional (creditor-debtor) effects.

Describing these pernicious real effects, Hume writes that "a nation, whose money decreases, is actually, at that time, weaker and more miserable than another nation, which possesses no more money, but is on the encreasing hand . . . The workman has not the same employment from the manufacturer and merchant; though he pays the same price for everything in the market. The farmer cannot dispose of his corn and cattle; though he must pay the same rent to his landlord. The poverty, and beggary, and sloth, which must ensue, are easily foreseen" (40). Here is the source of the classical emphasis on the real costs of deflation.

In analyzing these deflationary costs, Hume distinguishes between those arising from one-time monetary contractions versus those stemming from continuous contractions. One-time contractions produce temporary losses occurring in the short run but not the long. At first, monetary shrinkage depresses real activity. Eventually, however, the real depression ends, and only lower prices remain. At this point Hume hints at a micro-foundations decision mechanism that the Swedish classical economist P. N. Christiernin later was to sketch in greater detail. Hume suggests that prices (and wages) start to fall only when price- and wage-setters, noticing that their inventories of unsold goods

and unused labor are abnormally high, interpret these excessive inventories as signaling the need for downward price-wage adjustment (Niehans 1990, 56). This correction continues until all perception errors are eliminated and real activity returns to its natural equilibrium level. Here is the source of the classical doctrine of the short-run nonneutrality and long-run neutrality of deflationary changes in the money stock.

Hume claimed that long-run neutrality holds for one-time but not for a steady succession of monetary contractions. The latter he believed to entail persistent real effects.² His explanation is straightforward (Humphrey 1982, 244–45). Continuous monetary contractions are partly unperceived and unadjusted for, perhaps because agents, lacking information, harbor static expectations and so expect the current money stock and price level to prevail in the future (Cesarano 1983, 198–99). Such surprise contractions forever stay a step ahead of sticky prices, perpetually frustrating their attempt to catch up. The result is that the lead of shriveling money over dwindling prices persists indefinitely, thus producing a permanent reduction in real activity. The upshot is that Hume, founder of the classical neutrality doctrine as it applies to levels of and one-time changes in the money stock, emerges as a believer in the long-run nonneutrality of continuous deflationary contractions of that stock. Because long-run nonneutrality holds for monetary expansions as well as for contractions, Hume's advice was to exploit the former while avoiding the latter. "The good policy of the magistrate," he said, "consists only in keeping it [the money stock], if possible, still encreasing; because, by that means, he keeps alive a spirit of industry in the nation, and encreases the stock of labour, in which consists all real power and riches" (Hume [1752] 1970, 39–40).

The preceding applies to the closed economy where the sticky-price assumption holds sway. Real effects vanish, however, when Hume—seeking now not to demonstrate nonneutrality but to banish mercantilist fears of a permanent loss of money—drops the assumption in his analysis of open trading economies. With prices now fully flexible, the specter of persistent deflation bringing losses in output and employment gives way to the notion of a specie-flow mechanism working swiftly to eliminate such phenomena.³

Let deflation occur: In his essay, "Of the Balance of Trade," Hume supposes that four-fifths of Britain's money stock is annihilated overnight with prices sinking immediately in proportion. At once British goods become cheaper on world markets and outsell all foreign goods at home and abroad.

² See the preceding quote where Hume refers to two nations possessing identical money stocks changing at different rates, negative in one country and positive in the other. Here is his belief that it is money's rate of change and not its quantity that matters for real variables in the long run.

³ That Hume used his closed and open models for different purposes, the one to demonstrate short-run and possibly long-run nonneutrality, the other to expose mercantilist fallacies, perhaps accounts for his different treatments of price flexibility and inflexibility in the two cases.

The resulting export expansion and import shrinkage produces a trade balance surplus financed by inflows of monetary gold. The gold influx, by expanding the domestic money supply and hence total spending, bids up domestic prices to their pre-deflation levels. It all happens so fast that deflation is of extremely short duration. “In how little time,” Hume asks rhetorically, “must this bring back the money which we had lost, and raise us to the level of all the neighbouring nations?” (62). Indeed, in other passages Hume suggests that quick-acting commodity arbitrage renders the process virtually instantaneous as it eradicates price differentials at home and abroad (Cesarano 1998; Niehans 1990, 56).

Hume’s conclusion: Provided the world stock of monetary gold grows as fast as the real demand for it, deflation, at worst a transitory problem for open national economies, can never be a serious one. Deflation, in other words, is a speedily self-correcting phenomenon that brings its own remedy in the form of monetary expansion through the balance of payments. The result is to underscore the key importance of price inertia to Hume’s analysis. Its presence in the closed case and absence in the open case renders deflation painful in the one and painless in the other.

2. PEHR NICLAS CHRISTIERNIN (1725–1799)

Hume was arguably the first classical economist to analyze deflation for countries on a metallic monetary standard and fixed exchange rates. Pehr Niclas Christiernin, a Swedish lecturer in economics at Uppsala University, was the first classical writer to do so for countries on a pure paper standard and floating exchange rates.⁴ Sweden had converted to an inconvertible paper currency regime in 1745 and had suffered inflation under it during the Seven Years War (1755–1762). Christiernin wrote during the last years of that period when paper money expansion had raised the prices of goods, gold, and foreign exchange. With inflation reaching intolerable levels, Sweden’s Parliament began to consider ways to arrest and reverse it. One group of politicians advocated deflation to restore prices to their pre-inflation levels.

