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On the Way to the Great Depression: The Demand Regime of the American Economy (1900–1929)

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Abstract

This paper investigates the dynamics of income distribution, private debt, and aggregate demand in the United States in the era before the Great Depression. Based on a post-Keynesian model, I estimate the effects of the wage share and private debt on aggregate demand for private domestic output. I draw on the Post Keynesian literature to develop a framework that captures the interplay between private debt, income distribution, and demand. I use error correction model to determine the demand regime of the period. The results of the study show the demand regime was wage-led with private debt playing an important role in driving aggregate demand. Furthermore, I argue that during the roaring Twenties, higher income inequality along with the rise of destabilizing channels that propped up demand contributed to heightened economic fragility. The destabilizing channels were a real estate boom financed by mortgage debt, and a consumer spending boom financed by consumer debt. The combination of rising income inequality and higher private debt level characterized the demand regime of the Roaring Twenties which ended with the crisis of the Great Depression.

KEYWORDS: Income distribution, debt-led growth, wage-led growth, Great Depression.
JEL CODES: E12, B22, E25, N10, C21

Introduction

The paper employs a post-Keynesian framework to determine the demand regime of the United States in the pre–Great Depression era and finds the demand regime to be wage-led, with an important role played by private debt. Furthermore, it shows how the increase of income inequality during the Roaring Twenties along with higher private debt, contributed to the fragility of the economy on the path to the Great Depression.

Following the pioneering models of Michal Kalecki and the Cambridge Post-Keynesians, Bhaduri and Marglin (1990) theorized a framework to determine whether a demand regime is profit-led or wage-led. In a wage-led system, an increase in wages boosts demand for goods and services and thereby fosters greater economic growth. In a profit-led system, in contrast, higher profits drive higher demand for investment goods and productive capacity building, which leads to higher growth of output in the economy. Inspired by the framework of Bhaduri and Marglin, most studies of demand regimes have covered the post–World War II period. In spite of the claims of its similarities to current income distribution and growth dynamics, none have studied the era before the Great Depression. The demand regime of the pre-Great Depression era is a gap in the literature that this work attempts to fill.

While the majority of demand regime studies have been based on either Neo-Kaleckian or Goodwin models, I draw on the Post Keynesian literature to develop a framework to investigate the dynamics of aggregate demand, debt, and income distribution in the early twentieth century. The framework is inspired by Kaldor late views of investment as mainly derived demand. Accordingly, in a closed economy either

wage-led or debt-led demand regimes are possible.

Utilizing available historical data and using statistical methods, I constructed time series of wage share, consumer debt, and investment debt for the relevant period. I then used a single-equation error correction model to estimate the elasticity coefficients of wage share and debt variables for private consumption and investment to determine the demand regime for the period.

The second part of the paper, income distribution, debt and demand dynamics are discussed for the booming period preceding the Great Depression, an era characterized as the Roaring Twenties. I argue that the drop in demand that could have been caused by the rise of income inequality was compensated for by two destabilizing channels. The first was a real estate boom (1922–1926) financed by higher levels of mortgage debt. The second was a consumer debt boom that sustained aggregate demand in the second half of the Roaring Twenties, but was responsible for the drop in demand in the Great Depression.

Section 2 of the paper gives the theoretical background, Section 3 follows with a description of the historical trends of growth, debt, and income distribution throughout the period, Section 4 presents the empirical model, Section 5 presents the test results, Section 6 addresses the Roaring Twenties period, and Section 7 is the conclusion.

Theoretical Background

This paper is framed within the Classical-Post Keynesian tradition. The model is classical in the sense that income distribution matters and exogenously determined. Prominent Classical economist David Ricardo defined the main question that political

economy pursues as an enquiry into the determinants of income distribution among classes. Karl Marx also underlined the importance of income distribution in his analysis of the contradictions of the capitalist system. With the Marginalist Revolution of the late nineteenth century taking a micro-level approach to economic problems, income distribution was endogenized and became an outcome of relative scarcity of factors of production. The importance of investigating income distribution had to wait to be recovered in the hands of Piero Sraffa, Michal Kalecki, and the Cambridge post-Keynesians. This revival underscored the importance of understanding the economy on a class base, and revitalized the role of class conflict and income distribution in explaining economic reality (De Vroey, 1975).

