

# Wage-led versus profit-led demand regimes:

## The long and the short of it

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### Abstract

Empirical studies have found mixed results regarding whether various countries have wage-led or profit-led demand regimes based on a variety of econometric methodologies. However, most of the previous literature has paid too little attention to the time dimension of this distinction. This paper argues that demand is more likely to be profit led (or, at least, more weakly wage led) in the short run and more likely to be wage led (or more strongly wage led) in the long run, because the positive effects of higher profits (lower labor costs) on investment and net exports are likely to be strongest in the short run, while the positive effects of a higher wage share on consumption are if anything likely to be stronger in the long run. In fact, most of the studies that have found profit-led results (especially for the US) have used methodologies that (either intentionally or unintentionally) emphasize short-run cyclical relationships. An examination of correlations in the raw data for the US economy over different time horizons illustrates the plausibility of output and growth being profit led in the short run and wage led in the long run.

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## 1 INTRODUCTION

By now, the basic logic of the relationship between income distribution and aggregate demand in post-Keynesian<sup>1</sup> macro models is well understood. On the one hand, a redistribution of income toward wages boosts consumption demand because of the higher marginal propensity to consume out of wages compared with profits, an effect that is magnified in a country with a progressive income tax system. On the other hand, higher labor costs may, under certain conditions, diminish the competitiveness of national products, thereby reducing net exports, and can also lessen the profits that are one of the main incentives (or sources of finance) for private investment. Hence, demand (usually measured by the rate of capacity utilization) is wage-led if the positive effect of a higher wage share on consumption dominates the potentially negative effects on investment and net exports, and it is profit-led in the opposite case (Blecker 2002; Hein 2008, 2014; Lavoie and Stockhammer 2013). Even if demand is wage-led, economic growth (measured by the rate of capital accumulation) can be either wage-led or profit-led, depending on whether the positive effect of a higher wage share on capacity utilization is strong enough to outweigh the direct negative impact of lower profitability on investment.<sup>2</sup>

Since the possibility that demand-led regimes could be either wage-led or profit-led was first opened up by Blecker (1989), Bhaduri and Marglin (1990), and Marglin and Bhaduri (1990), an entire generation of empirical research has attempted to determine whether various countries have wage-led or profit-led economies.<sup>3</sup> Unfortunately, however, this now vast empirical literature has yet to reach a consensus for many countries, including some of the largest and most important ones such as the US, Japan, and various EU members. Many studies have found that most countries are wage-led domestically and that the larger economies (including the US and the EU as a whole) are wage led overall, while some smaller or more open economies (including some individual EU members) are profit led once foreign trade is taken into account (e.g., Onaran and Galanis 2012). Nevertheless, other studies using a variety of different methodologies have continued to find that the US is profit led (Fernandez 2005; Barbosa-Filho and Taylor 2006; Storm and Naastepad 2012), and one paper finds that a panel of 13 OECD countries (including the US and eight EU members) has profit-led demand (Kiefer and Rada 2014).

Of course, it is not unusual for empirical studies in economics to find conflicting results. Nevertheless, it is disconcerting that researchers are not finding more robust results about an issue as important as the links between distribution, demand, and growth, especially in an era when rising inequality is increasingly seen as linked to stagnant growth in many leading nations. While researchers continue to come up with new results using their own preferred methodologies

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<sup>1</sup> What are referred to here as “post-Keynesian” macro models (following, for example, Dutt 2012 and Hein 2104) are sometimes also called “neo-Kaleckian” (e.g. by Blecker 2002, 2011 and Palley 2013a, 2013b) or “structuralist” (Taylor 1983, 2004). On the Shakespearean assumption that “a rose by any other name would smell as sweet” (*Romeo & Juliet*, II.ii), we do not worry about such semantic distinctions and instead proceed to the analysis.

<sup>2</sup> If demand (utilization) is profit-led, then growth (accumulation) is also profit-led. In an intermediate case, aggregate demand or capacity utilization can be weakly demand led while growth is profit led, a case referred to as “conflictual stagnationist” by Bhaduri and Marglin (1990) and Marglin and Bhaduri (1990) and simply “conflictive” by Palley (2013a).

<sup>3</sup> For surveys of the empirical studies see Blecker (2011), Onaran et al. (2011), Onaran and Galanis (2012), Lavoie and Stockhammer (2013), and section 2.2 below.

and data sets, remarkably little effort has gone into attempting to reconcile the different results obtained to date or thinking about why they differ as much as they do.

This paper will argue that the conflicting results for wage-led versus profit-led demand regimes can be explained to a significant extent by paying more attention to the time dimension of the analysis. Specifically, the relative magnitudes of the distributional effects on consumption, investment, and net exports are likely to vary depending on the length of the time horizon considered. Some distributional effects may be more important in the short run (over a few quarters or years, or the length of an ordinary business cycle), while others are likely to be more important in the long run (across, say, one or more decades). In particular, it will be argued here that the positive effects of higher profit shares (or lower labor costs) on investment and net exports are mainly short-run phenomena, while the sensitivity of workers' consumption to their wage income is, if anything, likely to be stronger in the long run. Although few studies to date have studied the long-term effects of distribution on demand, those econometric studies that have focused (either explicitly or implicitly) on identifying short-run, cyclical effects have been more prone to find profit-led outcomes.

There are a few exceptions in the literature that have explicitly distinguished short-run and long-run relationships between income distribution and aggregate demand.<sup>4</sup> Barbosa-Filho and Taylor (2006) and Kiefer and Rada (2014) are explicitly concerned with short-run cyclical dynamics; these authors do not attempt to analyze how distribution and demand are related in the long run. Pérez Caldentey and Vernengo (2013) find that the real wage has a greater “coherence” and “dynamic correlation” with output and investment in several countries using low frequency data compared with medium or high frequency data, but they do not test for the wage share (i.e., the real wage adjusted for productivity) and their methods cannot identify the direction of causation between the real wage and the other variables.<sup>5</sup> Stockhammer and Stehrer (2011) show how estimated effects of the wage share on consumption and investment are sensitive to lag lengths in separate time-series estimates for 12 OECD countries, but the authors use econometric methods that (as they admit) can only identify short-run relationships (up to eight quarterly lags, or two years, at the longest). One study that explicitly contrasts long-run and short-run effects of distribution is by Vargas Sánchez and Luna (2014), who use vector autoregression (VAR) and vector error correction (VEC) techniques to show that the profit share has a positive effect on output in the short run and a negative effect in the long run using time-series data for Mexico.

Two scholars of this topic have raised the following (very good) question about studies that find profit-led results:

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<sup>4</sup> One branch of the literature that has emphasized the time dimension is the long-running debate about whether capacity utilization should be treated as an endogenous variable in the long run as well as the short run (see, for example, Skott 1989; Lavoie 1996). Some of the data presented in section 4 below show that, empirically speaking, capacity utilization does vary in the long run, at least in the US economy, using a survey-based measure that reflects business firms' actual views of their output and capacity.

<sup>5</sup> This paper also provides a concordance analysis (related to the duration of cycles), which shows a high degree of synchronicity of movements in the real wage and real GDP (although again, the wage share is not considered and the direction of causality is not addressed). However, the paper's argument that neo-Kaleckian models generally “favor” profit-led results and only Kaldorian models imply wage-led results does not make sense in light of the literature survey provided in section 2 below.

despite the fact that in almost all OECD countries real wage growth was significantly restrained after 1980, allowing profitability to recover to its golden-age level, post-1980 macroeconomic performance is in general characterized by lower output growth, lower rates of investment, and higher rates of unemployment than witnessed during the period from 1960 to 1980.... The disappointing performance raises the question of why the redistribution of income from wages to profits in a supposedly profit-led demand regime has so far failed to bring about a more adequate long-run economic performance. (Storm and Naastepad 2012, p. 113)

There are several possible answers to this question, which are not mutually exclusive. The authors' preferred answer is that most OECD countries in fact have wage-led regimes, but their own results show that two major nations (Japan and the US) are profit-led. Also, even if income distribution is an important determinant of macroeconomic performance, it is surely not the only one, and it is necessary to control for other factors, such as financial booms and busts or fiscal and monetary policies, in order to analyze actual outcomes. In the present global situation, the prevalence of fiscal austerity, reliance on inflation-targeting monetary policies, and continued fallout from the recent financial crisis are undoubtedly restraining employment and growth in many countries below what they would be otherwise. It is also possible that the distribution-demand relationship is nonlinear (so that the direction of the effect of the former on the latter would depend on initial conditions), or that this relationship has undergone structural changes since the time periods for which the empirical estimates are based.

This paper will suggest another possibility, which is that the empirical evidence for profit-led demand regimes mainly relates to short-term behavior over the business cycle, and is not relevant to longer term comparisons. In other words, it will be suggested here that most countries (especially the US, which I know best) are more likely to be profit led (or only weakly wage led) in the short run but wage-led (or more strongly wage led) in the long run, although some countries could be exceptions. If this hypothesis is correct, then the evidence for demand and growth sometimes being profit led in the short run should not be dismissed, but it should not be assumed that these findings are relevant to the impact of longer-term shifts in income distribution on economic performance (as in comparisons of the post-1980 neoliberal era with the "golden age of capitalism" in the 1950s and 1960s).

Before turning to the analysis, a few important caveats are in order. First and foremost, this paper is a preliminary statement of the hypothesis about short-run vs. long-run effects of distribution on demand, and the arguments made here are undoubtedly subject to some qualifications that have not occurred to the author. Second, the data analysis here—which consists of fairly simple correlation analysis, with no sophisticated econometrics—is extremely preliminary; it is simply intended to be suggestive of the plausibility of this hypothesis. Third and finally, this hypothesis is very much driven by the author's familiarity with the US case, and the data analysis here is completely US-centric. It is certainly possible that household consumption, business investment, and foreign trade behave in different ways in other countries, implying that the long-run and short-run effects of income distribution would also differ from what are argued here to characterize the US case. The author's hope is that this analysis, however tentative, will inspire econometric research designed to distinguish long-run from short-run impacts of distribution in a wide array of countries, and the author also hopes to be able to present econometric estimates of his own in future versions of this research.

The rest of this paper is organized as follows. Section 2 surveys the relevant literatures, both theoretical and empirical. Section 3 provides the theoretical motivation for our hypothesis, while section 4 presents the suggestive empirical evidence. Section 5 concludes with a discussion of policy implications and directions for future research.