Christiernin opposed such policies. In his 1761 *Lectures on the High Price of Foreign Exchange in Sweden* he argued that the best policy was to forgive the inflation that already had occurred and to stabilize prices at their prevailing, post-inflation level. The level of prices did not matter for real variables as much as changes in the level. Decisionmakers could get used to any price level, provided it was constant. They could not, however, tolerate the risks associated with deviations from that level. It followed that under no circumstances should prices be deflated. To do so when the “entire price

⁴ On Christiernin, see Eagly (1971), Myhrman (1976), Niehans (1990, 56-59), and Persson and Siven (1993).

and wage structure” had become “fully adjusted to the current [depreciated] value” of the currency would be to “destroy our . . . prosperity” and plunge the economy into a slump (Christiernin [1761] 1971, 90). His fears were realized when in 1768 the policymakers, failing to heed his advice, deflated the level of prices by roughly fifty percent and precipitated a depression.

Echoes of Hume reverberate in Christiernin’s claim that deflation diminishes “trade, industriousness, and the general welfare” (94). Like Hume, whose work he knew, Christiernin saw that price-wage stickiness—wage stickiness in excess of price stickiness being one of his innovations to Hume’s analysis—transforms deflationary pressure into declines in output and employment. With prices and nominal wages slow to adjust (the latter more so than the former), monetary contraction leads to rising real wage costs, falling real profits, reduced real spending, and sinking real activity before it fully lowers money wages and prices. During the process, stagnation occurs in both the domestic and foreign trade sectors.

In the domestic sector, several influences besides Hume’s sticky prices work to accentuate deflation’s adverse real effects. According to Christiernin, these influences include undesired inventory accumulation (also mentioned by Hume), rising real debt and tax burdens, and deflationary expectations (the anticipated rate of return on holdings of money balances) that increase the demand for idle hoards of cash. All inhibit real spending, forcing it to fall short of its full-capacity level.

And in the export sector, a falling, or appreciating, exchange rate—a result of the money-induced contraction in income and demand including the demand for foreign exchange—combines with sticky prices to render the country’s goods dear in terms of foreign currencies. This dearness reduces the foreign demand for, and consequently the domestic production of, the export goods. The appreciating exchange rate also makes foreign goods cheap in terms of domestic currency, thus shifting domestic demand toward imports and away from domestic import substitutes. By discouraging activity in the export and import-competing sectors, “a reduction in the price of foreign exchange . . . would have the worst possible consequence for commerce and industry throughout our nation” (89).

All this demonstrates that Christiernin did more than just build upon Hume’s work. He advanced deflation theory markedly beyond Hume and took a giant step toward the modern analysis of the subject. Any compendium of elements that went into this step must include at least three of Christiernin’s innovations. First, of course, is his restatement and refinement of Hume’s sticky-price hypothesis, albeit with an asymmetric twist. “It is easy,” Christiernin says, “for prices to adjust upward . . . but to get prices to fall has always been more difficult” (90).

Second are the explicit micro-foundations for price-wage stickiness barely hinted at by Hume. “No one,” wrote Christiernin, “reduces the price of his

commodities or his labor until the lack of sales necessitates him to do so. Because of this [condition] workers must suffer want and the industriousness of wage earners must stop before the established market price can be reduced” (90). In other words, producers and workers lower their asking prices and wages only when unsold supplies of output and labor services materialize. Rising inventories of goods and labor constitute the signals that trigger reductions in prices and wages.

Third and most important are additional effects of deflationary monetary contraction beyond those adduced by Hume. These include (1) falls in the consumption and investment subcomponents of total spending, (2) undesired inventory accumulation mentioned above, (3) rising real burden of fixed, nominal lump-sum taxes, (4) rising real debt burdens and the associated rash of business bankruptcies, (5) growing deflationary expectations (the anticipated appreciation gains from holding money instead of goods) and the resulting increased demand for idle hoards of cash, (6) changes in the structure of relative prices, and finally (7) appreciating real exchange rates. An impressive list indeed.

Of the items on the list, Christiernin wrote the following: On monetary-induced falls in the separate consumption and investment components of spending: “A reduction of bank notes from circulation reduces everyone’s consumption and the output of all sectors [including that of the capital goods sector]. The lack of capital [to equip labor and enhance its productivity] means unemployment and less industriousness among the working class, which results in less output” (93). On undesired inventories: a deflationary “shortage of money . . . causes[s] many goods to lie unsold (94), thus inhibiting production. On real tax burdens: nominal lump-sum “taxes . . . levied and paid in money . . . form a heavier burden . . . when . . . prices fall since more labor and goods are required to pay the same tax” (95).

Christiernin continues. Regarding real debt burdens and bankruptcies, he says, “When prices fall . . . the debtor must work longer and sell more commodities in order to retire his [fixed nominal] debt” (92). “[D]ebt . . . become[s] correspondingly more difficult to service and to repay. . . . Bankrupts . . . follow and the failure of one would pull down several more” (91). A debt-deflation spiral ensues as “all debtors . . . wish to sell all they had in order to pay off their debts before prices fell further” (94). Sellers hoping to beat the price fall flood the market with goods only to find that consumers “would not buy except at a low price—and even if they did buy (and the debts at the bank were repaid) the refunding of the principal to the bank would cause a new reduction in the circulation of money” (94). The result would be “nothing short of a complete credit breakdown” as “creditors [would] not dare loan their money for fear of debtors’ inability to pay, and borrowers would not negotiate any loans because the fall in prices would [by reducing creditors’ willingness to lend and so raising interest rates] mean they would have to pay more for less” (94-95).

