WHERE DID ALL THE MONEY GO?
MEASURING THE EXTENT OF THE MARKET DURING THE INTERWAR YEARS, 1919—1939

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ABSTRACT

This paper looks at the Interwar years from the perspective of exchange rather than traditional wealth measures such as national income and product. Using the Federal Reserve's bank debits data, an aggregate of exchange activity patterns is constructed. Then, this aggregate is further classified into exchanges occurring on account of consumption, production, and finance activities. The picture that emerges from this analysis provides new insights into economic activity from 1919 to 1939.

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> *Consider an inflationary, or as a matter of fact, any increase in the total quantity of money. If no account is given* where *this additional money originates from,* where *it is injected, and with* what *different magnitudes and* how *it penetrates (through* which *paths and channels, and with* what *speed), into the body economic, very little information is given.*
>
> — Oskar Morgenstern (1972)

INTRODUCTION

It matters who receives an inflationary injection of money and credit. In this, Morgenstern is clearly recalling Cantillon (1755) who had recognized after the collapse of Law's scheme that monetary distribution patterns have real effects (and potentially lethal consequences[1]). The decade leading up to the Great Depression is not always one clearly identified as a period of inflationary excess, especially if one simply considers prices. Price levels as measured by traditional indexes of consumer and producer prices, were essentially flat during the 1920s, then down sharply from 1930 to 1933. However, when one uses the classical definition of inflation advanced by Morgenstern and Cantillon, the 1920s were clearly inflationary.

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The supplies of high-powered money (H), M1, and M2 for example, grew at compound annual rates of 0.9%, 2.6%, and 5.0% respectively from January 1919 through September 1929.[2] This monetary growth compares with a compound annual growth rate for the Barron's—Persons Index of Production and Trade of 1.7% over the same period.[3] Conversely, from October 1929 to March 1933, the supply of high-powered money grew at a 5.6% rate (mainly as banks held more reserves), while the supplies of M1 and M2 *fell* 11.0% and 15.3% respectively, while the Barron's—Persons Index fell 28.7% by comparison. This cursory analysis would seem to suggest that the injection of money and credit in the 1920s went somewhere other than production and trade, while on the other hand, the contraction of money in the early 1930s had a compound influence on production and trade. The crucial question therefore is, where did the influx of money in the 1920s go and what were its effects on economic activity (i.e., on the extent of the market)?

This paper sketches one possible approach to addressing Morgenstern's challenge. However, since other authors have already covered the monetary aspects of this period, I do not replicate those efforts here except to suggest that the initial inflation can trace its origins to the Federal Reserve System (and subsequent compounding through the deposit multiplier of the commercial banking system). Friedman and Schwartz (1963) in their seminal history, and particularly Benjamin Anderson (1949) in his compilation of contemporary accounts, provide

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[1] In the wake of the collapse of the Mississippi bubble, John Law had to flee Paris for his life.

[2] High-powered money is taken from Friedman & Schwartz (1963), Table B-3, pp. 801-805. M1 is the sum of NBER Series M14131 (publicly held gold), M14138 (publicly held silver), M14065 (Federal Reserve Notes in circulation), and M14172 (demand deposits all commercial banks). M2 is the sum of M1 and NBER Series M14171 (time deposits all commercial banks).

[3] The Barron's—Persons Index of Production and Trade is available through the NBER Marcrohistory Database as series M12004. In the narrower period, 1919 through 1924, H, M1, and M2

ample evidence to suggest that an inflation of money and credit occurred during the 1920s, and again in the 1930s in response to the Great Contraction. Questions remaining less clearly answered however are of the character asked by Morgenstern and they are the subjects of this inquiry: Namely, where was the money injected, with what magnitude, and which paths did the injections follow? The picture that will ultimately emerge from this analysis, is one that provides new insights into economic activity during the interwar years.

THE EXTENT OF THE MARKET AND EXCHANGE ACTIVITY

In order to begin addressing Morgenstern's challenge, a measure of economic activity is needed that goes beyond traditional economic measures such as national income or gross national product for example. While the traditional measures are useful and instructive in many instances, for our purposes here we need metrics from which the flow of economic activity can be inferred. Specifically, that means metrics designed to capture the volume of exchange activity transpiring over a given period. The rationale for such an approach is that the volume of emergent voluntary exchanges—either in nominal or real terms—is synonymous with the extent of the market in a Smithian sense.

Nominal consideration of course constitutes one half of a contractual exchange. Therefore, if we can estimate nominal exchange volumes (i.e., consideration), we should be able to generate a reasonably accurate account of the volume of exchange activity. This overall nominal total in turn can then be further refined into estimates of consumption, production, and financial exchange volumes. With these estimates, it should become clear—at least at a broad

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grew at compound rates of 4.0%, 3.7%, and 6.9% respectively compared to a 1.4% growth rate in the Index of Production and Trade.

level of abstraction—where the injections of money went, and what the subsequent effects were on exchange activity.

Bank Intermediation and Exchange Volumes

One way to develop an approximation of exchange activity may be found if one considers the volume of bank account activity transpiring in a given period—inasmuch as banks are crucial intermediaries in the process of exchange. The banking system's position as exchange intermediary is especially significant during the interwar years, given that non-bank intermediation such as money market mutual funds, cash management accounts, electronic funds transfers, and so on were still in the distant future. Most exchange transactions during the interwar years at some point encountered the banking system, and were accomplished in the main by the transmittal of bank drafts. Therefore, it seems reasonable that bank account clearing activity ought to provide a good first approximation of the total exchange volumes.