John Maynard Keynes did not address income distribution substantially, but he proposed a demand-driven theory of output and employment. Before Keynes the dominant theory in explaining the level of output was Say's law: 'supply creates its own demand.' Keynes (1936) strongly refuted this proposition and maintained that output and employment levels are determined rather by the level of aggregate demand in the economy. Michal Kalecki, who developed a demand-driven theory of output determination in Polish before Keynes, incorporated income distribution and demand theory in his 1942 article maintaining that, while income distribution is exogenously determined, aggregate demand is affected by income distribution and output adjusts to the change in aggregate demand (Palley, 2005).

Nickolas Kaldor, drawing upon Kalecki (1942) and Joan Robinson (1956), proposed that income distribution is determined by output (Kaldor, 1955). Starting from equality of savings to investment, and assuming that workers do not save out of their

wages and that capitalists' propensity to save is given and positive,[(i)]

$$\frac{P}{Y} = \frac{1}{Sp} \quad \frac{I}{Y} \tag{2.1}$$

where Y is output at full employment, P is profit, I is investment, and Sp is propensity to save out of profit.

This equation implies the profit share of income is determined by the investment share of full employment output. The equation is satisfied only in a full employment situation, however, a condition Keynes showed not normally to be the outcome of the dynamics of the capitalist system. Furthermore, the equation is based on equality between savings and an autonomous function of investment, which ignores the effect of investment on capacity of production Pérez and Vernengo (2013).

Influenced by his engagement in policymaking and practical economic problems (Palumbo, 2009), in his later works (1970, 1988) Kaldor emphasized the role of demand in driving investment. Whereas Keynes maintained the importance of effective demand in the short run, Kaldor expanded the role of demand in determining output in the long run also. In 1988 he stated:

> Since under the stimulus of growing demand capacity of all sectors will be expanded through additional investment, there are no long-run limits to growth on account of supply constraints; such constraints, whether due to capacity shortage or to local labor shortage, are essentially short-run phenomena—at any one time, they are a heritage of the past. (Kaldor, 1988, p. 157)

Kaldor (1970, 1988) incorporated the super-multiplier concept of Hicks (1950) in explaining the effect of effective demand on output. The super-multiplier concept

combines two processes. The first is the Keynesian multiplier, by which an increase in autonomous spending leads to an increase of output and, through a chain reaction, higher output induces higher spending, which leads to further output growth. The other process of the super-multiplier relation is the accelerator principle, according to which investment is mainly derived demand; where an increase of output and capacity utilization leads capitalists to invest to enhance production capacity thus maintaining excess capacity to keep up with unforeseen demand. Although Kaldor talked about the foreign trade multiplier in which export is the only autonomous demand, Heinrich Bortis (1997) in his formulation of the super-multiplier considers both exports and government spending as the components of autonomous demand.

Following Bhaduri and Marglin (1990), three types of models have been used in determining the demand regime for different sets of countries:

1. Goodwin model: Based on Richard Goodwin's (1967) growth model, which adopts a common Marxist position of a positive relationship between profit and investment, Barbosa and Tylor (2006) framed the question in a predator–prey model and employed a VAR model to determine the type of demand system between 1948 and 2002. They found that it was profit-led. Rada and Kiefer and (2015) studied the distributional dynamics of economic activity for a panel of OECD countries in the last four decades and found that the demand regime for the group was weakly profit-led.
2. Neo-Kaleckian models: In these models, Stockhammer and Onaran (2013) adopt Kalecki's position on the possibly expansionist role of an increase in wage share and a wage-led system, although they also recognize the possibility of a profit-led

system when investment is highly sensitive to profits. Naastepad and Storm (2007) studied the demand regimes in eight OECD countries between 1960 and 2000. Whereas in France, Germany, the Netherlands, Italy, Spain, and the United Kingdom demand regimes were wage-led, they found the demand regimes in the US and Japan to be profit-led.