A superior exposition of these phenomena, including the induced reduction of the money stock, would have to wait until the 1933 publication of Irving Fisher's debt-deflation theory of great depressions. Until then, Christiernin's version set the standard.

Likewise, his discussion of deflationary expectations and the resulting increased demand for idle balances was not surpassed until the 1920s. On these expectations-induced demands for cash, Christiernin wrote that "Deflation . . . increase[s] the need for money because of speculation and hoarding. When it was known that bank notes were becoming more and more valuable as a result of reductions in the money supply and that all prices in time would consequently fall, everyone would await that time and in the interim would not purchase more than the bare essentials" (94), but would hoard cash instead.

Finally, on the structure of relative prices, he says that "the price impact of a reduction in the money supply is not uniform: Not all prices fall; not all prices fall at the same time Prices only fall for those goods that are less essential or that are in over supply" (90). Christiernin never explained why these relative price changes, which by definition average out to zero, adversely affect aggregate activity. They could do so if producers, treating the variability of relative prices as a measure of business uncertainty and risk, interpret the changes as evidence of such increasing risk and accordingly cut production. Of classical deflation theorists, only Thomas Attwood, a Birmingham banker, pamphleteer, and Member of Parliament, would provide a superior statement of the effects of the unevenness of price falls during deflation.

3. HENRY THORNTON (1760–1815)

Although Christiernin's work foreshadowed Thornton's, there is no reason to believe that Thornton, a London banker, Member of Parliament, and author of one of the nineteenth century's two best books on monetary theory, knew of it.⁵ For one thing, Christiernin wrote in Swedish, a language inaccessible to Thornton and his English contemporaries. Then, too, Thornton differed from Christiernin on certain points. True, both men feared the effects of monetary contraction deliberately engineered to reverse a preceding rise in prices. But Christiernin always attributed the prior price rise solely to overissue of paper, whereas Thornton recognized that real shocks also could be a cause. And while Christiernin opposed reversing monetary overissues and the price rises caused by them, Thornton, at bottom a hard money man, favored such reversal, albeit at a cautious, moderate pace to avoid precipitating panics. Thornton reasoned that overissue of the paper component of the money stock could, unless reversed by policy, persist "permanently" even as gold—which in

⁵ Much has been written on Thornton. Studies highlighting his deflation analysis include Hicks (1967) and Salerno (1980, 357–400).

Thornton's day still circulated as coin that could be melted down for export—was flowing out. That is, overissue could persist long enough to keep prices high and render the country's goods uncompetitive in world markets. It was price rises caused by real rather than monetary shocks whose reversal by deliberate monetary contraction he opposed. Real shocks, unlike overissues of paper money, tended to be temporary and self-reversing. That being so, it made no sense to put the economy through the wringer of monetary deflation to correct something that would quickly correct itself.

Thornton wrote during the first, or inflationary, phase of the famous Bank Restriction period (1797–1821) when the exigencies of the Napoleonic wars forced the Bank of England to suspend the convertibility of its notes into gold at a fixed price upon demand. The suspension of specie payments and the resulting move to an inconvertible paper regime was followed by rises in the prices of goods, gold, and foreign exchange. An influential group of classicals known as the strict bullionists arose to attribute these inflationary phenomena solely to the redundancy of money and to accuse the Bank of taking advantage of the absence of a convertibility constraint to overissue the currency. Against this purely monetary explanation Thornton contended that inflation must persist for several years before bullionist critics could claim they had proof enough to blame it on the Bank. For shorter periods, negative real shocks beyond the Bank's control might be the culprit.

The negative real shocks that concerned Thornton were nonmonetary disturbances to the balance of payments. These disturbances included domestic harvest failures as well as wars and the associated extraordinary foreign expenditures on subsidies to allies and on the maintenance of troops abroad. All tended to put the balance of payments into deficit.

Conventional wisdom at the time called for correcting such deficits with deflationary monetary contraction. Such contraction would, by making the country's goods cheaper both at home and abroad, spur exports, check imports, and so restore equilibrium in the external accounts. Thornton, however, opposed this remedy on the grounds that, by precipitating a depression and disrupting production, it would reduce the output of goods available both for export and for import substitution and so worsen, rather than correct, the payments deficit. In explaining this perverse outcome, Thornton, like Christiernin, identified channels additional to Hume's sticky price circuit through which deflationary contraction depresses real activity.

First was a money-demand channel. Unlike Christiernin, Thornton never stressed the influence of deflationary expectations on cash holdings. But he did note that manufacturers and merchants have a well-defined demand for money balances, balances held for the purpose of conducting transactions, paying suppliers, and compensating workers.

Given this money demand, a sudden, sharp contraction of the money stock creates a cash deficiency that depresses real activity. Merchants, attempting

to rebuild their balances to the desired level “delay making the accustomed purchases of the manufacturer . . . [whose] *sales* . . . are, therefore, suspended” (Thornton [1802] 1939, 118, italics in original). This sales stoppage adversely affects manufacturing output and employment—all the more so as the manufacturer is at that same time being “pressed for a prompter payment than before” by his creditors while his continued outlay on labor and materials means that “his money is going out while no money is coming in” (118). Because of these considerations, the “manufacturer, on account of the unusual scarcity of money, may even, though the selling price of his article should be profitable, be absolutely compelled by necessity to slacken, if not suspend, his operations” (118). In short, merchant reluctance to buy transforms an excess demand for money into a deficient demand for manufactured goods.