Checks presented for payment through the clearing system, cash withdrawals from passbook savings accounts, and the cashing of checks at the teller window are all examples of bank account debit activities that can be translated into related exchange activities. Of course, bank clearings (or bank debits more accurately) do not capture every exchange that occurs; it only captures those that have contacted the banking system. For example, hand-to-hand cash exchanges can go several iterations before the currency touches the banking system again. Still, if not in absolute magnitude, the volume of clearings or bank debits ought to provide an approximation at least in *pattern* of total exchange activities.

Indeed, that bank account activity parallels actual economic activity is not a novel observation. Some of the oldest regularly collected economic statistics in the US are check

clearings. The volume of checks presented at the clearinghouse for collection has been consistently collected since at least the 1850s, and as might be expected, bank clearings as a proxy for exchange, tend to mirror economic activity fairly closely.[4] That is, as the volume of bank clearings accelerates, the overall volume of economic activity also accelerates and conversely. Banks clearings per se' however, suffer from a number of statistical defects, including the fact that they do not include so-called "on-us" checks; that is, checks drawn and cleared within the same institution. Neither do clearings include bank account cash withdrawal activity. Also, interbank checks drawn for purposes of account settlement are included in bank clearings and as such represent an instance of double counting within the statistics themselves. In recognition of these deficiencies, but while still recognizing the need for a comprehensive measure of exchange activity, the Federal Reserve began collecting a series called "Bank Debits" in 1919.

Bank debits, as the name implies, include all debits to customer deposit accounts—that is, reductions in customer deposit liabilities. Checks, drafts, and other customer-written transmittals are included, as are bank counter cash withdrawal activity and on-us checks. Interbank settlement transactions however, are not included. In short, any money transactions involving a customer's bank account ought to be captured in the bank debits data. Importantly, activity in the US Treasury's Tax and Loan Accounts are also included, inasmuch as Federal Reserve branches maintain these accounts to facilitate the banking requirements of the US

[4] Indeed Garvy (1959, p. 65) suggests that the volume of debits outside New York closely approximates the value of final output. "Check payments for final products and payments to the factors of production alone add up to roughly twice the value of the GNP, even though some payments are made in currency." This makes sense insofar as checks are paid to the factors of production (i.e., the national income side) as well as to the products of final consumption (i.e., the GNP side).

Treasury. Bank debits therefore are a more comprehensive and accurate series as compared to bank clearings, but they lack the longevity of the clearings series.

Although the bank debits series are not further classified as such, clearly the data contain exchanges executed on behalf of consumption, production, and financing activities. That is, sales of goods and services made by businesses to the final consumer, as well as government provision of goods and services to citizens (i.e., consumption exchanges) are captured in bank debits. Importantly however, bank debits also include those exchanges conducted among businesses on behalf of further production, as well as a sizable portion of financial transactions (i.e., those transactions undertaken to finance production and consumption exchanges that cannot be paid for out of current income). Ideally, the debits data would capture every consumption, production, and financial transaction in the economy. In fact however, debits, although superior to clearings, are still an incomplete measure of *total* exchange activity, and this obtains for several reasons.

First, bank debits data are not collected from every financial institution since not every institution is a member of the Federal Reserve System. Even here however, a sizeable amount of non-member volume should be captured through correspondent banking relationships non-members customarily maintained with member banks. Second, not every transaction is accomplished via the banking system. Clearing of stock trades via direct debit or presentation of shares at a brokerage house or stock exchange for example need not involve the banking system. Third, not every exchange is accomplished using money as the consideration media. Barter is an obvious example, while the direct delivery of commodities to settle a futures contract is another. Finally, not every cash transaction generates a corresponding debit in the

banking system's books. Hand-to-hand cash transactions, and underground economic exchanges for example can fall into this category. In spite of these weaknesses, bank debits provide the most comprehensive data available for determining the *pattern* of exchange activity and thereby inferring the extent of the market.

The collection of bank debits data occurs in two distinct categories: inside debits and outside debits. So-called "outside" debits are those bank account debits cleared outside New York City, while inside debits are those occurring within New York City. The reason for the distinction is to isolate the lopsided effects New York has on the statistics as a mercantile, wholesale, and financial center. New York City bank debits in 1929 for instance were nearly twice as large as the debits from all other clearing cities in the US combined.[5]

As suggested previously, not every single economic exchange will be captured in bank debits, but most are. Most consumption exchanges are accounted for with the exceptions of barter exchanges, underground economic activity, and non-bank cash transactions.[6] Virtually all production exchanges (i.e., business-to-business exchanges for purposes of furthering production) involve the banking system and are therefore captured in the debits data. A potential pitfall remains however with financial debits. Beginning in 1921, New York brokerage firms began clearing trades among themselves through the Stock Clearing Corporation. From 1921 to 1946 Garvy (1959, p. 19) notes, "the Stock Clearing Corporation [had] replaced payment by check in amounts ranging from less than $10 billion to more $100 billion a year. If checks for

[5] Monthly bank debits data are available from the National Bureau of Economic Research Macrohistory Database. NBER Series M12030 is the Total US bank debits series, while NBER Series M12016 is the outside series. New York City debits are derived by differencing M12030 and M12016.