3. Kaldorian model: Unlike the Neo-Kaleckian models whose investment function is partially autonomous, Pérez and Vernengo (2013) argued for a model that is based on the later work of Kaldor (1970) in which investment is a derived demand; what drives a higher rate of investment is mainly the need to enhance production capacity to keep up with an increase in demand as reflected in an increased capacity utilization. The effect of output on investment is captured by the accelerator part of Hicks's (1950) super- multiplier relation. Independently of Kaldor's contributions, Freitas and Serrano (2015), developed a model of Sraffian Supermultiplier in which growth is led by autonomous spending, investment is induced expenditure, and income distribution is exogenous.

The models are thus distinguished by both the investment function and the possible type of demand regime.[ii]

The demand regime in both the Neo-Kaleckian and Kaldorian models could be wage-led. Where they differ is in the investment function; the Neo-Kaleckian investment function is partially autonomous and responds positively to profits. The Kaldorian investment function is derived demand and gives a prominent role to the accelerator effect of output growth. As output grows and production capacity is highly utilized, investors increase their spending to keep up with higher demand.

Another difference between the Neo-Kaleckian models and the Kaldorian models is the case of repressed wage share, where declining wages cannot finance an increase in demand. Neo-Kaleckian models recognize positive effects of profits on investment and propose the possibility of a profit-led system. In Kaldorian models, in contrast, the profit-led system is not a possibility, as investment is mainly derived demand and an increase of demand in times of repressed wages could be financed only through an increase in debt. Another difference between these two models is that Neo-Kaleckian models predict a 'crisis of accumulation' in wage-led regimes in the long run, as investment responds negatively to a decline in profits (Bhaduri and Marglin, 1990), which means that demand adjusts to supply and not the opposite. Kaldorian models do not foresee this possibility as investment is derived demand and both output and capacity adjust to autonomous demand through the super-multiplier mechanism.

Private debt finances spending in a closed economy through consumer debt and investment debt. Consumer debt finances private consumption. Individuals could resort to debt to maintain higher living conditions in the Veblenian sense (Veblen, 1912), (Cynamon and Fazzari, 2008). Furthermore, higher consumer debt also leads to increase in debt-income ratio which tends to constrain consumer spending (Pressman and Scott, 2009). Private business debt interaction with private investment could be characterized in a Miskyian cyclical pattern (Palley, 1994). Capital accumulation expands firms need for external finance, and as companies' financial position deteriorates as their debt/income ratio rise, the economy falls into a debt-burden regime (Nishi, 2012).

In conclusion, since the Kaldorian model eliminates the possibility of profit-led demand, in our model the increase of demand for goods and services in a private closed

economy can only be actualized through the channels of higher wage share, and private debt. Hence we can recognize either wage-led or debt-led demand regimes.

Historical Trends (1900–1929)

In the period from 1900 to 1929 the US economy completed the full transformation into an industrial economy, with the deployment of the mass assembly line as the mode of production. By 1929, only 20% of the labor force was engaged in agriculture, compared with 40% at the beginning of the twentieth century. The period was characterized by intense class warfare that increasingly emboldened the position of labor against capital in the first two decades. By 1921, however, employers, with significant help from the judicial system, succeeded in containing and undermining the labor movement (Dulles and Dubofsky, 2010). This brought an increase in income inequality, indicated by the increase in the share of income of the top 1% and the top 10% of income earners, who captured 23.9% and 49.3% of total income, respectively, in 1928 (Piketty, 2014). Also in an analogy with the trends of income distribution post-1980, there was rising wage inequality within the class of wage earners; the top 10% of wage earners obtained 29.2% of the total wage bill in 1929.[iii]

Furthermore, in manufacturing, which was the leading economic sector, the ratio of wages of white-collar workers to those of blue-collar workers was rising (Figure 1). [insert Figure 1 near here] Whereas the share of white-collar workers in value-added manufacturing output was steady at around 11% between 1919 and 1929, the wage share of blue-collar workers declined from 40 to 35% in the same period (Goldin and Katz, 1999).[iv] Another important development was the rise of wage workers in relation to self-

employed workers, accompanying the decline in the farming sector and the achievement of full-scale industrialization.