## 2 LITERATURE SURVEY

### 2.1 Theoretical perspectives

In the foundational work of Kalecki 1954 [1968]) and Steindl (1952 [1976]), changes in the relative shares of wages and profits were linked to the profit mark-ups (or price-cost margins) of firms and hence to the evolution of the industrial structure, which Steindl characterized as transitioning from a phase of competitive industries through a process of “absolute concentration” into a phase of “mature” or oligopolistic capitalism.<sup>6</sup> These theories implied that increased profit mark-ups or margins, which would lead to higher profit shares, would be contractionary, and hence an increased degree of oligopoly power would result in chronic economic stagnation unless offset by ‘external’ factors such as epochal innovations, public spending, or an export surplus. However, as emphasized by Vargas Sánchez and Luna (2014), Kalecki (1954 [1968]) also theorized that the total level (as opposed to the share) of profits has a positive effect on investment spending in the context of short-run business cycles. These ideas were later formalized by Harris (1974), Asimakopulous (1975), del Monte (1975), Steindl (1979), Rowthorn (1982), Dutt (1984, 1987), and Taylor (1983, 1985) into what became known as the “neo-Kaleckian” or “stagnationist” macro models, in which both demand (output or utilization) and growth (capital accumulation) were generally wage led.

The conclusion that demand-constrained economies are necessarily wage-led in regard to both output and growth was later challenged on two main grounds, having to do with international trade and the investment function.<sup>7</sup> In regard to trade, Blecker (1989, 1999) objected to the closed economy nature of the early stagnationist models, and argued that the outcomes could be reversed in an open economy. Blecker argued that the mark-up rate should be treated as endogenous in an open economy in which domestic producers have to compete with foreign rivals, and postulated that it would respond positively to the ratio of foreign prices (converted to domestic currency) to domestic nominal unit labor costs (ULC), so that increased ULC would “squeeze” the mark-up and lower the profit share. In such a model, either a nominal currency depreciation or a nominal wage cut (taking productivity as given) would make domestic goods more internationally competitive, and the resulting boost to net exports could possibly (although not necessarily) outweigh the decrease in domestic consumption brought about by a lower wage share.<sup>8</sup>

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<sup>6</sup> The latter phase has often been referred to as “monopoly capitalism” in some of the neo-Marxian literature (e.g., Baran and Sweezy 1966; Foster 2014).

<sup>7</sup> The early neo-Kaleckian models tended to assume no saving out of wages. However, a number of authors including Taylor (1990) and Mott and Slattery (1994a) pointed out that positive saving out of wages, albeit at a lower rate than saving out of profits, could result in profit-led demand or growth even for a closed economy using an investment function like equation (1) below.

<sup>8</sup> Note that the effect on investment is also ambiguous in Blecker’s model and depends on various parameters. In

In regard to investment, Bhaduri and Marglin (1990) and Marglin and Bhaduri (1990) objected to the type of investment function used in most of the neo-Kaleckian models of the late 1970s and 1980s, which in their view embodied the implicit assumption of a “strong accelerator condition.” By postulating what they considered a more general investment function that allowed for the alternative possibility of a strong profitability effect, Bhaduri and Marglin showed that profit-led regimes were possible even in demand-driven closed economies. To see the Marglin-Bhaduri argument, note that most of the early neo-Kaleckian macro models (e.g., Steindl 1979; Rowthorn 1982; Dutt 1984, 1987; Taylor 1983) assumed an investment function of the general form:

$$(1) \quad I/K = f(r, u),$$

where  $r$  is the profit rate (rate of return to capital),  $u$  is the capacity utilization rate (ratio of actual to potential output, sometimes proxied by the output-capital ratio),<sup>9</sup> and it is usually assumed that  $f_r, f_u > 0$ .

The emphasis on the profit rate  $r$  harks back to classical and Marxian theories of capital accumulation and Kalecki’s work on the role of profits and investment in business cycles. The idea that the accumulation rate depends on the profit rate was formalized in the desired accumulation function of Robinson (1962), who assumed that  $I/K = \phi(r)$  with  $\phi' > 0$  and  $\phi'' < 0$  (hence implying the famous “banana” shape). The idea that investment depends on utilization was introduced by Steindl (1952 [1976]). Steindl reasoned that because firms want to build capacity ahead of demand and also because oligopolies want to maintain a desired level of excess capacity as a deterrent to entry, as well as because of indivisibilities in capital equipment, a high (low) rate of utilization would serve as a signal to invest in more (less) new capital.

Marglin and Bhaduri’s critique begins by observing that the profit rate can be expressed as  $r = \pi u/v$ , where  $\pi$  is the profit share of income (output) and  $v$  is the capital-output ratio at full utilization of capacity (i.e., the ratio of capital to potential output). Therefore, (1) can be rewritten as  $I/K = f(\pi u/v, u)$ , which seems to show that utilization is double-counted. More specifically, Marglin and Bhaduri criticized the assumption that  $f_u > 0$ , where  $f_u = \partial(I/K)/\partial u$  holding  $r$  constant. In order for  $r$  to remain constant while  $u$  increases,  $\pi$  must fall by the same percentage that  $u$  rises; Marglin and Bhaduri argued that in such a situation firms would not necessarily desire to invest more. This critique led Marglin and Bhaduri to postulate what they claimed was the more general alternative investment function:

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regard to the magnitude of the trade effect, the impact of net exports in possibly making an economy profit-led (or more weakly wage-led) depends on several factors, including the degree to which changes in unit labor costs affect the relative prices of exports and imports, the price elasticities of export and import demand, the extent of imports of intermediate goods, and the degree of openness of the economy (see, for example, Stockhammer et al. 2011). Moreover, in an open economy setting, whether a country exhibits wage-led or profit-led behavior is likely to depend on the *source* of a distributional shift: profit-led outcomes are more likely (or wage-led effects are weaker) when rising unit labor costs squeeze profit mark-ups, while wage-led outcomes are more likely (or stronger) when firms’ target mark-ups change due to changes in the degree of oligopoly power of firms (Blecker 1989, 2011).

<sup>9</sup> Del Monte (1975) used the growth rate of output instead of the utilization rate, thus introducing a more correctly specified accelerator effect into a dynamic version of the model. Unfortunately, his paper was only published in Italian and did not have the influence it deserved on the later literature.

$$(2) \quad I/K = g(\pi, u)$$

in which they assumed that  $g_\pi, g_u > 0$ . Marglin and Bhaduri argued that it was more sensible to assume that  $g_u > 0$ , where  $g_u = \partial(I/K)/\partial u$  holding  $\pi$  constant (instead of  $r$ ). They also motivated this specification by arguing that investment really depends on the expected profit rate  $r^e$ , and that  $\pi$  and  $u$  are the two key variables that influence firms' expectations of future profits.<sup>10</sup>

Theoretically, equation (2) offers the advantage that it allows for cases in which either “accelerator” (utilization) or “profitability” (profit share) effects can be stronger, and thus permits either wage-led or profit-led demand and growth (even in simplified models with no saving out of wages and no foreign trade).<sup>11</sup> The apparent generality of Marglin and Bhaduri's analysis and their colorful terminology for describing wage-led and profit-led regimes as “stagnationist” and “exhilarationist,” respectively, led to the widespread adoption of the investment function (2) in the subsequent literature. Nevertheless, although equation (2) has very convenient mathematical properties for theoretical purposes, it is not a good specification for empirical estimation for reasons that will be discussed in section 3.1 below.

In addition to these contributions about foreign trade and the investment function, many other extensions and qualifications have been introduced into post-Keynesian macro models.<sup>12</sup> Most importantly for present purposes, it is important to recognize that income distribution is endogenous and may depend on the level or growth rate of economic activity among other variables. Thus, there is likely to be two-way causality between measures of demand and distribution (which is often framed in terms of aggregate demand and aggregate supply relationships).<sup>13</sup> Labor productivity is also likely to be endogenous, which creates feedbacks between output growth, unit labor costs, and wage shares that are often modelled along neo-Marxian and/or Kaldorian lines (see Rada 2007; von Arnim 2011; Storm and Naastepad 2012). Moreover, many theorists have argued for nonlinearities in these various relationships (e.g., Marglin and

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<sup>10</sup> Mathematically, substituting  $r^e = r^e(\pi, u)$  into  $I/K = h(r^e)$  implies (2).

<sup>11</sup> See Blecker (2002, 2011) and Hein (2008, 2014) for more detailed analyses of the conditions for these results.

<sup>12</sup> For example, Marglin and Bhaduri (1990) emphasized an additional distinction between “cooperative” and “conflictual” variants of either wage-led or profit-led regimes, which has largely been neglected in most of the subsequent literature. Also, several authors have pointed out that even if some individual countries are profit-led, the whole world economy may still be wage led if international competitive effects cancel out at the global level and the consumption benefits of higher wages tend to dominate in the world as a whole; this implies that a worldwide redistribution of income toward wages may be expansionary even in countries that are individually profit led (Onaran and Galanis 2012; Lavoie and Stockhammer 2013). In addition, the phenomenon of “financialization” has led to various modifications of post-Keynesian macro models aimed at incorporating, among other things, the distinction between firms' net profits and rentiers' income (interest and dividends), the role of business and household debt, and the impact of interest costs and debt service burdens (see, among many others, Stockhammer 2004; Hein 2008, 2012; Onaran et al. 2011; Isaac and Kim 2013). Fiscal and monetary policies can influence the relationship between income distribution and aggregate demand in various ways, for example through the progressivity (or regressivity) of taxes and expenditures and how the central bank responds to inflationary pressures (e.g., Mott and Slattery 1994b; Blecker 2002; Hein 2008; Hein and Stockhammer 2011; Palley 2013a).

<sup>13</sup> Some theoretical efforts to represent the determination of relative shares on the aggregate supply side (i.e., how income shares respond to utilization and employment rates) include the “producer's equilibrium” (PE) curve of Marglin and Bhaduri (1990), the “distributional curve” (DC) of Taylor (2004), and the analysis of labor bargaining dynamics in Sasaki et al. (2013), among many others.

Bhaduri 1990; Taylor 1990; Palley 2013b), which would imply that whether a country has wage-led or profit-led demand (or whether the wage share depends positively or negatively on output or employment) would depend on the initial levels of the variables. Although the rest of this paper will focus on the core question of how the demand-side impact of income distribution on output and growth is likely to vary across different time horizons, it is essential to recognize that these additional layers of complexity have important implications for how that impact is estimated and evaluated empirically.