[6] With respect to the National Income and Product Accounts, inclusion of agricultural home production is the largest contributor to consumption exchange volumes not captured in bank debits

such amounts had been cleared, New York clearings for 1921 to 1946 would have increased on the average by about 12 per cent."[7]

Given the near-ubiquitous focus of modern macroeconomics on final product, it is not surprising that past studies using debits have tried to net out the financial impact of New York in order to focus exclusively on consumption. Evidently, the belief animating this line of inquiry is that the intermediate stages of production are subsumed in the final stage; or, that financial activities such as arranging inventory loans, or ensuring liquidity by providing a deep market in corporate securities are only indirectly related to size and rate of economic progress. Indeed, a focus on final consumption can lead to no other conclusion, since the effects of all the prior stages of economic activity are assumed to have been imputed into the value of final goods themselves.[8]

Using bank debits as a first approximation of the extent of market activity in the US, indicates that total exchange volumes averaged some five to seven times larger than the level of national income from 1919 to 1939. This lopsided ratio suggests the bulk of economic (i.e., exchange) activity was occurring outside the final stages of exchange. By contrast, the traditional net view of macroeconomic activity includes only final exchanges and *net*

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figures. Therefore, to account more accurately for consumption exchange activity, this autarkic production will be excluded from subsequent analyses of the data.

[7] Moreover, a survey conducted by Garvy (1959, p. 41) using 1946 data found that New York Stock Exchange members accounted for roughly 16% of New York debits. The point here is that any estimates of financial exchanges using bank debits will be understated by roughly 10% to 15%.

[8] See for example Samuelson (1992, p. 416) for the textbook exposition of the imputed nature of final product. On the one hand, Samuelson states, "GNP equals the sum of money values of all consumption and investment goods, government purchases, and net exports to other lands." His definition seems to indicate a comprehensive measure of economic activity. However, three pages later, the intermediate goods represented by investment, we are told, should be netted out to avoid so-called double counting. "If you look again at the upper loop [in the standard circular flow diagram], you will see that bread and cars appear in the flow of products, but you will not find any wheat, flour, or steel."

investment. An exchange-based approach as outlined here on the other hand, suggests that the vast bulk of economic activities are aimed at furthering production, and are therefore only partially revealed in the final view to the extent of net investment.[9]

Moreover, focusing on exchange activity and the extent of the market helps one to think in terms of spatial and temporal arrangements inherent in the structure of production, as against the highly distilled view provided by the national income and product accounts. In 1919 for instance, national income and consumption outlays totaled $64 billion and $54 billion respectively, while total bank debits for the year were $435 billion.[10] Production and financial exchanges therefore amounted to at least $300 billion[11] in exchange activity but were only captured in the national income and product accounts as roughly $10 billion in net investment. In 1929 by comparison, national income and consumption expenditures were approximately $87 billion, and $77 billion respectively. Total 1929 bank debits however, were more than $935 billion, suggesting that exchange activity not captured in national income and product accounts had more than doubled to over $770 billion.

CONSUMPTION, PRODUCTION, AND FINANCIAL EXCHANGE VOLUMES

In order to address Morgenstern's challenge of observing the flows of exchange activity, and to make some inferences regarding the inflation of money and credit, it will be helpful to classify further the exchange activities captured in bank debits into exchanges undertaken on

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(p. 419) This view is fine if one's concern is with value added, or final demand. If however, one's focus is instead on exchange activity and the extent of the market, this view can be misleading.

[9] A related treatment appears in Skousen (1991).

[10] National Income and Product data from Kuznets (1961), debits data from NBER.

[11] It actually works out to more than $300 billion because, as we will see presently, the national income figures contain wages and salaries payments, which are classified here as production exchanges.

behalf of consumption, production, and finance. Even at this broad level of abstraction, we should be able to draw some inferences regarding the injection effects.

Consumption Exchanges. Consumption exchanges are simply those exchanges made by consumers (usually though not always with businesses) in order to satisfy final demand. Exchanges undertaken to secure food, clothing, and shelter for instance fall into this category, and are captured in the national income and product accounts as personal consumption expenditures.[12] Considering consumption exchanges from the perspective of businesses on the other hand, allows inclusion of the transfers businesses make to their owners in the consumption exchange category. Specifically, dividends, interest, and entrepreneurial draw are included as consumption related exchanges.[13] As mentioned earlier, autarkic agricultural production, imputed in personal consumption estimates is removed. In addition, taxes and government expenditures (all at levels of governance) are included in consumption exchanges.[14]

Production Exchanges. As the name implies, production exchanges are transactions carried out to further production of either consumer or producer goods. The exchanges occur primarily among businesses, but also include exchanges between businesses and their employees in the form of wages and salaries payments. One of the significant aspects of these

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[12] NBER Series, A06073, "Total Consumer Outlay, Current Prices."

[13] A case can be made that these transfers are not exchanges in the literal sense since the business owners remain in possession of their property. However, the transfers do constitute money transactions that need classification, and they do not logically belong in either of the other two categories, so they are included in the consumption estimates.

[14] It can be argued that government-related transactions do not qualify as voluntary exchanges. However, since they are captured in the bank debits figure, it seems they should be accounted for. Moreover, some government expenditures (such as highways, the postal service, etc.) might be more correctly classified as production related "exchanges," given their long-term nature. However, since the customary practice is not to capitalize government expenditures but rather to expense them in the year incurred, government related transactions are treated as consumption exchange activity for purposes of this analysis.

business-to-business exchanges that is netted out in the calculation of national income and product accounts are the purchases of raw materials so instrumental to on going production. The business-to-business sales of materials used up in the process of further production are every bit as crucial to production as are the employment of capital and labor. Unfortunately, precise data on these critical components of production are unavailable. In order to estimate them therefore, I employ an estimating technique called pro-forma modeling in which I treat the macro economy as if it were one large firm and estimate an overall income statement.