Output growth throughout the period increased annually by an average of 3.5% (Figure 2-table 1)[insert figure 2-table 1 near here], but was also characterized by severe fluctuations. Meanwhile, the whole period was characterized by high nonfarm unemployment, averaging 7.7% (Figure 3) [insert figure 3 near here].

The period from 1900 to 1929 witnessed rise in the importance of durable goods as consumption items. Many household items such as cars, radios, washing machines and refrigerators were introduced in this period. Accompanying this trend was the rise of consumer credit arrangements and agencies such as installment finance companies, credit unions, and even commercial banks, which were willing to provide credit for consumption purposes (Nugent, 1939) (Figure 4)[insert figure 4 near here].

Corporate debt increased steadily throughout this period, from 110% of investment spending at the beginning of the period up to a six fold increase in investment spending in 1928 (Figure 5)[insert figure 5 near here]. Farm mortgage debt also rose noticeably; mortgage debt as a percentage of the value of land and buildings rose from 27% in 1910 to 40% in 1930 (Olmstead and Rhode, 2006) (Figure 6)[insert figure 6 near here]. Nonfarm mortgage debt was gradually increasing up to 1914, but starting in 1918 it increased significantly (Figure 7)[insert figure 7 near here].

The overall private debt to output ratio increased from 1900 to World War I and resumed its accelerating tendency after the war and through the Roaring Twenties (Figure 8)[insert figure 8 near here].

The Empirical Model

The aim of this paper is to define the demand regime that best describes the dynamics of income distribution and aggregate demand in the US during the pre-1929 period. As government spending and international trade were not significant relative to the size of private consumption and investment in this period, the model of a private closed economy is not a significantly distorting abstraction from the actual economy.[v]

The Keynesian private domestic equilibrium equation is:

$$Y = X = C + I \tag{2.1}$$

where Y is private output, X is aggregate demand, C is private consumption, and I is private investment.

Private Consumption

In a Keynesian framework, consumption is function of income. Although consumption takes place out of both profits and wages, consistent empirical tests that show significantly higher marginal propensity to consume out of wages relative to profits do justify such an abstraction, Stockhammer, Onaran and Ederer (2009). Furthermore, Cynamon and Fazzari (2008) showed social and cultural norms interacting with a change in household finance could give a rise to debt-financed consumption spending. So consumption is a function of the exogenous variables of autonomous consumption, income, wage share, and debt. The private consumption equation is:

$$C = \alpha + \beta Y + \tau W + \upsilon N \tag{2.2}$$

where Y is output, W is wage share and N is consumer debt; α is autonomous consumption, and β , τ, and υ are consumption spending coefficients for the independent variables.

Private Investment

In the Kaldorian model the main variables that are assumed to determine investment spending are capacity utilization, wage share, and debt.

$$I = \mu U + \varpi W + \varepsilon Z \tag{2.3}$$

where U is capacity utilization ratio, W is wage share and Z is investment debt; μ, ϖ, and ε are coefficients of the independent variables.