Thornton’s second channel through which deflation depresses real activity runs through sticky money wages. By refusing to fall when prices fall, sluggish nominal wages translate into rising real wages and falling real profits that destroy incentives for employment and production. Christiernin, of course, had said the same thing.

But Christiernin had said nothing about the source, or cause, of wage stickiness in the face of falling prices. Here Thornton had the edge. He located this source in workers’ beliefs that under the gold standard then prevailing (though temporarily suspended for the duration of the Napoleonic wars) price falls are transitory and reversible. Workers, expecting deflated prices to return soon to traditional levels, naturally are unwilling to accept wage cuts in the interim. In his 1802 *Paper Credit of Great Britain*, Thornton expressed the whole matter in a passage that for clarity, precision, and perspicacity is unrivaled in the classical literature and is hardly surpassed today.

[A] diminution in the *price* of manufactures . . . may also, if carried very far, produce a suspension of the labour of those who fabricate them. The masters naturally turn off their hands when they find their article selling exceedingly ill. It is true, that if we could suppose the diminution of bank paper to produce permanently a diminution in the value of all articles whatsoever, and a diminution, as it would then be fair that it should do, in the rate of wages also, the encouragement to future manufactures would be the same, though there would be a loss on the stock in hand. The tendency, however, of a very great and sudden reduction of the accustomed number of bank notes, is to create an *unusual* and *temporary* distress, and a fall of price arising from that distress. But a fall arising from temporary distress will be attended probably with no correspondent fall in the rate of wages; for the fall of price, and the distress, will be understood to be temporary, and the rate of wages, we know, is not so variable as the price of goods. There is reason, therefore, to fear that the unnatural and extraordinary low price arising from the sort of distress of which we now speak, would occasion much discouragement of the

fabrication of manufactures (Thornton [1802] 1939, 118–19, italics in original).

Thornton's third channel features wastes and inefficiencies of capacity underutilization and resource misallocation. It is through this channel that a deflationary "diminution of notes prevents . . . industry . . . from being so productive as it would otherwise be" (119). He sketches a scenario in which deflation leads to the squandering of inputs as projects are halted and abandoned and the labor embodied in them is lost. Capital equipment is shut down only to produce nothing during its period of idleness. Unsold goods pile up in inventories where they lose value through physical deterioration and obsolescence. Then too, cash-starved producers, in a frenzy to obtain liquidity, dump specialized, unique goods on undifferentiated markets unsuited to their absorption. For all these reasons, Thornton says, "There cease . . . to be that regularity and exactness in proportioning and adapting the supply to the consumption, and that dispatch in bringing every article from the hands of the fabricator into actual use, which are some of the great means of rendering industry productive, and of adding to the general substance of a country" (120–21).

It follows that "Every great and sudden check given to paper credit not only operates as a check to industry, but leads also to much . . . misapplication of it" (121). This wastage spells a further reduction in national product, or as he puts it, a "diminution of the general property of the country . . . and, of course, a deduction also from that part of it which forms the stock for exportation" (121). In short, deflation impairs efficiency whose attenuation pushes output further below its full capacity potential.

Thornton concludes that deflation is the wrong way to spur exports and check imports and thus to remedy real-shock-induced deficits in the balance of payments. Deflation is ill-advised because "To inflict such a pressure on the mercantile world as necessarily causes an intermission of manufacturing labour is obviously not the way to increase that exportable produce, by the excess of which, above the imported articles, gold is to be brought into the country" (118). Better to ride out the real disturbances with unchanged, or even increased, issues of paper money until the disturbances correct themselves.

To summarize, Thornton's position on deflation was this: Deflate to reverse price rises emanating from monetary overissue. But never deflate to correct real shocks to the balance of payments. Such deflation operates through the channels described above to lower real output of exportable and import-competing goods and thus has a perverse effect on the trade balance. Deflation in this case is unnecessary anyway because real shocks are temporary, and the balance of payments will correct itself.

4. DAVID RICARDO (1772–1823)

Of classical monetary theorists, David Ricardo has the reputation of believing that money and price-level changes have no effect on aggregate real variables in either the short run or the long. But this reputation is not entirely warranted. His awareness of the real costs of deflation underlies his policy rules for restoring equality between the market and mint prices of gold after arbitrage-inhibiting inconvertibility has allowed the two to move apart. Upon resumption of convertibility, he would deflate away small, but not large, gaps between the two prices. Large gaps he would eliminate by raising the mint price to the prevailing market price instead of lowering the market to the old mint price. He also recommended gradualism in deflation and the avoidance of policy mistakes that worsen deflation.⁶

Ricardo was writing in the second, or deflationary, phase (1815–1821) of the Bank Restriction era when wartime inflation had given way to post-war deflation, and the authorities were considering how to implement resumption. During the war, the price of gold had undergone substantial inflationary upward drift such that bullion commanded a premium over its mint price. The decision to resume gold convertibility spelled the elimination of this premium. No such premium could exist when agents could convert paper, at the fixed mint price, into gold for resale on the market. Arbitrage would eradicate the premium. But the authorities could determine, through their setting of the mint parity, which price—market or mint—would adjust. Two-price equality could be achieved either through a lowering of gold's market price to the pre-war mint parity or, by devaluing (debasement) the standard, through a raising of the mint parity to gold's going market price. The first option involved painful deflationary monetary contraction. The second and far less painful option involved accepting the gold price rise that had occurred during the war, re-basing the mint parity at that price, and keeping the money stock unchanged.