Most of the data necessary to populate the pro-forma income statement are known or can be conveniently estimated from available sources. Working from the bottom of the income statement up, net income (or profits before payment of dividends) is known. It derives from corporate profits plus dividends, and draw.[15] Adding state, local, and federal taxes as well as interest expenses to net income, yields earnings before interest and taxes (EBIT). Then, adding cost of goods sold to EBIT gives an estimate of total revenues, which can be checked along with the other estimates against the semi-decennial Census of Manufactures to validate the pro-forma estimates.

Cost of goods sold on the other hand, contains five main cost categories: wages, depreciation, materials, rent, and other. Wages, depreciation, and rent are readily available from the national income and product accounts. Other expenses (i.e., selling, general, and administrative expenses in modern terms) are estimated at 10% of cost of goods sold. This estimate is generally in line with contemporaneous estimates from the Census of Manufactures. Exchanges to obtain raw materials on the other hand, are estimated by comparing the non-

[15] Appendix A summarizes the pro-forma modeling technique, the sources used, and the results achieved.

materials components of cost of goods sold in relation to Outside Bank Debits.[16] Again, magnitudes were confirmed by comparison with the Census data.

The materials estimate derived from the pro-forma model represents an estimate of the business-to-business exchange volumes occurring on behalf of this one component of the production process. To the raw materials estimate, I then add purchases of property, plant, and equipment (including non-residential construction), to capture the sales of capital goods among businesses. In addition, I also include the estimate of "Other" expenses in productive exchanges inasmuch as these exchanges largely constitute the employment of productive services (such as advertising, legal, and administrative services for example). Taken together, these data constitute an estimate of the volume of exchange activities taking place on behalf of further production. In other words, the estimate represents the pattern of trade activity occurring among businesses that keeps a given structure of production operating.

Financial Exchanges. In the finance category of exchanges, I include those exchanges undertaken in order to finance consumption and production exchanges that are not payable out of current income. Examples of this activity include the extension of bank credit, stock and bond trades, and the execution of commodities and futures contracts to name a few.[17] Therefore, to develop an estimate of all financial exchange activities, I simply subtract the

[16] This assumes as a first approximation that outside debits contain no financial exchanges. This is not entirely accurate insofar as regional stock, bond, and commodity exchanges existed and were captured in Outside Bank Debits. However, it is equally true that New York City ("Inside") Debits also contained production and consumption exchanges to some degree. If we assume therefore that the two essentially cancel out, the ratio of cost of goods sold to outside debits should make a reasonable first approximation for the pattern of materials exchanges. For additional justification of this methodology moreover, refer to note 2 above.

[17] Stock and bond trading data at the major New York exchanges are fairly complete for this period. However, regional financial exchange data are less widely maintained. Data on flows of bank credit nationwide are similarly incomplete, as are data on commodities and future transactions.

previously derived estimates of consumption and production exchanges from the total bank debits figure. This remainder should represent, at least in pattern, the volume of financial exchange activity.

WHERE DID THE MONEY GO?

Relying on the previous estimates of consumption, production, and financial exchange volumes, Figure 1 (on the next page) shows some interesting patterns in interwar economic activity and the extent of the market. The first striking implication of the analysis as depicted in Figure 1 is the relative smallness of exchanges on behalf of final demand (i.e., "Consumption" exchanges). Consumption exchange activities averaged just 19.1% of all exchange activities in the 1920s. Over the same period by comparison, production exchanges averaged 32.2% and financial exchanges averaged 48.7% of total exchange volumes. These observations should not be taken as suggesting that consumer sovereignty does not hold, or that satisfying final demand is not the ultimate aim of production; merely that the vast bulk of exchange activity takes place outside of final demand.

In this connection, Figure 1 (on the next page) shows production exchanges are roughly two-thirds again as large, on average, as consumption exchanges in the 1920s, thereby challenging the accepted orthodoxy that consumption activity constitutes the vast majority of economic activity. The results presented in Figure 1 make sense however when one considers that the structure of production must not only furnish the goods destined for final demand, but it must also furnish the means of its own replacement (i.e., capital goods and raw materials). When viewed this way, it stands to reason that production activities necessarily dwarf consumption activities.