## 2.2 Empirical methodologies and results

There are two main approaches to estimating the effects of income distribution on demand, which will be called the “*structural*” and “*aggregative*” approaches. To see this distinction, consider a fairly standard version of the demand side of a post-Keynesian macro model, taken (with some modifications) from Stockhammer et al. (2011):<sup>14</sup>

$$(3) \quad Y = AD = C(Y, \psi, Z_C) + I(Y, \psi, Z_I) + NX(Y, P, Z_X, Z_M) + G,$$

where  $Y$  is output,  $AD$  is aggregate demand,  $\psi$  is the wage share,  $C$  is consumption,  $I$  is investment,  $NX = X - M$  represents net exports ( $X$  and  $M$  are exports and imports, respectively),  $P = P(\psi, Z_P)$  is the domestic price level,<sup>15</sup> and  $Z_j$  is a vector of exogenous (control) variables affecting endogenous variable  $j$  ( $j = C, I, X, M, P$ ). It is generally assumed that  $C_Y > 0$ ,  $C_\psi > 0$ ,  $I_Y > 0$ ,  $I_\psi < 0$ ,  $NX_Y < 0$ ,  $P_\psi > 0$ , and  $NX_P < 0$ .<sup>16</sup> Then the total effect of a change in the wage share on output, holding all the exogenous terms  $Z_j$  constant, is given by

$$\frac{dY}{d\psi} = \frac{\frac{\partial AD}{\partial \psi}}{1 - \frac{\partial AD}{\partial Y}}.$$

Assuming  $\frac{\partial AD}{\partial Y} = \frac{\partial C}{\partial Y} + \frac{\partial I}{\partial Y} - \frac{\partial M}{\partial Y} < 1$  for Keynesian (goods market) stability, the sign of  $dY/d\psi$  depends only on the sign of the numerator,  $\partial AD/\partial \psi$ .

The **structural** approach estimates the individual components of  $AD$  using *separate econometric equations* for  $C$ ,  $I$ ,  $X$ ,  $M$ , and  $P$ , and then adds the effects together to determine the

<sup>14</sup> We omit the role of intermediate goods and the cyclical behavior of  $G$  from the model of Stockhammer et al. (2011) for the sake of simplicity. Sometimes the equations are specified as functions of the profit share  $\pi$ , but since this is easily transformed into the wage share  $\psi$  using the identity  $\psi \equiv 1 - \pi$ , it is sufficient to conduct our discussion in terms of the latter.

<sup>15</sup> In practice, researchers often use different price indexes for exported goods and import-competing goods, but we simplify here for expositional purposes.

<sup>16</sup> The last partial derivative,  $NX_P < 0$ , assumes that the Marshall-Lerner condition holds. See the discussion in section 3.2, below.



total effect of a distributional shift on  $AD$  as follows:<sup>17</sup>

$$(4) \quad \frac{\partial AD}{\partial \psi} = \frac{\partial C}{\partial \psi} + \frac{\partial I}{\partial \psi} + \left( \frac{\partial X}{\partial P} - \frac{\partial M}{\partial P} \right) \frac{\partial P}{\partial \psi}.$$

In this approach,  $\partial AD/\partial \psi$  is calculated by summing the various partial derivatives for consumption, investment, and net exports with respect to the wage share (including the effect of the wage share, usually measured by real ULC, on the domestic price level  $P$ ).<sup>18</sup> In contrast, the **aggregative** approach relies on estimation of the *reduced form solution* for output written as

$$(3') \quad Y = Y(\psi, Z_C, Z_I, Z_{NX}, Z_P),$$

and so calculates the derivative  $\partial Y/\partial \psi$  directly by regressing output  $Y$  on (various lags of) the wage share and any control variables that may be included (thus implicitly incorporating the multiplier effects—the significance of which will be discussed below).<sup>19</sup>

Each of these two approaches has its own strengths and weaknesses. In principle, the structural method can identify the sign and magnitude of the distributional effects on each component of  $AD$ , and thus allows for a distinction between domestic effects (measured by the sum  $\partial C/\partial \psi + \partial I/\partial \psi$ ) and the total effect including international trade per equation (4). However, there are many pitfalls in the estimation of such systems of equations. Estimates may be highly sensitive to the functional forms, data transformations, lag lengths, and control variables assumed for each equation.<sup>20</sup> The equations may be subject to simultaneity bias as many of the right-hand side variables (including  $\psi$ ) are likely to be endogenous and possibly correlated with the error terms; also the equations could be subject to common shocks possibly resulting in cross-equation residual correlation. For both reasons, systems methods or other methods that control for endogeneity (such as 3SLS or GMM) could be preferred, but as a practical matter have rarely been used and the equations have usually been estimated by OLS with  $\psi$  (or  $\pi$ ) treated as exogenous. In addition, there are many alternative ways of measuring the wage share, utilization rate, and price level, as well as many different choices for the inclusion (or exclusion) of control variables, leading to further potential biases due to possible measurement error or

<sup>17</sup> Note that this sum is written as a partial derivative because all the control variables  $Z_j$  are held constant.

<sup>18</sup> Depending on the precise specification used, it may be necessary to weight the estimated effects of the wage share on the various components of GDP ( $C$ ,  $I$ , and  $NX$ ) by their respective shares in total GDP. See, e.g., Stockhammer et al. (2011), who estimate the equations in log differences so that the coefficients are elasticities.

<sup>19</sup> If autoregressive distributed lag (ARDL) or VAR/VECM methods are used, then lags of the dependent variable ( $Y$ ) may also be included on the right-hand side of the regression equation.

<sup>20</sup> For example, Onaran and Galanis (2012) estimated their investment functions in first differences of natural logarithms, while Storm and Naastepad (2012) estimated theirs in log levels with investment normalized by GDP (as confirmed in email correspondence from Servaas Storm, 12 September, 2014). This slight difference in specification yields major differences in the results for some countries. For the US case, Storm and Naastepad find a significant coefficient of 0.48 on the lagged profit share, while Onaran and Galanis find a coefficient of only 0.077 which is statistically insignificant—and based on these different findings, the former conclude that the US economy is profit-led domestically as well as overall, while the latter conclude that it is wage-led in both respects. This is just one example of how sensitive the results can be to apparently small differences in specification.

omitted variables.<sup>21</sup> Finally, there are likely to be complicated lag structures and dynamics in such time-series relationships, but these are often neglected in the interest of obtaining parsimonious specifications or maintaining consistency across countries (in cross-country studies).<sup>22</sup>

These sorts of difficulties probably account for why authors using the structural approach have often found quite varying results for the same countries. In one of the earliest studies, Bowles and Boyer (1995) found that five major countries all had wage-led domestic demand, but three (France, West Germany, and Japan) were profit led overall (including net exports) while two (the UK and US) remained wage led even including net exports. Also among the early studies, Gordon (1995) found that the US economy was weakly profit led domestically and strongly profit led overall. Ederer and Stockhammer (2007) found that France was wage-led domestically and profit-led overall. Stockhammer et al. (2009) found that the Euro area as a whole (12 countries) was wage-led both domestically and overall. Hein and Vogel (2008) found that two smaller European countries (Austria and the Netherlands) were both profit led overall, and one of them (Netherlands) was even profit led domestically, while the four largest economies in their sample (France, Germany, UK, and US) were all wage-led both domestically and overall. Hein and Vogel's finding that Austria was profit-led was supported by Stockhammer and Ederer (2008). Stockhammer et al. (2011) found that Germany was wage-led overall, although only weakly so and to a diminishing degree over time. Onaran et al. (2011) are notable for their careful effort to control for financialization effects in the US economy, for example by distinguishing rentiers' and nonrentiers' (firms') profits. In the end, they concluded that the US economy remains weakly wage led for their entire sample period (1962-2007), although in some of their alternative estimates it is found to have been weakly profit led for certain subperiods.

Storm and Naastepad (2012) found that nine countries (Denmark, Finland, France, Germany, Italy, the Netherlands, Spain, Sweden, and the UK) had wage-led demand regimes both domestically and overall, while two (Japan and the US) were profit-led in both respects and Belgium was neither wage led nor profit led. In contrast, Onaran and Galanis (2012, 2013) studied 16 of the G20 countries (all the ones for which data were available) and found that all countries in their sample (including the US and Japan) had wage-led domestic demand. Including net exports, Onaran and Galanis found that several of the smaller or more open economies (Canada, Australia, Mexico, Argentina, India, South Africa, and—most strongly—China) had profit-led demand overall, while most of the larger or more closed economies (Germany, France, Italy, the UK, the US, Japan, and 12 core euro area countries as a group) had wage-led demand overall; two emerging market nations (Turkey and Korea) also had wage-led overall demand. These results are literally “all over the map,” with different studies often reaching opposite conclusions about the same countries (especially the US and Japan). There does seem to be an emerging consensus among the structural studies that the larger European nations and the euro area as a whole are mainly wage led, but even for these countries we will see below that other methods yield different results.

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<sup>21</sup> For example, Palley (1994) and Kim (2013) have shown the significance of debt variables for explaining movements in US output, while Kim et al. (2014b) have shown the significance of household debt for explaining US consumption, but most studies of distributional effects using either the structural or aggregative approach have not included debt variables.

<sup>22</sup> See Stockhammer and Stehrer (2011) on sensitivity to lag length.

Turning to the aggregative approach, in this method the output variable (often measured as the rate of capacity utilization) is regressed directly on the wage (or profit) share, usually with some lags, and possibly on various control variables as well. By its nature this approach cannot separate the effects of the wage share on domestic demand and net exports, and many of the same issues that afflict the structural model estimates (especially possible measurement error and choosing the “right” lag structure and control variables) also affect the aggregative estimates. Although estimates of equations like (3') can also be subject to simultaneity bias if  $\psi$  is endogenous, the aggregative approach makes it easier to address this problem, for example by using VAR or VEC methods or estimating a separate equation for  $\psi$  using systems methods.

Importantly, the aggregative approach may capture interaction effects that the estimation of individual structural equations could miss. For example, if a rise in profitability stimulates investment and this in turn boosts consumption via the multiplier, this will be captured by an aggregative model but might not be captured by separate estimates of consumption and investment functions (in which the effect on consumption would be picked up by the total income variable, not the distributional variable). Similarly, if a rise in the wage share boosts consumer demand and this in turn stimulates investment via accelerator effects, this would be incorporated in an aggregative model but might not be reflected in separate estimates of an investment function (where the impact would be picked up by the utilization or accelerator term, not by the distributional variable).<sup>23</sup>

One influential variant of an aggregative approach is a version of the famous Goodwin (1967) profit cycle model developed by Barbosa-Filho and Taylor (2006) and later adapted by Kiefer and Rada (2014). In theoretical terms, the model is described by two simultaneous differential equations in the utilization rate and wage share:

$$(5) \quad \begin{aligned} \dot{u} &= f(u, \psi) \\ \dot{\psi} &= g(u, \psi) \end{aligned}$$

The model (5) can have various mathematical solutions (stable or unstable, clockwise or counter-clockwise rotation, etc.) depending on the signs and magnitudes of the various partial derivatives, but those theoretical results need not detain us here.