Capacity utilization is the ratio of current output to potential output. It captures the accelerator effect, which is the effect of output on investment. Assuming a fixed ratio of capital to potential output in the long run, current output to fixed capital ratio could stand for current capacity utilization. Wage share captures the income distribution effect. Furthermore, wage share rather than profit share was chosen as the distributive variable in the investment equation because in a Kaldorian model there is no place for a profit-led

system; investment is derived demand. The debt variable included in the investment equation is investment debt, which equals the total of business debt and mortgage debt; it captures the effect of debt on investment. The driver of accumulating household debt to finance residential investment is the same motives of households to spend accumulate debt maintained in Cynamon and Fazzari (2008), and Pressman and Scott (2009). The debt-business investment nexus is based on the Minskyian concept of a cycle with tranquil and turbulent phases. In the tranquil phase investors' appetite for investment and borrowing is accommodated by the financial sector, leading to growth in investment spending accompanied with accumulation of business debt. This opens the door for financial fragility with the rising debt-income ratio and firms' worsening balance sheet position, ending in a bust of the boom of debt financed investment spending (Palley, 1994).

Consolidating Equations 2.2 and 2.3, the model states that aggregate demand is a function of the exogenous variables of autonomous consumption, income distribution, and debt. Where wage share is the crucial distributional variable:

$$X = f(A, W, D) \tag{2.4}$$

where X is aggregate demand, A is autonomous consumption, W is wage share, and D is private debt level.

According to the dynamics of aggregate demand, wage share, and private debt, in the case of positive debt elasticity of aggregate demand, $E_D > 0$, we can recognize four

cases (Figure 2.9):

If the wage elasticity of aggregate demand is positive, $E_W > 0$, then:

(1) When $|E_W| > |E_D|$ have wage-led demand.

(2) When $|E_W| < |E_D|$ we have debt-led demand.

If wage elasticity of aggregate demand is negative, $E_W < 0$, then:

(3) When $|E_W| > |E_D|$ we have a capital-strike position.

(4) When $|E_W| < |E_D|$ we have debt-led demand.

In the case of negative debt elasticity of aggregate demand, $E_D < 0$, we can recognize four cases:

If the wage elasticity of aggregate demand is positive, $E_W > 0$, then:

(5) When $|E_W| > |E_D|$ we have a wage-led demand.

(6) When $|E_W| < |E_D|$ we have debt-burdened demand (Nishi, 2012).

If the wage elasticity of aggregate demand is negative, $E_W < 0$, then:

(7) When $|E_W| > |E_D|$ we have a capital-strike position.

(8) When $|E_W| < |E_D|$ is theoretically impossible.

Capital-strike position as used by Przeworski and Wallerstein, (1988) is equivalent to the 'revenge of the rentier' proposition. In Kalecki's thesis on the social and political implications of permanent full employment (Kalecki, 1943), an increase of the wage share accompanied by a decline in aggregate demand could take place if preceded by higher output growth and employment that caused increased bargaining power of the labor class. This would lead to higher inflation if the pace of the growth of wages was outstripping that of productivity, or would result in the increased ability of labor to control production. The response of the capitalist class would be – a capital strike- cutting production which drive the economy into recession.

To determine the demand regime in a private closed economy, I next examine whether the growth of wage share or debt level was the biggest driver of the growth of aggregate demand.

Estimation of Elasticity

The testing strategy is to construct a single equation for each of the components of aggregate demand in a private closed economy; and estimate the wage share and debt elasticity of consumption and investment equations. I use a single equation error correction model (Banerjee, Dolado, and Mestre, 1998) which estimates the relationships of time series variables that are integrated to the first order.[(vi)] This method has two advantages; it deals with autocorrelation in time series data, and it enables testing for both short-run and long-run relationships between the variables. The long-run elasticities of the independent variables are calculated by dividing the coefficients by the negation of

the adjustment coefficient, where both coefficients have to be significant (Onaran and Galanis, 2013). Since the method is only applicable to cointegrated data series I use the Augmented Dickey–Fuller test to test for stationarity of the series. All the variables will be transformed into a logarithmic form, and the series stationarity will be tested in log-level form and first-differenced log-level form to check the order of integration. Given the size of the sample, I implement the test with a model of one lag.

The error correction method works with variables that are stationary in the first order. As we can see from Table 2[insert table 2 near here], all the variables are non-stationary at log-level and stationary when first-differenced, indicating that the tested time series are integrated of order (1).