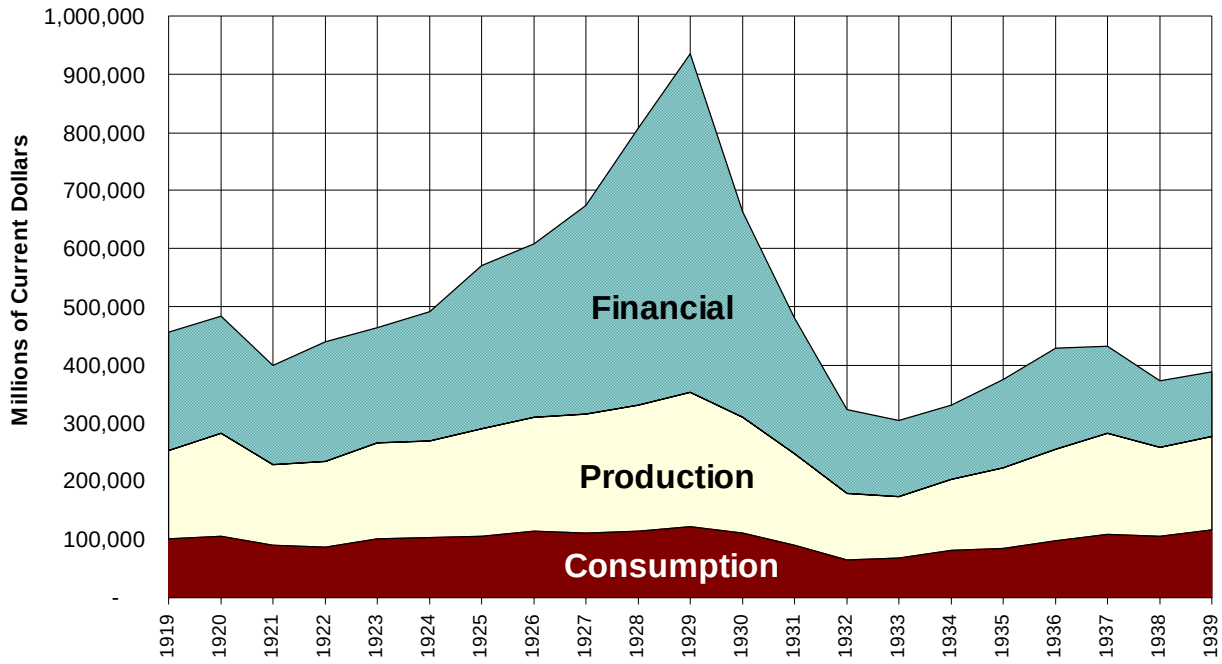

Figure 1

RELATIVE EXCHANGE VOLUMES

Exchange volume estimates derived from bank debits data as described in the text.

Figure 2 depicts the relative year-over-year changes in exchange volume growth during the interwar years. In the 1920s, consumption exchanges grew an average 2.2 % per year (1.1% from 1920 through 1924, and 3.3% from 1925 to 1929). Production exchanges on the other hand grew significantly faster in the second half of the 1920s than in the first half: 6.9% versus just 2.8% (but this is largely the result of the 1921 outlier). However, the 1920s were also witness to rising marginal productivity of capital and labor as major technological innovations such as increasing electrification, the fractional horsepower motor, and the automobile among others, gained widespread acceptance. Thus, while production exchanges in the 1920s were accelerating and may have been the beneficiaries of some of the growth in money and credit, the growth does is not inordinate when the extraordinary technological progress is considered.

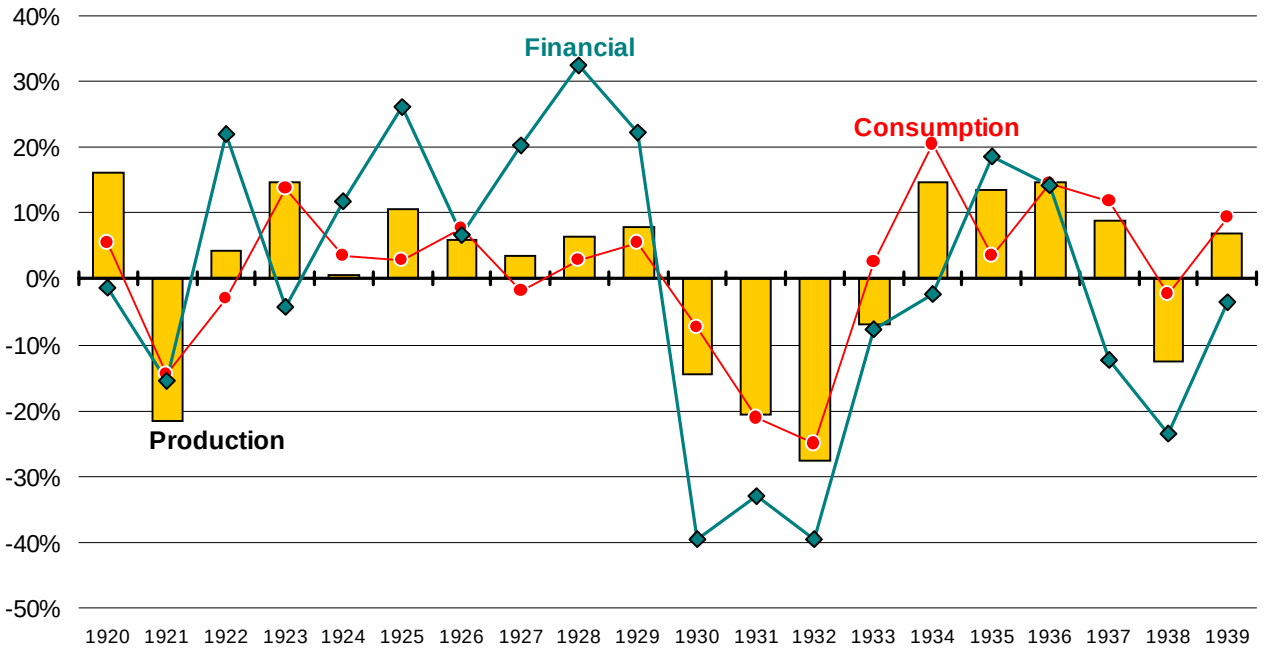

Figure 2
YEAR-OVER-YEAR CHANGES IN RELATIVE EXCHANGE VOLUMES

Figures 1 and 2 seem clearly suggestive that the 1920s inflationary impulse coursed mainly through financial asset exchanges—especially during the second half of the decade. This view also gains support from the contemporaneous observations of Benjamin Anderson (1949) and from the data and observations of Friedman and Schwartz (1963). In short, aggressive open market operations and real bill rediscounting fueled a speculative boom in financial assets during the twenties. Further support for this conclusion may be found in general price levels. Indexes of consumer and producer prices were essentially flat during the 1920s, suggesting a reasonably stable supply / demand relationship for these goods and services. Financial asset prices on the other hand boomed, rising at a compound annual rate of 29.6%

from 1925 to 1929.[18] Indeed some accounts have referred to the asset market activity in the late 1920s as a mania[19] or a bubble.[20] Anderson (1949, p. 190) even went so far as to echo Ralph Robey's reference to President Coolidge and Treasury Secretary Mellon as the "Capeadores of Wall Street."[21]