For empirical purposes, Barbosa-Filho and Taylor (2006) used a linearized version of (5) written as a system of difference equations in discrete time with lags, which could be estimated as a standard VAR model,<sup>24</sup> and concluded that  $\partial u / \partial \psi < 0$  and  $\partial \psi / \partial u > 0$ , i.e., demand is profit-led and there is a “profit squeeze” on the distributive side, using quarterly data with two lags. This model has the advantage that it tests for the two-sided effects of  $u$  and  $\psi$  on each other, but it does not include any control variables and the results are sensitive to the lag length assumed.<sup>25</sup>

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<sup>23</sup> In principle, the structural models could address this by conducting dynamic simulations of a complete model instead of merely adding up the estimated coefficients from the separate equations.

<sup>24</sup> Barbosa-Filho and Taylor’s VAR model is linear in  $u$  but log linear in  $\psi$ . They measured output in levels and the wage share in natural logarithms to facilitate decompositions of each variable into its component parts (which are additive for GDP and multiplicative for the wage share).

<sup>25</sup> Stockhammer and Stehrer (2011) found that US domestic demand (consumption and investment) was wage-led using eight lags even though it was profit-led using fewer lags, but most of the lags were insignificant; they did not

Barbosa-Filho and Taylor measured  $u$  by deviations of real GDP from its Hodrik-Prescott filtered trend, which means that only short-run fluctuations are incorporated in  $u$  and longer-term variations in output or growth are not explained. Similarly,  $\psi$  was measured by deviations of the wage share from its mean in natural logarithms, thus assuming that it has no long-run variation (an assumption that no longer seems valid) and that all changes in distribution are short run. The short-term nature of these estimates can also be seen in the impulse responses, in which the positive effects of shocks to the profit share on output last only about 6-8 quarters, i.e., about two years or less.

More recently, Kiefer and Rada (2014) developed the following difference equation variant of (5) for application to panel data for 13 OECD countries:

$$(6) \quad \begin{aligned} u_{it} - u_{it-1} &= \beta_0(\psi_{it-1} - (\psi_{it}^* - \beta_1 u_{it}^*)) - \beta_1 u_{it-1} + \nu_{it} \\ \psi_{it} - \psi_{it-1} &= \alpha_0(\psi_{it-1} - (\psi_{it}^* - \alpha_1 u_{it}^*)) - \alpha_1 u_{it-1} + \varepsilon_{it} \end{aligned}$$

where  $t$  indexes time and  $i$  indexes country,  $\alpha$  and  $\beta$  are parameters,  $\nu$  and  $\varepsilon$  are error terms, and  $u^*$  and  $\psi^*$  are long-run equilibrium levels. This specification is even more explicitly a cycle model: it explains the *changes* in  $u$  and  $\psi$  by their *deviations* from their respective long-run equilibrium levels, which in turn may be specified in various ways (e.g., they may be treated as parameters to be estimated or set exogenously by imposing restrictions, and they may be assumed to be constant or to have long-run trends). By design, this methodology can only detect short-run, cyclical relationships; the method can be used to estimate shifts or trends in the long-run equilibrium values  $u^*$  and  $\psi^*$ , but it cannot identify the causes of those long-run changes or determine how the variables are related to each other in the long run. Kiefer and Rada's results show that their whole panel of 13 countries exhibits profit-led demand (utilization) and a profit squeeze (the wage share is positively affected by utilization). Interestingly, they find this result for a sample that consists heavily of euro area members, even though several of the structural models surveyed above find that many of these same countries and the euro area as a whole are wage led.<sup>26</sup>

Another type of aggregative model is the one developed by Fernandez (2005), who estimated an empirical version of the theoretical model in Blecker (2002). The model can be summarized in what Fernandez (following Margin and Bhaduri 1990) called the "IS curve" (goods market equilibrium) and "PE curve" (producers' equilibrium or aggregate supply), which can be written in implicit form as:

$$(7) \quad \begin{aligned} u &= u(\pi, z, g_0, i_0, m) && \text{[IS]} \\ \pi &= \pi(u, \phi, m, z) && \text{[PE]} \end{aligned}$$

where  $z$  is the ratio of import prices to domestic ULC (a measure of international competitiveness),  $g_0$  is the ratio of government spending to potential output,  $i_0$  is the constant term (shift factor or "animal spirits") in the investment function,  $m$  is a parameter representing Kalecki's

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analyze net exports or test for overall demand effects.

<sup>26</sup> Six of the 13 countries in Kiefer and Rada's sample are euro area members: Finland, France, Germany, Ireland, Italy, and Netherlands. The other countries in their study are Australia, Canada, Japan, South Korea, Sweden, UK, and US.

“degree of monopoly” or the target mark-up of firms, and  $\phi$  is the ratio of fixed costs to potential output (proxied by a measure of the depreciation rate of the capital stock).

In the empirical analysis, the variables  $i_0$  and  $m$  were omitted to a lack of available data, and (7) was estimated as a system of linear ARDL equations with the variables measured in log differences.<sup>27</sup> The equations were estimated using the “general-to-specific” (GTS) methodology of Hendry (1995) to select the variables and lags included in the final or “specific” model that satisfies certain criteria of statistical adequacy and congruence. Fernandez’s results uniformly showed that demand was profit led ( $\partial \hat{u} / \partial \hat{\pi} > 0$ ), while the profit share was independent of utilization<sup>28</sup> and was explained entirely by international competitiveness (the import-price to ULC ratio,  $z$ ), with  $\partial \hat{\pi} / \partial \hat{z} > 0$  (i.e., higher ULC relative to import prices squeeze the profit share). Although Fernandez (2005) did not specify an explicit cycle model as did Barbosa-Filho and Taylor (2006) or Kiefer and Rada (2014), the fact that he expressed all the variables in log differences (rates of change) suggests that his estimates are mostly picking up short-term, cyclical effects. In the end, Fernandez’s results are qualitatively similar to those of Barbosa-Filho and Taylor (2006) in regard to US demand (utilization) being profit led; his differing result for the profit share equation probably reflects his inclusion of a control variable (the ratio of import prices to ULC) that was omitted by those authors as well as his use of GTS methods.<sup>29</sup>

More recently, Vargas Sánchez and Luna (2014) have deliberately contrasted short-run and long-run effects of distribution on output using aggregate time-series data for Mexico.<sup>30</sup> Vargas Sánchez and Luna note that Kalecki included profits in his investment function as part of his business cycle model, but also theorized that a higher profit share would lower total output (capacity utilization) due to the negative effect on consumption, and they argue that the former effect is likely to dominate in the short run while the latter should dominate in the long run. The authors use the cointegrating equation from a VEC model to determine the long-run effect of the profit share (the “exploitation rate” in their terminology) on GDP, while they use the impulse responses from a VAR model to identify the short-run dynamics. The results show that the profit share has a negative impact on GDP growth in the short run, but a positive effect on GDP in the long run. The results also show that the flow of profits, measured by gross operating surplus, has a positive effect on gross capital formation (investment) in both the short and long run.<sup>31</sup> Thus,

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<sup>27</sup> The data were differenced because some of the series had unit roots in log levels, but the variables did not all have the same order of integration so that standard cointegration techniques would not be reliable. All variables were stationary in log differences. In light of the simultaneous nature of the equation system (7), both instrumental variables (IV) and OLS estimations were carried out, but Wu-Hausman tests showed that IV was only needed for the IS equation and none of the results were sensitive to the use of IV vs. OLS. In addition, a VAR was also run (with the variables again measured in log differences) as another sensitivity test and again the results were qualitatively similar.

<sup>28</sup> That is,  $\hat{u}$  was either eliminated in the simplified/final model for  $\hat{\pi}$  by the GTS algorithm, or it was statistically insignificant if included; in either case, the conclusion is that  $\partial \hat{\pi} / \partial \hat{u} = 0$ . A circumflex ( $\hat{\phantom{x}}$ ) here represents the rate of change in a variable.

<sup>29</sup> Neither Barbosa-Filho and Taylor (2006) nor Kiefer and Rada (2014) control for any other variables in estimating the relationships between  $u$  and  $\psi$ , leaving open the possibility of omitted variable bias (although, to be fair, many studies in this whole genre, including some of the structural estimates, also include few control variables).

<sup>30</sup> I became aware of this article after I had started writing this paper, when I received the Fall 2014 issue of the *Journal of Post Keynesian Economics* in the mail, but obviously it supports my argument here.

<sup>31</sup> The cointegrating equation for output (GDP) measures the “exploitation rate” as the profit share and controls for

the one study to date that (to this author's knowledge) has explicitly contrasted long-run and short-run effects using aggregative time-series methods has found output to be wage led in the long run but profit led in the short run, at least in one country (Mexico), although the short-run results may be spurious for econometric reasons.<sup>32</sup>

Overall, most of the studies using the aggregative approach, which have been mainly oriented (either intentionally or unintentionally) toward finding short-run, cyclical relationships, have found that demand is profit-led in the short run for both the US and other OECD countries.<sup>33</sup> In contrast, the studies using the structural approach have obtained much more mixed results, but on the whole have been relatively more prone to find wage-led demand regimes (at least compared with the aggregative studies). For the US, which is probably the most studied case, wage-led results are found *only* in some of the structural studies, and never in the aggregative ones. Of course, the structural studies have not been intended to identify long-run relationships any more than the aggregative ones have. Most of the structural studies use annual data, often in differenced form, and some authors of these studies have acknowledged that their results pertain only to the short run (e.g., Stockhammer and Stehrer 2011; Stockhammer et al. 2011). Indeed, as this survey demonstrates, very few studies have been explicitly concerned with identifying long-run effects of distribution on demand or growth.

Nevertheless, I think there are a few reasons why, as a practical matter, the structural studies may come relatively closer to identifying long-run relationships than most of the aggregative studies have. For one thing, the most robust finding in the structural studies is a strong positive effect of the wage share on consumption; to the extent that this effect should dominate in the long run (as will be argued in the next section), this alone would tend to make these studies more likely to obtain results that are relevant to the long run. Second, some of the structural studies may underestimate the short-run effects of profitability on investment as a result of specification problems, as discussed in the next section. Third, as noted earlier, the structural studies cannot capture some of the short-run accelerator-multiplier interactions that are likely to dominate during cyclical upturns and downturns, which are likely to lean in a profit-led direction (because profits are normally a leading variable driving investment up and down in expansions and recessions, respectively).<sup>34</sup> These accelerator-multiplier interactions, which are not picked up in sepa-

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investment (gross capital formation) and public sector spending; the latter rather oddly has a negative effect. The cointegrating equation for investment measures profits by gross operating surplus and controls for the ratio of the real wage to the RER (which has a positive effect). Needless to say, the results could be sensitive to these choices of control variables and the ways in which they are measured.