From equation (2):

$$\Delta C = C0 + \Delta Y + \Delta W + \Delta N + lC + lW + lN \tag{2.5}$$

where l stands for one time lag and Δ stands for difference.

I ran the regression of the consumption spending equation using Newey–West standard errors to overcome heteroskedasticity and autocorrelation problems. Consumption spending, income level, and consumer credit are annual data and in both real terms and logarithmic form.[(vii)] I found the cointegration relationship and the coefficients of the independent variables to be significant. Table 3[insert table 3 near here] includes the statistical results for the significant variables in the consumption equation.

The significant long-run coefficients show that an increase of 1% in wage share would be associated with an increase in consumption spending of 0.35%, which implies wage-led consumption spending. An increase of consumer debt by 1% would be associated with an increase in consumption spending of 0.20%. As will be discussed later in the paper, the importance of consumer debt increased throughout the whole period and significantly during the Roaring Twenties.

The tested investment equation includes capacity utilization, wage share, and investment debt as independent variables.

$$\Delta I = I0 + \Delta U + \Delta W + \Delta Z + lI + l\,U + lW + lZ \tag{2.6}$$

where l stands for 1 time lag and Δ stands for difference.

I ran the regression of the investment equation using Newey–West standard errors to overcome heteroskedasticity and autocorrelation problems. All variables are annual data series and are in both real terms and logarithmic form. Investment spending shows a strong response to capacity utilization as a 1% increase in capacity utilization is associated with a 2.67% increase in investment, implying a Kaldorian investment function. A wage share increase of 1% is associated with an increased in investment spending of 1.5%, showing that in distributive terms there was wage-led investment. Investment debt was not statistically significant in main model.

Using Kendrick's (1961) national account data throughout the period,

consumption was on average 84% of total private output excluding trade, whereas investment was about 16% of total private output. Multiplying the wage share coefficients for consumption and investment by their respective weight in private spending, we find that a 1% increase in wage share is associated with an increase of 0.48% in private output,[(viii)] while a 1% increase in private debt is associated with a 0.17% increase in private output.[(ix)] These results led me to conclude that the demand regime was wage-led, with private debt playing an important role in driving private aggregate demand. I show in the next section that the rise of the importance of debt in driving demand in the Roaring Twenties was partially responsible for the instability of the system. As spending financed by debt outpaces the spending of earned income, the economy becomes more vulnerable and prone to crisis (Charpe, Flaschel, and Proaño, 2012).

Furthermore, the investment equation test indicates a strongly demand-driven investment function which, given the wage-led demand regime, suggests that a Kaldorian model performs well in describing income distribution and demand dynamics in this period.

The Roaring Twenties

It might be puzzling that we observed a wage-led demand regime for the early decades of the twentieth century, whereas the Roaring Twenties (1922–1929) was characterized by both rising income inequality and decent economic growth—averaging 4.8%. First of all, the increase in income inequality manifested itself not only in the bigger share top income earners were taking, but also in the increased inequality among

wage earners themselves. Furthermore, as Palley (2017) pointed out focusing on functional income distribution, ignores the effect of the distribution of wages. Even if the wage share did not decline after 1921, blue-collar workers were significantly disadvantaged in their wage share compared with white-collar workers, as shown in Section 3 above. The wage inequality reinforced the absorption of income by the top income brackets.

Secondly, the drop in demand that could have been caused by the increase in income inequality was compensated for by two channels that sustained high levels of demand. The first was an increase in mortgage debt that financed a real estate boom, which drove the economy out of the 1920–1921 recession and then burst in 1926. The real estate boom was financed by a significant increase in residential mortgage debt, which doubled in value during the boom (Table 5)[insert table 5 near here] whereas demand in this period was driven by investment spending, which was predominantly investment in residential construction.[(x)] White (2009), using a price index of newly built houses, maintained that the real estate bubble of the 1920s was a nationwide phenomenon and could be considered greater in magnitude than that of the 2000s. When using the Case–Shiller price index of both old and new houses, the 1920s real estate boom is comparable to the 1980s boom. The second channel by which a drop in demand was averted was the increase in consumer debt, which financed a consumption boom (1926–1929). Consumer debt increased in importance to finance consumption and reached its highest level of 12% of personal income in 1929. The increase in consumer debt fed into a consumption boom, which resulted in demand in 1926–1929 being driven mainly by strong consumption spending. In contrast, real investment was sluggish, registering a

growth of only 2.18% for the last four years of the Roaring Twenties (Table 2.6).