Ricardo favored the deflationary option, but with two major provisos. First, the gap between market and mint prices of gold should not be too large. Deflation to eliminate a 5 percent gap was one thing, deflation to eliminate a 30 percent gap quite another. Should the gap be 30 percent or more, Ricardo was prepared to abandon restoration at the old parity for a new parity established at the prevailing price. Instead of deflating back to par, he would leave prices as they were. As he wrote in a September 1821 letter to John Wheatley, "I never should advise a government to restore a currency, which was depreciated 30 percent, to par; I should recommend . . . that the currency be fixed at the depreciated value by lowering the standard [i.e., raising the par], and that no further deviations take place. It was [a] currency . . . within 5 percent [of par]

⁶ On Ricardo's view of the costs of deflation see Hollander (1979, 488–500) and Laidler (2000, 29–31).

and not with a currency depreciated 30 percent, that I advised a recurrence to the old standard” (Ricardo [1821] 1951, IX, 73–74).

Ricardo’s advice is of more than antiquarian interest. It speaks to today’s distinction between zero-inflation versus price-level targeting where the former allows for price drift and the latter does not. What should a central bank do when confronted with an upward drift in the price level? Should it accept such drift and thereafter stabilize the inflation rate about the new, higher price level? Or should it refuse to accommodate drift and instead deflate prices back to their old target level? Ricardo’s position on these matters was clear. In the case of large market-minus-mint-price gaps, he was for accommodating drift. Instead of deflating gold prices back to par, he would leave them as they were. And in other passages, he made it clear that while he would accept the price drift that already had occurred, he would rely upon restored convertibility to prevent further drift from the re-based gold price level. So while he was not an inflation targeter strictly speaking, he at least was for resetting the price-level target when the old one implied excessive deflation.

Ricardo’s second proviso was that deflation, once the Bank of England had decided to accomplish it, should be conducted gradually. Influenced by Thornton’s work, Ricardo saw that precipitous deflation would wreck the economy. It “would be attended with the most disastrous consequences to the trade and commerce of the country, and . . . would occasion so much ruin and distress, that it would be highly inexpedient to have recourse to it as the means of restoring our currency to its just and equitable value” (Ricardo [1810–11] 1951, III, 94). Such sharp and sudden deflation should be shunned absolutely. Gradualism, not abruptness, was the key to conducting deflationary policy to close small price gaps. “If gradually done,” he said, “little inconvenience would be felt” (94). In this connection he suggested transitory devaluation, that is, setting a temporary new mint parity to which the market price would conform, and then lowering both in easy stages to the old mint par.

Ricardo’s recommendation of gradualism said nothing about rational expectations. As Lucas, Sargent and Wallace, and others have taught us, however, a fully expected deflation adjusted for in all contracts should have no real effects. Now the Bank’s pre-announced return to gold at the old parity was a perfect example of a deflation that would seem to be fully expected. If so, the Bank could eschew gradualism and deflate to par immediately without fear of precipitating a recession.

In Ricardo’s defense, however, as well as that of other classicals writing in the sticky-price tradition, it must be noted that with inflexible prices even perfectly foreseen monetary contractions can have negative output effects. If so, then price rigidity rather than neglected rational expectations does the damage. In any case, it was not until 100 years after Ricardo wrote that the Swedish economist Knut Wicksell explicitly enunciated the case for rational expectations under flexible prices and the corresponding case for immediate

movements to par. “If the price fall is clear beforehand and can be fairly forseen,” said Wicksell, “businessmen ought to . . . be in position to adapt themselves to the expected increase in the value of money . . . so that they can work without . . . losses” (Wicksell 1918, 1920, quoted in Boianovsky 1998, 225). With rational expectations and flexible prices rendering money-stock contraction neutral in its real effects, policymakers can deflate to par in one step. Here is the crucial ingredient missing in Ricardo’s analysis.

Ricardo’s greatest fear was that the Bank’s own policy errors upon resumption would worsen deflation. In particular he feared that the Bank, in acquiring extra bullion reserves so that it could convert paper notes and deposits into gold coin when its customers so requested, would exert a heavy demand for gold in world markets. This demand would bid up gold’s value or, in other words, lower the price of goods in terms of gold. Deflation of this price would augment deflation of the money price of gold to put double downward pressure on the money price of goods.

Ricardo’s argument was quite ingenious. Recognizing that the money price of goods P is by definition equal to the multiplicative product of the money price of gold G and the world real gold price of goods R , or $P = GR$, he saw that deflation accompanying resumption could stem from two sources. Source number one was the fall in the gold premium, or money price of gold G , necessary to restore the market price of the metal to its mint parity. Source number two was a fall in the real gold price of goods R caused by the additional English demand for the fixed world supply of the metal consequent upon resumption.