<sup>32</sup> The authors used the variables measured in log levels in the VAR estimation, but this is not appropriate because the variables have unit roots. Since the variables are stationary in first differences, the correct procedure would be to use log first differences, which would also be better for identifying short-run relationships. I have communicated with the authors about this problem via email, and they have promised to send me new results with the VAR estimated in log differences.

<sup>33</sup> One exception is Stockhammer and Onaran (2004), who found mostly small and insignificant effects of income distribution on aggregate demand in France, the UK, and the US using a VAR approach.

<sup>34</sup> Weisskopf (1979) demonstrated that the profit rate was a leading variable in US business cycle fluctuations, and argued that in a typical cyclical downturn the "decline in the average rate of profit leads to a decline in investment spending that leads ultimately to a decline in real output" (p. 351). Weisskopf showed that, in all five US business cycles between 1949 and 1975, the profit rate always peaked *prior* to the peak of output, and that during this phase of each cycle (i.e., between the peak of profits and the peak of output) the reduction in the profit rate was driven

rate regressions for consumption and investment, are likely to wash out in the long run anyway, so studies that omit them are more likely to reflect long-run relationships. Thus, the structural studies seem to pick up a mix of short-run and long-run relationships, with the exact mix depending on the precise specifications used in the econometric estimation, and so it is not surprising that these studies come up with such varied results for many of the same countries, while the aggregative studies that have mainly focused on short-run cyclical relationships generally find profit-led demand.

### 3 AGGREGATE DEMAND IN THE SHORT RUN AND THE LONG RUN

In this section, we discuss the theoretical reasons which lead us to believe that the negative effects of the wage share on investment and net exports are likely to prevail mainly in the short run, if at all, while the positive effects of the wage share on consumption are if anything more likely to dominate in the long run.

#### 3.1 Investment

Investment is by far the most volatile component of aggregate demand, with cyclical fluctuations that are typically much larger than those of total GDP. The strong cyclical volatility of investment implies the necessity of distinguishing the drivers of the short-term dynamics of investment over the length of a business cycle from the determinants of longer-term trends in capital accumulation. In a nutshell, the argument that will be made here is that profits are likely to have stronger effects on the short-run cyclical movements of investment, while accelerator (output growth) effects should normally be expected to dominate in the long run.

The close correlation of short-run, cyclical fluctuations in investment and profits in the US economy is verified by Figure 1(a), which shows annual percentage changes (measured by log differences expressed in percent) in gross fixed business (nonresidential) investment and gross operating surplus of nonfinancial corporations, both measured in real terms. This graph shows that upturns and downturns in investment typically follow the upturns and downturns in profits, usually with lags of one or more years (with longer lags in downturns than in upturns—upturns sometimes have no lags in the annual data, although they may in the quarterly data). However, this strong relationship is purely cyclical, and does not indicate a tendency for investment to follow profits in the long run. As Figure 1(b) shows, the ratio of investment to profits (using the same two measures) has varied greatly over the past half century in both nominal and real terms, indicating no strong tendency of the former to follow the latter in the long run.<sup>35</sup>

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mainly by reductions in the profit share (rather than reductions in the capacity utilization rate or increases in capital intensity). This evidence supported the “profit squeeze” theories of cyclical crises that were popular in the 1970s.

<sup>35</sup> Figure 1(b) is suggested by a similar diagram (Figure 13) in Kliman and Williams (2014). A full discussion of Kliman and Williams’ main argument—that financialization is not what has depressed productive investment in recent decades in the US economy—would be beyond the scope of the present paper. However, it seems to me that the wide variations which they show in the ratio of investment to profits undermine their claim that profits drive investment in the long run, and these authors do not consider accelerator effects (rather than the profit rate) as an alternative explanation for long-run trends in investment.

This argument can also be justified theoretically using a modern, extended version of the accelerator theory of investment.<sup>36</sup> The accelerator theory begins with the concept of a desired capital stock,  $K^*$ . In the original, simplest models (e.g. Hansen 1938, Samuelson 1939), assuming a constant capital-output ratio  $v$ , desired capital is proportional to output:  $K^* = vY$  (where  $Y$  is output and  $v$  is the capital-output ratio). Assuming a constant depreciation rate of  $\delta$  per year ( $0 < \delta < 1$ ) and a one-period adjustment of actual capital to the desired stock, gross investment at any time  $t$  is given by

$$(8) \quad I_t = K^*_t - K_{t-1} + \delta K_{t-1} = vY_t - vY_{t-1} + \delta K_{t-1} = v\Delta Y_t + \delta K_{t-1}.$$

This basic accelerator model has been refined in many ways over the years, by allowing for (among other things): lagged adjustments of the actual to the desired capital stock; possible negative effects of the cost of capital on the capital-output ratio  $v$ ; and the presence of financial or liquidity constraints on firms' investment expenditures. The inclusion of a variable representing the cost of capital grows out of the neoclassical tradition of Hall and Jorgenson (1967), although Eisner and Nadiri (1968) and many others have shown that Hall and Jorgenson's model (which assumed a Cobb-Douglas production function) was biased toward overestimating cost-of-capital effects. In contrast, the emphasis on financial constraints grows out of the heterodox investment theories of Kalecki (1937, 1954[1968]), Steindl (1952 [1976]), and Minsky (1975, 1986), as well as more mainstream versions based on asymmetrical information (Stiglitz and Weiss 1981; Greenwald et al. 1984). Financial constraints were introduced into modern empirical work on investment by Fazzari and Mott (1986-87), Fazzari and Athey (1987), Fazzari et al. (1988), and Fazzari (1993).

Several decades of research in this tradition have led to what might be called a hybrid accelerator model, which combines all of these elements, as in this equation which is adapted from Chirinko et al. (1999):<sup>37</sup>

$$(9) \quad \frac{I_t}{K_{t-1}} = \beta_0 + \sum_{i=0}^m \beta_{1i} \frac{\Delta Y_{t-i}}{Y_{t-i-1}} + \sum_{i=0}^n \beta_{2i} \frac{\Delta UC_{t-i}}{UC_{t-i-1}} + \sum_{i=0}^q \beta_{3i} \frac{CF_{t-i}}{P_{t-i-1}^K K_{t-i-1}} + \varepsilon_t$$

where investment ( $I$ ), output ( $Y$ ), and capital ( $K$ ) are measured in "real" (deflated) terms,  $UC$  is the neoclassical "user cost" of capital,<sup>38</sup>  $CF$  is cash flow (in nominal terms),  $P^K$  is the price of

<sup>36</sup> There are, of course, many other theories of investment, including Tobin's  $q$  model, Minsky's post-Keynesian model, and various others. See Chirinko (1993) for an exhaustive survey of the literature on investment functions up to the early 1990s and Blecker (1997) for an interpretation of Minsky's theory in the context of international capital mobility.

<sup>37</sup> Chirinko et al. (1999) include additional subscripts for firms, but we suppress these and focus on the time dimension given the macroeconomic orientation of this paper.

<sup>38</sup> Following Chirinko et al. (1999, p. 57), user cost is defined as  $(P^I/P^Y)\tau(\rho + \delta)$ , where  $P^I$  and  $P^Y$  are the price indexes for investment and output,  $\tau$  is a tax parameter representing the impact of investment tax credits and accelerated depreciation allowances,  $\delta$  is the depreciation rate, and  $\rho$  is the financial cost of capital. The latter is defined as  $\rho = .67(\text{div} + .024) + .33[i(1-t) - p^e]$ , where  $\text{div}$  is the dividend-price ratio from the S&P composite stock index,  $.024 = 2.4\%$  is an assumed "expected long-run growth rate",  $i$  is the nominal yield on AAA bonds (adjusted for the tax deductibility of interest payments using the corporate income tax rate  $t$ ), and  $p^e$  is the expected inflation rate.



capital goods,<sup>39</sup> the  $\beta_{ki}$  are coefficients ( $k = \text{variable}, i = \text{lag}$ ),  $\varepsilon_t$  is the error term, and  $m, n,$  and  $q$  are the number of lags for each variable. Most empirical work finds that  $UC$  effects are relatively small<sup>40</sup> or statistically insignificant (Fazzari 1993; Chirinko et al. 1999, 2011; Spatareanu 2008; Ballinger 2013).  $CF$  is the variable posited by Minsky (1975, 1986) and most other theorists of financial constraints (both post-Keynesian and mainstream) to be the key factor that relaxes those constraints and thereby allows firms to carry out more of their desired investment plans. On the one hand,  $CF$  can be used directly by firms to provide “internal finance” for investment; on the other hand,  $CF$  is a crucial signal to external sources of finance (banks, bondholders, and/or equity owners, depending on the financial system) of the firm’s ability to service its debt (or make expected payouts to shareholders) in the face of uncertainty about future returns to particular investment projects. By definition,  $CF$  equals firms’ gross retained profits (net profits minus corporate income taxes, net interest payments, and dividend payouts, plus depreciation allowances), so it is the preferred profit variable in this model of investment.

According to equation (9), investment (normalized by the capital stock) depends on the *rates of change* of output (and user cost, if it is significant), because these variables affect the level of the desired capital *stock*, while investment represents *changes* in the (actual) capital stock. In contrast, the cash flow variable (also normalized by the value of the capital stock), which is used to capture financial (liquidity) constraints, is entered in the equation in *levels* because it influences the *current flow* of investment spending rather than the desired capital stock (Chirinko et al. 1999). According to this specification, therefore, profits (as reflected in cash flow) affect *only short-run fluctuations* in investment, and in fact are omitted when the long-run determinants of investment are estimated (Chirinko et al. 2011). But, this means that the profit (cash flow) variable in an investment function should only matter in the short run; longer-term variations in investment should be driven primarily by accelerator effects (output growth rates  $\Delta Y/Y$ ) and secondarily (if at all) by changes in the cost of capital ( $\Delta UC/UC$ ). The vast majority of studies using this approach finds that accelerator effects ( $\Delta Y/Y$ , often using sales in place of output at the firm level) are strong and robust, user cost effects are sometimes statistically significant but usually relatively small,<sup>41</sup> and cash flow is significant but only has short-run effects (e.g., Chirinko 1993; Fazzari 1993; Chirinko et al. 1999, 2011, Spatareanu 2008).