The inflationary influence on asset prices of course eventually wore off as further increases in the supply of money and credit were no longer forthcoming in sufficient quantity to sustain ever rising prices, and as deliberately tighter monetary policies were pursued in 1929. A scramble for liquidity ensued, which combined with subsequent waves of default, triggered a massive contraction in asset prices, production volumes and, to a lesser extent, in consumption activity. The effects of the Great Contraction are plainly evident in Figure 1, where the indentation in exchange activities looks as if a giant had put his boot to the extent of the market in the early 1930s.

Interestingly in Figure 1, beyond the Great Contraction, one can clearly see that production and financial exchange activities remained relatively stunted for the rest of the 1930s as compared to the twenties. This diminution of capitalistic activity may go a long way toward explaining similarly stunted incomes and employment if in fact productive activities account for the payment of most incomes and the employment of productive factors including labor.

It is also important to notice in both Figures 1 and 2 that consumption exchange activities grew relatively in the 1930s. I suggest that this outcome should be expected inasmuch as the New Deal instituted policies animated by the belief that a shortage of effective demand

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[18] This calculation is based on the monthly average of the Standard & Poor's Index of 90 stock prices (NBER Series M11025), which rose from 89.9 in January 1925 to a peak of 237.8 in September 1929.

[19] Kindleberger (1978).

[20] White and Rappaport (1993).

(or underconsumptionism) lay at the heart of the troubles in the Great Depression. Indeed, if consumption activity forms the bulk of economic activity, then such policies might be helpful. If, on the other hand, production and finance constitute the bulk of economic activity, then policies aimed at stimulating consumption may be positively harmful by fostering a consumption of capital and a reduction of investment and employment. The pertinent question in this context therefore, is what gives rise to "effective" demand? Is it the consumers of the produce of labor, or the actual employer of labor? John Stuart Mill (1871, pp. 79-81) suggested it was the latter rather than the former.

> What supports and employs productive labor, is the capital expended in setting it to work, and not the demand of the purchasers for the produce of labor when completed. *Demand for commodities is not demand for labor*. The demand for commodities determines in what particular branch of production the labour and capital shall be employed; it determines the direction of labour; but not the more or less of the labour itself, or of the maintenance or payment of the labour. These depend on the amount of capital, or other funds directly devoted to the sustenance and remuneration of labour …
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> …It is, to common apprehension, a paradox; and even among political economists of reputation, I can hardly point to any, except Mr. Ricardo and M. Say, who have kept it constantly and steadily in view. Almost all others occasionally express themselves as if a person who buys commodities, the produce of labour, was an employer of labour, and created a demand for it as really, and in the same sense, as if he bought the labour itself directly, by the payment of wages. …I conceive that a person who buys commodities and consumes them himself, does no good to the labouring classes; and *that it is only by what he abstains from consuming, and expends in direct payments to labourers in exchange for labour, that he benefits the labouring classes, or adds any thing to the amount of their employment*. [Emphasis supplied.]

To put Mill's observation somewhat differently, when one buys a quart of milk one does not purchase the labor services of the milkmaid or of the delivery person or of the farmhand and so on. One simply buys a quart of milk. Similarly, when one employs the services of the milkmaid and pays his wages, one does not again pay for the produce of the milkmaid's labors

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[21] Ralph Robey, "Capeadores of Wall Street," *Atlantic Monthly*, September 1928.

because that produce (the milk) is already one's own property to begin with. That is, one does not twice pay for what is one's own property in the first place.

Figures 1 and 2 indicate that an inflation of money and credit in the 1930s—as a monetary response to the Great Contraction—went largely into consumption-related exchanges.[22] Indeed, this is precisely where the bulk of New Deal policies intended to drive it. Consumption exchange activity accounted for 29.8% of all exchange activity by 1939, and averaged 23.1% throughout the 1930s, four percentage points higher than the 1920s—for a 21% increase in the relative size of consumption exchanges. However, policies aimed at stimulating consumption apparently did not have theorized multiplier effects because consumption, as Mill suggested, does not drive production in any direct way. Rather, production furnishes the means of effective demand that enables consumption on a large scale. In other words, to be a consumer one must first be a supplier of something of value to one's fellows. It is not surprising therefore that incomes and employment suffered throughout the 1930s as production and finance took a back seat to consumption.

CONCLUSION

The preceding analysis has suggested that the inflation of money and credit in the 1920s went primarily into financial asset trades, then to a lesser degree into production, and lastly into consumption exchanges. In the 1930s by contrast, that period's inflation went almost

[22] High-powered money rose from $8.4 billion in March 1933, to $19.3 billion by the end of 1939 (for a compound annual growth rate of 15.6%). M1 doubled from its 1933 nadir of roughly $18 billion, to nearly $37 billion in 1939 (compounding at a 13.4% annual rate). M2 also rose from about $28 billion in 1933 to $52 billion in 1939 (compound annual growth rate of 11.0%). This money supply growth moreover occurred at the same time the Barron's—Persons Index of Production and Trade rose from 48 to 94 (for a compound annual rate of 10.8%). Thus, the components of the money supply the central bank could directly control did in fact rise faster than the rate of production of goods and services.

exclusively into consumption-related activities, and then into production and finance. The relative magnitudes of these changes are apparent in the previously described figures.