Martha Olney (1989, 1991), who extensively studied consumption and consumer credit in the 1920s, demonstrated the role of consumer credit in bringing about the collapse of consumption in 1930 (Olney, 1999). It was the fear of indebted households of defaulting on their debts that forced them to cut consumption spending. In 1930, as down payments were a significant part of household income (from autos to appliances, down payments ranged between 5% and 48% of household disposable income) this development accompanied an increase in layoffs and cuts in weekly hours in the early months of that year.

To avoid defaulting on their debts, the only option for indebted families with installment credit—estimated by Olney (1999) to be 25% of all families—was to cut their consumption to meet payments and avoid serious wealth loss, since in 1930 default had the legal consequences of repossession of assets by the sellers. Olney estimates the cut of consumption required to meet the payments at around 3%, and cites Temin's (1976) estimate of the autonomous drop of consumption at 3.8% in 1930, which implies that more than three-quarters of the decline in autonomous consumption was caused by fear of default on consumer debt.[(xi)]

We can thus see how increasing income inequality combined with higher debt level were the main destabilizing developments in the Roaring Twenties era which ended by the Great Depression. [insert table 6near here]

Conclusion

This paper highlights the importance of incorporating income distribution and

debt in analyzing the dynamics of demand and growth. To analyze the relationships between income distribution, debt and demand, it draws on the classical theory of exogenous income distribution and Kaldor (1970,1988) view of investment as induced expenditures, in addition to the contributions of Cynamon and Fazzari (2008), and Pressman and Scott (2009) and Minsky (Palley,1994), (Nishi,012) to conceptualize the links between private debt and spending.

Kaldor's late views offer a consistent long-run demand theory of growth in which investment is a derived demand. Furthermore, in contrast to the Neo-Kaleckian and Goodwin demand regime models, the Kaldorian model presented in the paper recognizes two possible demand regimes in a closed economy; wage-led and debt-led. I investigated the demand regime in the early twentieth century and estimated both wage share and debt elasticities of aggregate demand. The results show that the demand regime was wage-led, with an important role played by private debt. Furthermore, the decline in demand that resulted from the increase in income inequality in the Roaring Twenties was compensated for by a real estate boom in the first half of that era (1922–1925) that was financed by mortgage debt. Later the economy witnessed an increase in the importance of consumer debt, which sustained demand in the second half of the Roaring Twenties (1926–1929). Consumer debt was a significant factor in the decline of consumption in 1930.

Given all the unstable tendencies of the capitalist system, past and recent experience indicates that the path to relatively stable and prosperous growth is only possible by adopting an equitable wage-led growth policy. The challenges to this policy are political rather than economic.

APPENDIX: DATA DESCRIPTION

National Accounts Data

Output is represented in Gross National Product data from Romer (1986). Consumption data is from Lebergott (1996), and investment data is from Kendrick (1961). Fixed investment data is from the U.S. Bureau of the Census (1966). Capacity utilization is expressed as a 1929-based index of the ratio of real private output to real capital stock as calculated by the Kendrick (1961) index and reported in Wright (2006).

Labor Force and Factor Shares Data

Labor force and unemployment data is from Weir (1992). In Weir's data, self-employment is added to salaried and establishment wage employment. All annual data on waged and self-employed workers is from Lebergott (1964). Data on manufacturing employees is from Lebergott (1964).