However, as noted earlier, most of the structural estimates of post-Keynesian macro models surveyed in section 2.2 have used investment functions of the Marglin-Bhaduri variety, that is, versions of equation (2). But an empirical investment function that uses  $u$  as a static proxy for the accelerator effect is likely to be misspecified, because in a true accelerator model the flow of investment should depend on *changes* in output rather than the *level* of output. Although the use of  $u$  to represent the accelerator effect may be justified on grounds of mathe-

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<sup>39</sup> This variable is not included in the corresponding equation in Chirinko et al. (1999), but it seems obvious that cash flow (a nominal variable) should be normalized by the nominal value of the capital stock (using current or replacement cost). Equivalently, one could view this variable as deflating cash flow, in which case the term  $CF/P_K K$  would be interpreted as the ratio of real cash flow to the real (constant or chained dollar) capital stock.

<sup>40</sup> Given the theoretical benchmark of a  $UC$  elasticity of investment of  $-1$  in the Cobb-Douglas model of Hall and Jorgenson (1967), an estimated elasticity of about 0.5 or less (in absolute value) indicates that investment is relatively inelastic with respect to  $UC$  and can be considered a “small” effect.

<sup>41</sup> This same conclusion holds if a real interest rate is used in place of the user cost of capital (Fazzari 1993).

matical tractability in a heuristic theoretical model, it is probably not the best output variable to use in econometric estimation. Also, the profit share  $\pi$  is not necessarily a good measure of profits to use in an empirical investment function. Business firms and their lenders care about profits (whether measured by cash flow or any other accounting concept) relative to the value of the firms' capital stocks, not as a share of value added. Thus, a more correct short-run investment function (a simplified version of equation 9) would be something like<sup>42</sup>

$$(10) \quad I/K = h(cf, \Delta Y/Y),$$

where  $cf$  is the ratio of cash flow to capital stock. The fact that most of the structural estimates of distributional effects on investment use various versions of equation (2) rather than (10) could account for the widely varying results they obtain, as discussed in section 2.2 above.<sup>43</sup> In any case, aside from the importance of measuring the accelerator effect by the growth rate of output instead of the utilization rate, the other key point is that the cash flow or profit effect should only operate over short-run cycles, while longer-term variations in investment are driven mainly by output growth as firms seek to increase their capital stocks in proportion to expected future demand.

Even if a different measure of profits is used instead of cash flow, or if the rationale for including them in the investment function is something other than financial constraints, there are other reasons why increases in profit rates (or shares) should not be expected to have permanent or lasting effects on investment. For example, as emphasized in theories of mature or “monopoly” capitalism (Steindl 1952 [1976]; Baran and Sweezy 1966), if a high profit share (price-cost margin) is the result of a high degree of oligopolistic pricing power of firms, it will not generally lead to greater investment in the long run because oligopolistic firms don't want to undermine their own market power by creating too much excess capacity. To be sure, oligopolistic firms do want to maintain a certain desired proportion of excess capacity as an entry deterrent and for other reasons (indivisibilities, uncertainty about demand), but they would not want to add additional capacity beyond that desired level simply because they are earning high profit margins on their current operations.

More broadly, under the modified accelerator theory covered here, once profits or cash flows rise to a level that enables firms to overcome financial constraints, still higher profits will not call forth additional investment beyond that deemed necessary by firms for satisfying the expected output growth.<sup>44</sup> Of course, in the short run firms driven by very optimistic “animal

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<sup>42</sup> Note that this is similar to the investment function used by del Monte (1975), whose modeling approach unfortunately did not have much influence on the subsequent literature for the reasons discussed in footnote 9. We also omit a cost of capital or interest rate variable here but one could be included if it is empirically significant.

<sup>43</sup> Continuing with the same example from note 20 above, Naastepad and Storm (2012) use a version of equation (2) with investment normalized by output, output used in place of the utilization rate, and the variables expressed in log levels; output is lagged one year but not computed as a growth rate. Onaran and Galanis (2012), in contrast, use a log differenced version of (2), also with output in place of utilization (but investment is not normalized by any variable), in which the change in investment is regressed on the lagged change in output. Neither study uses an equation like (9) or (10), in which the *level* of investment (or its ratio to the capital stock) is regressed on the *change* in output. Again, these different specifications yield quite different implications for the magnitude of profit effects.

<sup>44</sup> One exception is that, in an economy that is highly open to foreign capital flows, high profit rates (or margins) could attract a lot of foreign direct investment (FDI) that could potentially boost total domestic investment in the

spirits” may invest beyond what reasonable expectations of market growth and current profit levels would justify (the .com bubble in the US in the late 1990s comes to mind—see Pollin 2005), but by their nature such speculative booms in investment are self-limiting and usually end in crises; they do not persist in the long run.

### 3.2 Net exports

As noted earlier, a rise in the wage share can have a negative impact on net exports if it is caused by a rise in ULC that makes domestic goods and services less competitive compared with foreign products.<sup>45</sup> Based on the standard Marshall-Lerner (M-L) analysis, this negative impact will occur only if the sum of the price elasticities of export and import demand exceeds unity in absolute value. The M-L condition has to be modified if some of the standard assumptions (e.g. initially balanced trade) are not met, but in general the point remains that the negative impact of the wage share on net exports requires a certain degree of price sensitivity of the quantities of exports and imports demanded. Although there is much controversy about whether the M-L condition is normally satisfied, for purposes of discussion we will assume that it is satisfied in order to focus on whether the negative impact of a rise in the wage share on net exports in the short run (assuming that it occurs) is likely to persist in the long run.

Suppose, then, that a country lowers its ULC, for example by slashing wages or boosting productivity, thereby improving its external competitiveness and (after any J-curve lags are overcome)<sup>46</sup> also increasing its net exports in the short run. There are several adjustment mechanisms that could come into play that would act to offset the country’s improved competitive advantages in the long run. First, if the rise in net exports leads to an expansion of domestic employment, wages may eventually be bid up, thereby offsetting the initial decrease in ULC. Second, given the improvement in the country’s balance of payments, the currency (if the country has a flexible exchange rate) might eventually appreciate, thus also offsetting the initial competitive gains. Even if the nominal exchange rate is fixed or managed, the real exchange rate could appreciate because of increased domestic inflation induced by the boom in tradable goods industries and tighter labor-market conditions. These are all very standard adjustment mechanisms for reversing an improvement in net exports, and symmetrical mechanisms could come into operation in the case of a rise in ULC and an initial fall in net exports.

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long term, especially when such investment is linked to an export-led growth drive. However, export-led growth is also likely to be self-limiting in the long run for reasons discussed in the next subsection.

<sup>45</sup> However, if a rise in the wage share is caused by a reduction in the oligopoly power of firms (as reflected, for example, in lower target markups), then the consequences stated here need not occur. As shown by Blecker (1989, 1999, 2011), in this case the country’s external competitiveness would actually improve and net exports would not worsen, so a wage-led outcome for output and growth would be more likely.

<sup>46</sup> An important qualification to the M-L analysis is the famous “J-curve” effect: the price elasticities of demand for exports and imports are likely to be low in the very short run (when firms are locked into contracts and goods have already been ordered and are still being shipped) and to increase over time (as delivery lags are overcome, and firms can recontract with new suppliers and order from different sources). The result is that the trade balance (net exports) often worsens in the immediate aftermath of a currency devaluation, when the main impact is to raise import costs in domestic currency terms, but then subsequently improves, leading to a trajectory that roughly follows the shape of the letter “J.” However, most analyses show that the J-curve turns upward within roughly 1-2 years, which is still short run for purposes of the discussion in this paper.

However, the operation of these or other adjustment mechanisms is far from automatic, as argued long ago by Robinson (1946–47). For example, either a highly elastic labor supply in a dual economy or a repressive set of labor market institutions could prevent wages from rising in spite of a boom in net exports. Exchange rate management (so-called “currency manipulation”) can be used to prevent currency appreciation, and nominal devaluations can be used to offset higher domestic inflation. Financial capital flows can sustain trade (current account) imbalances, thereby forestalling the changes in monetary reserves that drive various classical and neoclassical stories about automatic adjustment. Also, trade imbalances can be sustained if Kaldorian cumulative causation sets in: if faster export growth leads to faster output growth which in turn stimulates productivity growth via Verdoorn’s Law, then a country’s international competitive advantages can be sustained and even amplified for some period of time, and conversely in countries with sluggish export performance (Setterfield and Cornwall, 2002; Blecker 2013).

Nevertheless, even if the standard adjustment mechanisms do not work or if Kaldorian cumulative causation starts to operate, reactions by other countries may also act to offset the home country’s initial improvement in competitiveness over time. Most obviously, foreign countries too can engage in competitive devaluations, wage cuts, or efforts to boost productivity, as analyzed by Robinson (1947) in her famous critique of “beggar-my-neighbour remedies for unemployment.” If foreign countries respond in these ways, then the home country will eventually lose its initial gains in net exports, but the negative consequences of the reduced wage share for domestic consumption will still remain. This point is the basis for several analyses which have shown that even if some countries have profit-led demand as a result of strongly negative effects of ULC on net exports, those same countries may end up being wage led if there is a simultaneous lowering of ULC and wage shares globally (“race to the bottom”), with the implication that the world economy as a whole is likely to be wage led even if some individual countries are internally profit led. This point has been stated clearly by Onaran and Galanis as follows:

Thus, a simultaneous wage cut in a highly integrated global economy leaves most countries with only the negative domestic demand effects, and the global economy contracts. Furthermore [according to our empirical results] most profit-led countries contract when they decrease their wage share, if a similar strategy is implemented also by their trading partners. Thus ‘beggar [thy] neighbour’ policies cancel out the competitiveness advantage in each country and are counterproductive. (Onaran and Galanis 2013, p. 87)

What has not been sufficiently recognized, however, is the time dimension of this canceling-out effect. It may take several years or even a decade or more for the competitive responses of other nations to cancel out the initial competitive gains of a particular country. Thus, a country can get a competitive advantage from lower ULC (and a lower wage share) that boosts its net exports in the short or medium run, even if this advantage is eventually dissipated by the responses of other nations in the long run.

These dynamics and adjustments can be seen, for example, in the constantly shifting waves of countries that have dominated US import markets (and other global markets) over the past half-century. Japan achieved significant inroads in US markets in the 1960s and 1970s with relatively low-cost export products, buoyed by what were initially low wages combined with rapid productivity growth. However, as Japanese wages rose and Japan shifted into higher value-

added and higher quality export products in the late 1970s and 1980s (and especially after the yen appreciated during the latter decade), it was replaced at the lower end of the market by the east Asian “four tigers” (principally South Korea and Taiwan), who enjoyed a boom in low-cost exports in those years. Then, Mexico took advantage of low ULC (especially in dollar terms, after the depreciations of 1985-86 and 1994-95) and a free trade agreement (NAFTA, 1994) to displace those countries in the US market in the 1990s. However, after 2001 China took advantage of even lower ULC (aided by rock-bottom initial wages and currency manipulation that maintained a fixed nominal peg between 1994 and 2005) and its entry into the World Trade Organization (WTO) in 2001 to displace Mexico and achieve a dominant position in the US import market in the early 2000s (Gallagher et al. 2008; Blecker and Esquivel 2013).