Admittedly, this analysis does not provide a detailed roadmap of the inflationary injections at the micro (i.e., individual) exchange level. However, it does begin with a solid foundation in the exchange process, and so shows, at a tolerably broad level of abstraction, into which major categories of exchange the given money injections flowed. Moreover, the exchange basis clearly shows the effects of inflation on the extent of the market. And just as Morgenstern predicted,

> …Depending on the existing condition of the economy, each point of injection will produce different consequences for the same aggregate amount of money, so that the monetary analysis will have to be combined with an equally detailed analysis of the changing flows of commodities and services.
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> This is what Cantillon saw clearly in the 1730s (published in 1755), though he did not elaborate his ideas. It is one of the distressing factors in economic history that his deep insight was lost. … [T]here seems to have been no systematic development of economic dynamics along these lines, though after 240 years it would seem that one had waited long enough. The times are certainly ripe to break with thinking in terms of unanalyzed global aggregates and to proceed to a truly scientific differentiation of analysis. [Morgenstern (1972, pp. 1184-1185)]

Indeed the times have only ripened and the economic questions only deepened, especially regarding the Great Depression. The exchange-based analytical perspective developed here suggests one way to begin differentiating aggregate economic activity, and thereby to begin addressing Morgenstern's concerns. At the very least, an exchange approach offers an augmentation to traditional macroeconomic analysis that with further refinement might help us rediscover what Cantillon evidently knew.

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Appendix A

PRO-FORMA MODELING OF US EXCHANGE VOLUMES—1919 TO 1939

Pro-forma Model Schema and Data Sources

The first page of this Appendix describes the schema and data sources used in building a pro-forma model of exchange volumes that emerged from 1919 to 1939. The second page describes the derivation of Consumption, Production, and Financial Exchange totals. The final pages show the results obtained from running the model.

Category	**Description**	**Data Source**[23]
Total Revenues	Sum of Cost of Goods Sold, Interest, Taxes, and Total Profits	*Calculated*[24]
Cost of Goods Sold	Sum of Wages, Depreciation, Materials, Rent, and Other (SG&A)	*Calculated*
Wages	Payment to Labor Factors	NBER Series M08181
Depreciation	Allowance for Capital Consumption	NBER Series A10062
Materials	Expenditures for non-capital materials consumed in process of further production	*Calculated*[25]
Rent	Payments to Land Factors	NBER Series A08184
Other (SG&A)	Selling, General, and Administrative Expenses	*Calculated*[26]
EBIT	Earnings before Interest and Taxes (or, Total Revenues minus Cost of Goods Sold)	*Calculated*
Interest	Interest Expenses	NBER Series A08186
Taxes-Federal	Total Federal Tax Receipts	NBER Series M15004
Taxes-State, Local	Taxes paid to State and Local Authorities	*Calculated*[27]
Net Income	EBIT less Interest and Taxes	*Calculated*[28]

[23] All data annualized.

[24] Sum of EBIT plus Cost of Goods Sold.

[25] Based on: 1 — (All other known or assumed Cost of Goods Sold as a percentage of Outside Bank Debits + SG&A). The reason for using Outside Debits is their close approximation to national product levels as reported in Garvy (1959). Materials expenditures based on this formulation, accounted for roughly three out of every five dollars spent in production. This figure approximates the relationships obtained from the Census of Manufactures conducted by the Bureau of the Census.

[26] SG&A expenses are assumed to constitute 10% of total Cost of Goods Sold.

[27] Surprisingly little data are available for this series, so an assumed rate of 5% of EBIT was used.

[28] Total Profits as used in the Revenue calculation is the sum of Gross Corporate Profits (NBER Series Q09048) and Entrepreneurial Draw (from Martin [1939, p. 21]).

Appendix A

PRO-FORMA MODELING OF US EXCHANGE VOLUMES—1919 TO 1939

Estimation of Consumption, Production, and Financial Exchange Volumes

Consumption Exchanges

Equal the sum of payments to "consumptive" factors (i.e., non-productive expenditures[29]) plus expenditures by consumers for consumption goods. Wage payments are therefore subtracted from National Income (NBER Series A08167) since wages are productive expenditures. Autarkic Agricultural Income[30] is also subtracted from National Income. The Adjusted National Income figure is then added to Consumer Outlays for consumption goods (NBER Series A06073). Federal Government receipts (NBER Series M15004) and expenditures (M15005) are added to the pro-forma estimates of state and local taxes. State and local authorities are assumed to follow balanced budgets such that expenditures equal receipts. Formally, this yields the following equation for Consumption Exchanges:

(National Income — Wages — Autarkic Agricultural Income) + Outlays for Consumer Goods + Government Receipts & Expenditures.

Production Exchanges

Equal the expenditures by business to employ labor (Wages, NBER Series M08181) plus inter-business sales volumes. This latter figure is composed of expenditures for Materials (as described under pro-forma modeling), Property, Plant, and Equipment (NBER Series Q10096), Private Non-residential Construction (NBER Series A02150), plus Selling, General, and Administrative (SG&A) expenditures (as described previously). Formally, this yields the following equation for Production Exchanges:

Wages + Materials + Property, Plant, & Equipment + Non-Residential Construction + SG&A.