Following Gollin's (2002) treatment of self-employment earnings, the self-employed are counted as wage-earners, and the wage share is calculated as:

$$W = \frac{nominal\ average\ wage * employees}{Nominal\ output}$$

Operating surplus stands for profit share. It equals residual income after subtracting wage share. Earnings of manufacturing workers by skill are from Margo (2006).

Debt Data

Consumer debt data from 1916 to 1929 is from the Bureau of Economic Analysis estimates in James and Sylla (2006). Data for the years 1909 to 1915 is from Nugent's (1939) estimates. For the years 1900 to 1908, consumer credit data is extrapolated from bank loans data.

Investment debt data includes both business debt and mortgage debt. Corporate debt is a proxy for both corporate and incorporate business debt. The corporate debt series from 1916 to 1929 is from the Bureau of Economic Analysis estimates in James and Syla (2006). For the years 1900 to 1915, I extrapolated corporate debt data from outstanding private bonds and private bank loans, a procedure similar to that followed by the BEA in estimating pre-1929 corporate debt. For the same period (1900–1916) for mortgage debt, I extrapolated mortgage debt data on private bank real estate loans as both were strongly correlated for the period 1917–1929.

Farm mortgage data is from Olmstead and Rhode (2006) and nonfarm household mortgage debt is from James and Syla (2006). Private debt data from 1916 to 1929 is from the Bureau of Economic Analysis estimates in James and Syla (2006). For the years 1900–1915 I extrapolated private debt data from outstanding private bank loans. Private bank loans data is from the Board of Governors of the Federal Reserve System report (1955).

Deflator Data

The deflator used for consumption spending, investment spending, consumer debt, and investment debt is Romer's (1986) GNP deflator, taking 1929 as the base year.

The deflator used to deflate fixed investment and residential construction is from the U.S. Bureau of the Census (1966) fixed investment deflator series.

Miscellaneous Data

The value of the new construction of private residential buildings is from Snowden (2006). Manufacturing output data is from Atack and Bateman (2006) deflated using Romer's (1986) GNP deflator.

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Endnotes

[i]Luigi Pasinetti (1962) reached the equation without assuming workers' propensity to save as zero, and reformulated it into what is known as the Cambridge equation.

[ii]For a recent review of the distinction between Kaleckian and Goodwin models, see Stockhammer and Stehrer (2011). For the Kaldorian models, see Setterfield (2010) and Pérez and Vernengo (2013). For a comprehensive review, see Blecker (2016).

[iii] The wage share of the top 10% of wage earners declined after World War II, not recovering the 1929 level until 1984 (Piketty, 2014, pp. 298–300).

[v] 'The value added of an establishment was calculated by subtracting the cost of materials, supplies, containers, fuels, purchased electric energy, and contract work

from the value of shipments for products manufactured plus miscellaneous receipts for services rendered' (Atack and Bateman, 2006).

[vi] Exports of goods and services share of GDP were 5% on average through the whole period, while net exports on average were below 5%.

[vii] To test for the significance of the cointegration relationship between the variables, I use the t-distribution critical values reported in Banerjee et al. (1998) for the speed of adjustment term.

[viii] It is realistic not to include wealth, as wealth concentration was very high during this period. Saez and Zucman (2014) calculated the bottom 90% share of wealth to be around 20% in the period between 1917 and 1930.

[ix] The short-term—within a year—propensity to consume based on wage share was quite significant; a 0.55% increase of consumption was associated with a 1% increase in wage share.

[x] The change in private output from a 1% increase in wage share is calculated as: (0.35*0.84) + (1.5*0.16) = 0.53%.

[xi] The change in private output from an increase of 1% in private debt is calculated as: (0.20*0.84) = 0.17%.

[xii] The share of fixed investment in residential structures as an annual average was 35% from 1915 to 1929. During the boom (1922–1926) it reached an unprecedented 50% or greater (Table 6).

[xiii] Romer (1993), using Kendrick's (1961) national account data, estimates the contribution of consumption in the decline of output in 1930 at 46%. The decline of consumption itself was 5.4%.