This brief history of the ever-shifting sources of US imports (and corresponding episodes of export-led growth in the source countries) serves to illustrate several points. First, it demonstrates the “fallacy of composition”: not all countries can succeed in achieving export-led growth based on labor cost advantages at the same time (Blecker and Razmi 2010). In regard to the present topic, this implies that only a limited number of countries can succeed at profit-led growth by lowering their relative ULC and depressing their wage shares at the same time, and even those who do succeed are likely to see their success reversed (and to be replaced by other countries) in the long run. Second, the adjustment mechanisms referred to earlier, while far from automatic, do nevertheless sometimes come into play albeit with long and variable lags. Japan’s currency eventually appreciated (about two decades after its export boom began), as has China’s more recently. Wages eventually rose in Japan, Korea, Taiwan, and now even (after very long lags) China. Today, many labor-intensive industries are leaving China for locations (e.g., Vietnam, Bangladesh, or Central America) with yet lower ULC, just as such industries left Japan and Korea several decades ago. Third, some countries can maintain their export success even after such adjustments occur if they succeed in upgrading the technological level of their products and shift into more innovative product lines, thereby achieving competitive advantages that rest upon quality and innovation rather than low labor costs (Japan and Korea are cases in point; China is striving to move in this direction). But in such cases, export success no longer depends on depressing ULC or wage shares, so the economies need not be profit-led as a result.

Indeed, one major branch of post-Keynesian growth theory—the model of balance-of-payments-constrained growth (BPCG) originally developed by Thirlwall (1979)—is based on the assumption that the competitive cost advantages that may arise in the short run do not persist in the long run (see McCombie and Thirlwall 1994, 2004; Blecker 2013). In the BPCG literature, this proposition is manifest in the assumption of long-run relative purchasing power parity (PPP): the real exchange rate is stationary in the long run, even though it may fluctuate widely during short-run or medium-run episodes.<sup>47</sup> However, the BPCG approach does not deny that real exchange rates can fluctuate and countries can achieve competitive cost advantages (or suffer competitive cost disadvantages) in the short run. What is being argued here is simply that this long-accepted distinction also matters to theories of wage-led versus profit-led demand, as it implies that open economy effects are more likely to push in the direction of a profit-led regime in a given country in the short run than in the long run. In this case, it can sometimes take as

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<sup>47</sup> Alternatively, some versions of the BPCG model can be justified by elasticity pessimism, i.e., the assumption that the M-L condition does not hold. It should be noted that BPCG does not require more extreme versions of PPP, such as absolute PPP (goods cost the same amount in all countries) or short-run PPP (absolute or relative).

much as a decade or longer for the long run to be reached, but competitive advantages in international trade based on low labor costs do not last forever, and hence the degree to which net exports make a country profit-led instead of wage-led is likely to diminish over time.<sup>48</sup>

### 3.3 Consumption

Consumption is the one part of aggregate demand for which the impact of income distribution is, if anything, likely to be greater in the long run than in the short run. Consumption is expected to respond positively to the wage share because of the higher marginal propensity to consume out of labor income compared with capital income. The reasons for a lower MPC out of capital income are well-known: on the one hand, a portion of corporate profits is retained by firms as “internal funds” or “cash flow” that can be used to finance investment or for other purposes, and is counted as corporate saving in the national income accounts, while on the other hand, payouts of dividends and interest to households go mainly to wealthier classes (“rentiers”) who have a higher propensity to save. Indeed, the wealthiest households that own large amounts of financial assets may be so rich that their consumption effectively becomes delinked from their current income. Working-class households, in contrast, typically spend all or most of their wage income on consumption, at least in most countries (China and some other East Asian nations may be exceptions, given their relatively high household saving rates). The implication that the wage share has a positive effect on consumption is one of the most robust results in the structural model estimates of distributional effects on demand surveyed in section 2.2, above. This same conclusion is supported by the numerous cross-sectional or panel studies that have found that the propensity to consume is inversely related to income levels of households.<sup>49</sup>

However, this leaves open the question of how the responsiveness of consumption to either labor or capital income varies over different time horizons. Some considerations from standard theories of the consumption function may help to understand this issue. A key “stylized fact” about consumption is that the overall MPC (for aggregate consumption) is higher in the long run than in the short run. This difference was the basis for many of the classic theories of the consumption function in the mid-twentieth century, including Duesenberry’s (1949) “relative income” hypothesis, Modigliani and Brumberg (1954) and Ando and Modigliani’s (1963) “life-cycle” saving hypothesis, and Friedman’s (1957) “permanent income hypothesis.” Without going into detail on each of these, one thing they all have in common is the idea that households typically try to maintain relatively steady consumption expenditures in the face of short-run fluctuations in income receipts.<sup>50</sup> The mechanisms that households can employ to accomplish this are

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<sup>48</sup> Although it may be somewhat of an extreme case, China began its export drive based on low ULC back in the late 1980s, and only after it began to gradually appreciate its currency after 2005 (and after wages finally started to rise significantly) did its labor cost advantages finally begin to erode (this could account for why China is found to be very strongly profit-led due to net export effects by Onaran and Galanis 2012). Nevertheless, most countries don’t have the extremely large labor surplus or unique institutions and history of China, so adjustment processes of over 20 years are likely to be the exception rather than the rule.

<sup>49</sup> See, for example, Bunting (1991) and Jappelli and Pistaferri (2014), among many others. Although such studies usually do not disaggregate income into its sources (i.e., labor vs. capital income), the concentration of capital income in the higher income strata is so strong that these results are also relevant to justifying the assumption of a higher MPC out of labor income.

<sup>50</sup> See also Baumol et al. (1989, p. 166), who argue that “increases in consumption characteristically lag behind when a nation experiences a sharp growth in per capita output” in the development process, although “this is to

well-known, and include drawing down accumulated saving or incurring debt when income falls (relative to expectations or the long-term trend) and increasing savings or paying off debt when income rises (again relative to expected or trend income). Later work on the consumption function in the neoclassical tradition has introduced more full-blown intertemporal optimizing behavior into a generally life-cycle/permanent income view (e.g. Hall 1978). However, one does not have to believe in neoclassical ultra-rationality or strict optimizing behavior to recognize that households of all types attempt to maintain *some* degree of stability in their consumption in response to fluctuations in their income that are perceived as short-term or transitory.

Recent work in the post-Keynesian tradition by Cynamon and Fazzari (2008, 2013) and Kim et al. (2014a, 2014b), among others, has revived Duesenberry's institutionalist approach, in which households "seek to maintain consumption relative to standards achieved in the past and contemporary standards established by others" (Kim et al. 2014b, p. 3). The new post-Keynesian approaches to consumption especially emphasize the role of household borrowing and debt in the context of financialization: consumers are seen as being induced to increase their consumption in the short run by the easy availability of borrowing, while being constrained in the long run by the accumulation of debt burdens whose negative impact may be discontinuous and felt mainly during crisis periods. This analysis provides a new rationale for at least partially delinking working class consumption from current labor income in the short run, but still implies that workers' consumption expenditures are limited by their wage income in the long run when debt service burdens begin to impose significant restraints on those expenditures and hence working class households become more constrained by their current disposable income. Importantly, the post-Keynesian approach links increasing consumer debt to rising inequality: as working class households acquire consumer aspirations based on the consumption patterns of the upper middle class above them, while their wages are squeezed by globalization and neoliberal policies, they borrow more in an effort to "keep up with the Joneses" (Kim and Ryoo 2014) in spite of stagnant real wages. The result is increasing financial fragility of households rather than the smooth adjustment of spending to long-term earnings predicted by the life-cycle model. Nevertheless, this approach still implies that workers are more likely to have their consumption limited by their labor income in the long run than in the short run.

Kim et al. (2014b) estimate consumption functions that include variables for household wealth, borrowing, and debt burdens along with disposable personal income and an index of consumer sentiment (they do not test directly for distributional effects, although they use the distributional argument cited above to motivate their inclusion of the borrowing and debt variables). Two key conclusions emerge from their work. First, they confirm that the MPC is notably higher in the long run (about 0.6 to 0.9 using two alternative methods of estimating long-run cointegrating relationships) than in the short run (about 0.4 for the whole sample period 1952-2011, and only 0.1 for the more recent sample 1980-2011). Given that most consumers are reliant primarily on labor income, we may infer that the MPC for wages is also likely to be higher in the long run than in the short run. Second, Kim et al. (2014b) demonstrate the significance of the financial variables mentioned above (consumer borrowing, debt, and wealth) especially in their long-run estimates, which suggests that omitting such variables from consumption functions could lead to biased estimates of the effects of other variables (including income distribution).

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some degree a transitory affair, as the next generation rapidly learns to participate in 'the good life' and consumption expenditures begin to soak up more of the national output formerly devoted to savings and investment."

For the wealthy rentier households that have large accumulations of financial assets, their consumption is probably not tightly linked to their income in either the short run or the long run. Moreover, to the extent that the consumption of such households is linked to their income, the relevant measure of their income would have to include the capital gains on their assets, which are not included in standard measures of disposable income from the national income (GDP) accounts. However, we would expect the consumption of workers to mirror their labor income flows more closely in the long run than in the short run for the reasons given above, and hence the *difference* in their consumption behavior (MPC) from that of the wealthy should be most apparent in a long-run comparison. Or, to put it another way, we think that the evidence for a higher overall MPC in the long run compared with the short run mainly applies to working class and middle class households, who constitute the bulk of consumers, but this means that the difference in MPCs between those who depend on labor income and those who depend on capital income is also likely to be greater in the long run than in the short run.

Moreover, the difference between the short-run and long-run MPCs for labor income has, if anything, only widened as a result of financialization, which has greatly extended the access of working class households to credit. Through the massive diffusion of credit cards, the invention of subprime mortgages, and the explosion of many other kinds of lending (car loans, home equity loans, revolving consumer credit, etc.), the financial sector now offers numerous opportunities for households of relatively modest means to borrow vast sums far in excess of what they could historically borrow at what are usually very high interest rates—and often far in excess of what they can ultimately afford to service or repay.<sup>51</sup> Thus, in countries that have experienced a significant degree of financialization, the short-run MPC out of wage income should be much lower than what it was in the past (a result supported by the findings of Kim et al. 2014b cited above, assuming that they apply mainly to households that rely primarily on labor income), and even in the past it was lower than the long-run MPC for wages.