Financial Exchanges

Equal the remainder after subtracting Consumption and Production Exchanges from Total Bank Debits (the proxy used here for total exchange volumes, NBER Series M12030). Formally, this yields the following equation for Financial Exchanges:

Total Bank Debits — (Production + Consumption Exchanges)

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[29] It is assumed in this context that returns to capital (i.e., interest and profits) and land (i.e., rent) are fully absorbed into consumption exchanges. That is, returns to capital are not productive expenditures per se' but rather are simply remuneration to the respective owners that in turn finance the owners' consumption exchanges.

[30] This figure is derived from *Historical Statistics of the United States, 1776 to 1976*, Table K269, p.483, and represents the estimated value of farm products consumed within farm households.

Appendix A

PROFORMA MODELING RESULTS

1919 to 1929

	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
Total Revenues	**180,466**	**204,351**	**162,273**	**169,669**	**192,980**	**194,946**	**214,181**	**224,444**	**231,104**	**246,055**	**264,409**
Cost of Goods Sold	**154,549**	**177,691**	**142,955**	**148,918**	**169,320**	**171,021**	**188,087**	**198,099**	**205,430**	**218,719**	**235,291**
Wages	36,706	43,319	34,932	36,403	42,724	42,708	44,413	47,399	47,787	48,703	51,521
Depreciation	3,411	3,585	3,632	3,949	4,044	4,154	4,386	4,861	4,877	5,175	5,498
Materials	95,011	108,731	85,625	88,778	100,455	101,426	115,015	120,888	127,145	138,028	149,826
Rent	3,966	4,287	4,470	4,896	5,165	5,631	5,465	5,141	5,078	4,941	4,917
Other (SG&A)	15,455	17,769	14,295	14,892	16,932	17,102	18,809	19,810	20,543	21,872	23,529
EBIT	**25,917**	**26,660**	**19,318**	**20,751**	**23,660**	**23,925**	**26,094**	**26,345**	**25,674**	**27,336**	**29,118**
Interest	3,228	3,652	3,872	3,979	4,206	4,374	4,579	4,698	4,935	5,272	5,604
Taxes-Federal	6,770	6,432	4,972	3,666	4,106	3,912	3,820	4,085	4,088	3,920	4,243
Taxes-Other	1,296	1,333	966	1,038	1,183	1,196	1,305	1,317	1,284	1,367	1,456
Net Income	**14,624**	**15,243**	**9,509**	**12,068**	**14,165**	**14,443**	**16,390**	**16,246**	**15,367**	**16,777**	**17,815**

Notes:

(1) Rent (NBER Series A08184) was available only through 1938. The 1939 data point was estimated by fitting a linear trend to the Rent data from 1932 to 1938. The Equation obtained was, Rent = 1846.6 + 95.214(t). $R^2 = 0.653$

(2) Corporate Profits (NBER Series Q09048), used in deriving Total Revenues, were missing the 1919 and 1939 data points. They were estimed by regressing Corporate Profits on Dividend Payments (NBER Series A08185). The resulting equation was, Profits = -2586.7 + 1.2571(Dividends). $R^2 = 0.384$.

(3) The NICB Entrepreneurial Draw Figures were missing observations for 1937 and 1938. They were estimated by regressing the NICB data against Entrepreneurial Withdrawals (NBER Series A08183). The equation was, Entrep. Draw = -3736.3 + 1.2956(ED). $R^2 = 0.704$.

(4) National Income was (NBER Series A08167) was missing the 1939 observation. It was estimated by regressing National Income on Consumer Outlays (NBER Series A06073). The resulting equation was, National Income = -18853.06 + 1.3765(Consumer Outlays). $R^2 = 0.920$.

Appendix A

PROFORMA MODELING RESULTS

1930 to 1939

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
Total Revenues	**225,674**	**179,672**	**131,570**	**126,206**	**144,049**	**162,289**	**185,294**	**201,279**	**178,222**	**189,424**
Cost of Goods Sold	**202,522**	**162,878**	**119,601**	**111,675**	**126,532**	**142,642**	**162,199**	**175,556**	**155,493**	**165,817**
Wages	47,040	39,587	30,721	28,194	32,124	34,998	38,863	43,503	39,693	42,639
Depreciation	5,549	5,481	5,119	4,879	4,745	4,721	4,700	4,900	5,000	5,100
Materials	125,416	98,497	69,711	65,320	75,104	86,516	100,230	107,018	92,676	98,888
Rent	4,265	3,026	2,090	2,114	1,905	2,143	2,186	2,579	2,575	2,608
Other (SG&A)	20,252	16,288	11,960	11,167	12,653	14,264	16,220	17,556	15,549	16,582
EBIT	**23,152**	**16,794**	**11,969**	**14,531**	**17,517**	**19,647**	**23,095**	**25,723**	**22,729**	**23,607**
Interest	5,720	5,712	5,515	4,999	4,915	4,648	4,608	4,688	4,593	4,630
Taxes-Federal	3,955	2,669	2,011	2,569	3,492	3,857	4,372	6,312	5,993	5,485
Taxes-Other	1,158	840	598	727	876	982	1,155	1,286	1,136	1,180
Net Income	**12,320**	**7,573**	**3,844**	**6,237**	**8,235**	**10,159**	**12,960**	**13,437**	**11,007**	**12,312**