To prevent the latter source of deflation, Ricardo, in his 1816 *Proposals for an Economical and Secure Currency*, offered his famous ingot plan in which the English money stock would consist solely of paper currency backed by, and convertible into, a reserve of bullion ingots. Such a paper currency offered the advantage (over gold coin) of greater flexibility in operation. It could, at the cost of variations in the reserve ratio, readily be expanded or contracted to accommodate temporary shifts in money demand.⁷

This, however, was but an incidental benefit of the scheme. Ricardo stressed the essential one: By abolishing gold coin and the Bank’s need to hold specie reserves to accommodate increased requests for such coin, his ingot plan would minimize England’s demand for the fixed world stock of bullion. True, there might be an export demand for gold ingots as well as a demand

⁷ “Whenever merchants . . . have a want of confidence . . . more money . . . is in demand; and the advantage of a paper circulation . . . is, that this additional quantity can be presently supplied without occasioning any variation in the value of the whole currency . . . whereas with a system of metallic currency, this additional quantity cannot be so readily supplied, and when it is finally supplied, the whole of the currency, as well as bullion, has acquired an increased value” (Ricardo [1816] 1951, IV, 58).

coming from the arts and industry. But such demands would be negligible in comparison with the (abolished) demand for coin and coin reserves.

By relieving the Bank of the need to hold large metallic reserves, the plan would largely remove that institution from world gold markets where it consequently would exert little downward pressure on the gold price of goods R . With gold's real value remaining largely unchanged, deflation of the general level of commodity prices P would be limited to the fall in specie's nominal price G necessary to restore parity.

Ricardo estimated that a deflation of no more than 5 percent would return gold to par under his ingot plan. But neither Parliament nor the Bank would adhere to his scheme. Indeed, Parliament set the plan aside before it could be executed, and the Bank filled its coffers with gold, which it had drained from the world market. The resulting deflation was twice what Ricardo estimated it would have been had the Bank been allowed to implement his plan. This entire excess deflation he blamed on policy mismanagement of the resumption.

To summarize, Ricardo's concern with falling prices is evident in the rules he laid down for dealing with deflation: Deflate only to eliminate small price deviations from target. In the case of large deviations, eschew deflation and accept price drift. If you must deflate, do it gradually. Avoid policy mistakes that worsen deflation.

5. THOMAS ATTWOOD (1783–1856)

Writing in the deflationary phase of the Bank Restriction period, Birmingham banker and pamphleteer Thomas Attwood, the most radical anti-deflationist of the classical era, would have none of Ricardo's proposals.⁸ All of them, gradualism and devaluation included, envisioned stabilizing the market price of gold, if not at its pre-war parity, then at least below its wartime peak when full employment had prevailed. Ricardo's price-stabilizing objective was anathema to Attwood who, hailing from an area particularly hard hit by post-war depression, advocated full employment instead. "The first and most important duty for the Legislature to attend to," he said, "is to take care that an ample demand for labour is restored and maintained throughout the country" (Attwood [1843] 1964, 17). By ample demand, he meant "a demand for labour . . . permanently greater than its supply" (17).

For Attwood then, full employment was the overriding policy goal, and price increases were the essential means of securing it. Government had "the duty . . . to continue the depreciation of the currency until full employment is obtained and general prosperity" (Attwood [1831–32], 467, quoted in Corry 1962, 86). The policy authorities, upon reaching the employment target,

⁸ On Attwood, see Fetter (1964, vii-xxviii), Laidler (2000, 25–27), O'Brien (1975, 164–65), and Viner (1937, 173, 186–87, 195, 199, 212–14, 289).

should permit prices to rise to levels compatible with it unconstrained by arbitrary ceilings. Inflation up to this height (but not beyond) was acceptable, even desirable. For when you “restore the depreciated state of the currency . . . you restore the reward of industry, you restore confidence, you restore production, you restore consumption, you restore everything that constitutes the commercial prosperity of the nation” (Attwood [1819] 1964, 66). But deflation, the evil “which ought most to be guarded against, which produces want of employment, poverty, misery, and discontent in nations” (Attwood [1843] 1964, 18) must be avoided at all costs.

Fearing deflation even more than did his classical peers, Attwood saw it as harmful because it worked its way slowly, unevenly, haphazardly, and disruptively through the price structure. “If prices were to fall suddenly, and generally, and equally, in all things,” he wrote, “*and if it was well understood that the amount of debts and obligations were to fall in the same proportion, at the same time*, it is possible that such a fall might take place without arresting consumption and production, and in that case it would neither be injurious or beneficial in any great degree, but when a fall of this kind takes place in an obscure and unknown way, first upon one article and then upon another, without any correspondent fall taking place upon debts and obligations, it has the effect of destroying all confidence in property, and all inducements to its production, or to the employment of labourers in any way” (Attwood [1817], 78–79, quoted in Viner 1937, 186, italics in original).

Equally important, deflation lowered product prices below wages and other contractually fixed costs. And when “the prices of commodities are suffered to fall . . . within the level of the *fixed charges and expenses* . . . the industry of the country dies” (Attwood [1826] 1962, 42, italics in original). It dies because profit margins, the difference between prices and costs, vanish and with them the means and the motive to produce. Output and employment then decline in a self-reinforcing downward spiral. For the same falling prices that combine with rigid cost elements to depress profits also prompt an unloading of stocks of goods. This dumping of goods puts further downward pressure on prices and profits causing still another unloading of stocks, etc. The downward movement continues until stocks are exhausted and the resulting shortage of goods spurs a rise in prices that ends the process at the trough of the cycle. This sequence brings great suffering to unemployed workers and hardship to businessmen. For these reasons, it is crucial that deflation be averted.

To Attwood the policy choices were clear: Use expansionary policy, inflating if necessary, to achieve full employment. Require or induce the Bank of England “to encrease the circulation of their notes . . . until all the labourers in the kingdom are again in full employment at ample wages” (Attwood [1819] 1964, 44). Once the employment target is reached, accept the market price of gold that coexists with it and establish that price as the new mint parity. Never attempt to deflate away premia in the market over the mint price of gold, not

even when they produce external drains that threaten exhaustion of the nation's gold reserve. Instead, be prepared to abandon the gold standard with its system of fixed exchange rates for an inconvertible paper currency regime with floating rates. The latter regime gives the government the autonomy to pursue its full employment objectives free of external constraints.⁹

6. ROBERT TORRENS (1780–1864)

No survey of classical deflation theory would be complete without mention of Robert Torrens's efforts to incorporate tariffs into the theory. Already in 1812 he had recommended raising the domestic tariff as a means of preventing price declines when restoring convertibility. Admitting that such a restriction on trade would be to sacrifice the advantages of international specialization and division of labor, he argued that the avoided costs of deflation outweighed the forfeited gains from free trade (Viner 1937, 207).

Then in his 1844 *The Budget* he showed how the imposition of a foreign tariff could foist deflation on the home country in a gold standard regime. He established this result with the aid of a two-country, two-good model—his famous Cuba-England, sugar-cloth case.¹⁰ His model has the export sector of each country specializing in the production of the good, fabricated at constant cost, in which it has the comparative advantage. The model also features unit elastic demands for both goods in both countries.

With these assumptions, Torrens showed that Cuba's imposition of a 100 percent import tariff on cloth creates a trade balance deficit in England. The resulting specie drain that finances the deficit causes England to lose one-third of her monetary gold stock to Cuba before the trade balance re-equilibrates itself. No country, Torrens thought, could endure a monetary contraction and proportional price deflation of that magnitude. The collapse of prices would bring ruinous rises in the real burden of debts, wages, and taxes the nominal values of which were sticky and responded sluggishly to deflationary pressure. Calamitous "crisis, . . . national bankruptcy, and revolution would be the probable results" (Torrens 1844, 37, quoted in Robbins 1958, 203).

To Torrens the policy implications were clear. Fight tariffs with tariffs. Cancel the deflationary effects of foreign duties by erecting compensating retaliatory duties at home. Such retaliatory duties, he said, "would bring back the metals . . . restore the circulation to its former amount, raise the price of all domestic products, and mitigate the pressure of the debt." (37, quoted

⁹ "Self-existent, self-dependent, liable to no foreign nations, entirely under our own controul; contracting, expanding, or remaining fixed, according as the wants and exigencies of the community may require, a *non-convertible* Paper Currency presents every element of national security and happiness . . ." (Attwood [1826] 1964, 34, italics in original).

¹⁰ On Torrens's Cuba case see O'Brien (1975, 191–94), Robbins (1954, 199–203), and Viner (1935, 298–99, 322, 463).

in Robbins, 203). In a word, practice reciprocity. Raise tariffs *pari passu* with the foreigner, and lower your tariff only if he lowers his. Needless to say, such reciprocity considerations did not sit well with Torrens's classical contemporaries, all of whom were unilateral free traders. But at least Torrens had highlighted a possible conflict between the goals of unilateral free trade and anti-deflationism in a tariff-ridden, gold standard world. For better or worse, Torrens's arguments still are employed today by those who put the blame for domestic deflationary pressures on foreign commercial policies.

7. CONCLUSION

If the classical writers surveyed in this essay are at all correct, then current concern over deflation is fully justified: For the essence of the classical doctrine is that there is every reason to spare the economy the adverse real effects of deflationary pressure. These effects, whether caused by lags of sticky prices behind money; or by lags of sluggish wages, interest, taxes, and other costs behind prices; or by rising real debt burdens and the resulting defaults and bankruptcies; or by cash hoarding in anticipation of future price declines; or to a combination of these and other causes, are likely to be painful in the extreme—especially so for deflations that are sharp, sudden, or sustained.

It follows that a policy of inflation targeting may be superior to price-level targeting as a means of eluding deflation. Suppose inflationary shocks and/or policy mistakes and inertia have caused or permitted prices to drift upward. Under inflation targeting, the central bank forgives the price drift that has occurred and thereafter stabilizes inflation about the new price level. It disinflates to its zero (or low positive) target rate of inflation at this price level but need not lower the price level itself. By contrast, under price-level targeting the central bank must engineer deflation and the recession it brings in order to lower prices to target.

Of course, deflation under certain circumstances might not be a bad thing, that is, might have no adverse real effects. If so, policymakers could ignore it or implement it with impunity. Such would be the case for deflations that (1) are always fully expected, (2) occur in a setting of complete wage-price flexibility, and (3) stem from productivity-induced growth in aggregate supply rather than monetary-induced contractions in aggregate demand. With the possible exception of Hume, however, classicals paid insufficient attention to these considerations and left their discovery to their neoclassical successors. But even if they had acknowledged them, they would have merely distinguished between bad and good (benign) deflations. As it was, they concentrated on harmful deflations. And it is these deflations that policymakers should seek to avoid. This lesson remains as valid today as it did in classical times.

REFERENCES

- Attwood, Thomas. [1816] 1964. *The Remedy; or, Thoughts on the Present Distresses*. In *Selected Economic Writings of Thomas Attwood*. Ed. Frank W. Fetter. London: London School of Economics and Political Science, University of London.
- _____. 1817. *Prosperity Restored; or Reflections on the Cause of the Present Distresses and on the Only Means of Relieving Them*. London.
- _____. [1819] 1964. *A Letter to the Earl of Liverpool*. In *Selected Economic Writings of Thomas Attwood*. Ed. Frank W. Fetter. London: London School of Economics and Political Science, University of London.
- _____. [1826] 1964. *The Late Prosperity, and the Present Adversity of the Country, Explained*. In *Selected Economic Writings of Thomas Attwood*. Ed. Frank W. Fetter. London: London School of Economics and Political Science, University of London.
- _____. 1831–32. In *Report from the Committee on Secrecy in the Bank of England Charter: With the Minutes of Evidence*. Parliamentary Papers, Commons. (772), VI: 452–68.
- _____. [1843] 1964. *Thomas Attwood's Letter to Sir Robert Peel on the Currency*. In *Selected Economic Writings of Thomas Attwood*. Ed. Frank W. Fetter. London: London School of Economics and Political Science, University of London.
- Boianovski, Mauro. 1998. "Wicksell on Deflation in the Early 1920s." *History of Political Economy* 30 (2): 219–73.
- Cesarano, Filippo. 1983. "The Rational Expectations Hypothesis in Retrospect." *American Economic Review* 73 (1): 198–203.
- _____. 1998. "Hume's Specie-Flow Mechanism and Classical Monetary Theory: An Alternative Interpretation." *Journal of International Economics* 45: 173–86.
- Christiernin, Pehr N. [1761] 1971. *Lectures on the High Price of Foreign Exchange in Sweden*. Ed., trans. R. Eagly in *The Swedish Bullionist Controversy*. Philadelphia: American Philosophical Society.
- Corry, B. A. 1962. *Money, Saving and Investment in English Economics 1800-1850*. New York: St. Martin's Press.

- Eagly, Robert V., ed., trans. 1971. *The Swedish Bullionist Controversy; P. N. Christiernin's "Lectures on the High Price of Foreign Exchange in Sweden"* (1761). Philadelphia: American Philosophical Society.
- Fetter, Frank W. 1964. Introduction to *Selected Economic Writings of Thomas Attwood*. London: London School of Economics, University of London.
- Hollander, Samuel. 1979. *The Economics of David Ricardo*. Toronto: University of Toronto Press.
- Hicks, John R. 1967. "Thornton's Paper Credit." In *Critical Essays in Monetary Theory*. London: Oxford University Press.
- Hume, David [1752] 1970. "Of Money" and "Of the Balance of Trade." In D. Hume's, *Writings on Economics*. Ed. E. Rotwein. Madison: University of Wisconsin Press.
- Humphrey, Thomas M. 1982. "Of Hume, Thornton, the Quantity Theory, and the Phillips Curve." Federal Reserve Bank of Richmond *Economic Review* 68 (November/December): 13–18.
- Laidler, David. 1999. *Fabricating the Keynesian Revolution: Studies of the Inter-war Literature on Money, the Cycle, and Unemployment*. Cambridge: Cambridge University Press.
- _____. 2000. "Highlights of the Bullionist Controversy." Research Report No. 13. Stockholm: Institutet För Ekonomisk Historisk Forskning.
- Myhrman, Johan. 1976. "Experiences of Flexible Exchange Rates in Earlier Periods: Theories, Evidence and a New View." *Scandinavian Journal of Economics* 78 (2): 169–96.
- Niehans, Jurg. 1990. *A History of Economic Theory: Classic Contributions, 1720–1980*. Baltimore: Johns Hopkins University Press.
- O'Brien, Denis P. 1975. *The Classical Economists*. New York: Oxford University Press.
- Persson, Mats, and Claes-Henric Siven. 1993. "Pehr Niclas Christiernin." In *Swedish Economic Thought—Explorations and Advances*. Ed. L. Jonung. London: Routledge.
- Ricardo, David. [1810–11] 1951. *The High Price of Gold Bullion. A Proof of the Depreciation of Bank Notes*. In *Works and Correspondence of David Ricardo*, vol. 3. Ed. P. Sraffa. Cambridge: Cambridge University Press.
- _____. [1816] 1951. *Proposals for an Economical and Secure Currency*. In *Works and Correspondence of David Ricardo*, vol. 4. Ed. P. Sraffa. Cambridge: Cambridge University Press.

- _____. [1821] 1951. Letter to Wheatley. In *Works and Correspondence of David Ricardo*, vol. 9. Ed. P. Sraffa. Cambridge: Cambridge University Press.
- Robbins, Lionel C. 1958. *Robert Torrens and the Evolution of Classical Economics*. London: Macmillan.
- Salerno, Joseph T. 1980. The Doctrinal Antecedents of the Monetary Approach to the Balance of Payments. Ph.D. diss., Rutgers University.
- Thornton, Henry. [1802] 1939. *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain*. Ed. F. A. von Hayek. London: George Allen & Unwin.
- Torrens, Robert. 1844. Letter II of *The Budget: A Series of Letters on Financial, Commercial, and Colonial Policy*. London: Smith, Elder and Co.
- Viner, Jacob. 1937. *Studies in the Theory of International Trade*. New York: Harper Brothers.
- Wicksell, Knut. 1918. "Inconveniences of the Measures for the Regulation of the Value of Money." *Svensk Handels-Tidning*, 25 September.
- _____. 1920. Memorandum on the High Prices. In *Report on the Question of How and to What Extent it is Possible to Set Up a Program for the Near Future for the Swedish Financial Policy*. Stockholm: Marcus: 39–63.