However, as the recent financial crash and slow recovery have demonstrated, the liquidity constraints imposed on working-class households do become more binding in the long run, when excessive levels of household debt become unsustainable. During the financial crisis and Great Recession, many working-class families had their mortgages foreclosed and lost their homes, or defaulted on consumer credit leading to bankruptcy. Such households, and other households that suffered less dramatic effects (for example, episodes of unemployment) or that feared similar outcomes, were induced to rein in their consumption spending and work off their credit balances (i.e., reduce their debts). Moreover, lenders also tightened credit standards and credit availability in the aftermath of the crisis, thus further contributing to a reversal of the long-term increase in the household debt-income ratio after 2008 (see Figure 2). The upshot of all this is that the difference between how much workers' consumption is constrained by their wage income in the long run versus the short run has probably increased, which implies that the degree to which aggregate demand is more likely to be wage led (or more strongly wage led) in the long run than in the short run is probably greater today than in the past.

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<sup>51</sup> See discussions in Cynamon et al. (2013) and Lavoie and Stockhammer (2013), among others.



## 4 EMPIRICAL EVIDENCE

In this preliminary statement of our hypothesis, we think it is important to take a step back from econometric estimation and look at some basic trends and correlations in the raw data, which we hope will suffice at least to establish the plausibility of our hypothesis. Although any such analysis is inevitably sensitive to the particular measures used, we have deliberately used “raw” data compiled from the standard official sources, without making any adjustments of our own (thus, for example, capacity utilization is measured by the Federal Reserve’s survey-based series for this variable, rather than by applying some kind of filter to GDP). To be sure, this evidence is far from conclusive, but if we succeed in demonstrating that our hypothesis is plausible, we hope that this will inspire research using more sophisticated econometric techniques that can distinguish long-run versus short-run effects of income distribution on output or growth (some suggestions along these lines are provided in the conclusions below), and the present author hopes to supply some evidence along these lines in future iterations of this work.

Figure 3 shows graphs of the labor share of value added for the US nonfarm business sector<sup>52</sup> plotted versus three alternative measures of economic activity: the GDP growth rate, the capacity utilization rate (for the manufacturing sector),<sup>53</sup> and the rate of capital accumulation (rate of increase in nonresidential private fixed assets), all measured on an annual basis. To avoid simultaneity issues, the labor share is lagged one year in every diagram. For the entire sample period 1948-2013, there is a positive relationship between the (lagged) labor share and all three measures of economic activity in panels (a) to (c). Interestingly, the positive relationship is strongest for capital accumulation, suggesting that in the long run even investment is wage-led (presumably as a result of strong accelerator effects, as discussed earlier). Of course, it must be emphasized that these are only correlations, but these graphs do show a positive association between one measure of the labor share and all three measures of economic activity over two-thirds of a century (66 years), and the fact that the labor share is lagged gives us some confidence that the causality is running from the labor share to economic activity and not the reverse.

But are similar upward-sloping relationships observed for shorter time periods, coinciding roughly with the length of business cycles? To address this question, Figures 4 through 6 divide the sample period into six subperiods coinciding roughly with business cycles, where the shorter cycles are combined into longer periods of about a decade in length (all periods are defined so that they end in the peak year of a cycle) in order to have a minimal sample size for calculating correlations.<sup>54</sup> The six short-run periods are defined as follows:<sup>55</sup>

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<sup>52</sup> Here we use the BLS index of the labor share, which is essentially an index of real unit labor costs based on 100 in 2009. Thus, the numbers on the vertical axis are not actual shares, but indices of the shares, and since 2009 was a year of an unusually low labor share, most of the numbers are above 100.

<sup>53</sup> In order to get data back to the late 1940s, we had to use capacity utilization for the manufacturing sector only for reasons of data availability. A broader measure of utilization for the total industrial sector is available starting in 1967, and the two indices have a correlation of 0.995 for the years of overlap (1967-2013).

<sup>54</sup> The dating of the business cycles was taken from the National Bureau of Economic Research (NBER), <http://www.nber.org/cycles.html>. The NBER dates cycle peaks and troughs by month. For our annual data, the peak was assumed to occur in the same year as the actual monthly peak for peaks that occurred in May through December and in the previous year for peaks that occurred in January through April.

1. 1949-59, 3 cycles
2. 1960-69, 1 cycle
3. 1970-79, 2 cycles
4. 1980-90, 2 cycles
5. 1991-2000, 1 cycle
6. 2001-7, 1 cycle.

For all three measures of economic activity, all of the correlations with the lagged labor share are negative in every period, although the strength of the negative relationships does vary.<sup>56</sup> These negative correlations with the wage share imply that a higher lagged profit share is associated with faster GDP growth (Figure 4), higher capacity utilization (Figure 5) and more rapid capital accumulation (Figure 6), in the short run. These negative short-run correlations are consistent with the view that output, investment, and growth are normally profit-led in the short run. In relation to the previous literature, *these negative short-run relationships between the labor share and various measures of economic activity could explain why econometric methods that are focused (intentionally or unintentionally) on identifying short-run effects tend to find that the US economy is profit-led.*

Next, in order to better identify the long-run relationships, we use averages of the data for longer periods defined by major policy breaks, rather than standard business cycles. For this purpose, we divide the data into either two or three periods of roughly equal length as follows.<sup>57</sup>

- Two periods
  1. Post-war era, 1948-79 (32 years)
  2. Neo-liberal era, 1980-2013 (34 years)
- Three periods (20 years each)
  1. Bretton Woods/Golden Age, 1954-73
  2. Stagflation and adjustment, 1974-93
  3. Great moderation and financial crisis, 1994-2013

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<sup>55</sup> In order to ensure that each period encompasses only complete cycles (whether one or more), we can only use data for 1949 to 2007 for the short-run analysis. At the front end, 1948 was the peak year of a cycle for which the previous peak occurred in 1945, and we don't want to include the immediate postwar years. The period of stagnation since 2008—with the Great Recession followed by a sluggish recovery—does not yet constitute a complete cycle.

<sup>56</sup> The weakest negative correlation is found between the lagged labor share and the capital accumulation rate for the 2001-7 cycle (Figure 4(f)). However, if one outlier year (2001, which is the observation in the upper-right-hand corner of this diagram) is omitted, the trendline for that period (shown as a dashed line) becomes much more strongly downward-sloping.

<sup>57</sup> Since our measure of capacity utilization is only available starting in 1948, we use this as the earliest year for the two-period averages for all variables. We divide the two periods between 1979 and 1980, even though this results in slightly unequal period lengths, because the appointment of Paul Volcker to chair the Fed in October 1979 and the election of Ronald Reagan to the presidency in 1980 marked a watershed in the transition to a “neoliberal” policy regime. For the three-period analysis, we start the first of the three periods in 1954, which yields three periods of exactly 20 years each (and which also takes us past the Korean War era).

The two-period comparisons (shown by the green squares in Figure 7) uniformly show that both the labor share and economic activity were lower in the neo-liberal era (1980-2013) compared with the post-war era (1948-79) for every measure of economic activity considered. In this sense, although again causality cannot necessarily be inferred, the data are at least consistent with the view that all three measures of economic activity (output growth, capacity utilization, and capital accumulation) are wage-led in the very long run. Moreover, this same positive association across these two historical periods is found for three alternative measures of the wage share (the BLS index of the labor share for the nonfinancial corporate sector, an adjusted share of labor compensation in national income constructed by the author, and the share of the bottom 95% in the US from the World Top Incomes Database).<sup>58</sup> The first of these is shown in Figure 8, while the other two are not shown for reasons of space but are available on request.

Using the three-period comparison, we also find a positive relationship between the labor share for the nonfarm business sector and each of the three measures of economic activity, with both the labor share and each of those measures falling between 1954-73 and 1974-93, and falling again between the latter period and 1994-2013 (see the red/orange-colored diamonds in Figure 7). However, for this comparison, the results are more sensitive to the measure of the wage share used. As can be seen in Figure 8, using the BLS index of the labor share for the nonfinancial corporate sector, the relationships were all negative between 1954-73 and 1974-93 and then positive between the latter period and 1994-2013.<sup>59</sup> Using this latter index of the labor share, the data are consistent with the view that wage-led demand and growth have prevailed in the long run during the post-Bretton Woods years (i.e., since 1974) but not before that (when, possibly, the data could be more reflecting “profit squeeze” behavior, i.e., higher economic activity reducing the wage share, or else the prevalence of short-run cyclical behavior during the more frequent but less volatile cycles of the Bretton Woods/Golden Age era).

Finally, to bridge the gap between the short-run analysis in Figures 4 to 6 and the long-run analysis in Figures 7 and 8, we examine what might be called a medium-run perspective in Figures 9 and 10 by analyzing the changes between the averages for our six short-run periods (as defined earlier). As shown in Figure 9, the labor share in the nonfarm business sector is mostly positively associated with each of the three measures of economic activity overall, but there are some exceptions where the movements between short-run periods are negatively sloped. This is true for all three activity measures between 1949-59 and 1960-69, and also between 1980-90 and 1991-2000 for the two output variables (GDP growth and capacity utilization). According to Figure 10, the relationship between the labor share in the nonfinancial corporate sector and the various measures of economic activity over the medium run is more complex, although it is mostly positive sloped from 1970-79 through 2001-7 (especially for the capital accumulation rate). Since the last cycle period shown excludes the years since the Great Recession of 2008–9

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<sup>58</sup> Data for the last measure end in 2012. The source for the last measure is Alvaredo et al. (2014), data downloaded August 26, 2014 from <http://topincomes.g-mond.parisschoolofeconomics.eu/> (subsequently the URL seems to have changed to <http://topincomes.parisschoolofeconomics.eu/>). The total income shares including capital gains were used for this purpose.

<sup>59</sup> When our adjusted measure of the share of labor compensation in national income is used, the results are more similar to the results shown in Figure 6 for the labor share in nonfinancial corporations. When the bottom 95% income share the World Top Incomes Database is used, the results are more similar to those shown in Figure 5 for the labor share in the nonfarm business sector.

(because the current cycle has not yet reached a peak), these data imply that the combination of slow growth/low utilization and a depressed labor share began *before* the financial crisis and Great Recession of those years. These figures also make it clear that the results for the long run are very much driven by the data for the new millennium, although this is not surprising because the changes in both income distribution and economic performance are much larger after 2001.

Once again, it is necessary to express much caution about the simple correlations shown in these graphs because they are, after all, only correlations. Although the labor shares are lagged in the annual data (Figures 3-6), giving us some confidence that the causality flows from distribution to output or growth in those analyses, the long-run and medium-run comparisons made in Figures 7-10 could reflect two-way causality between income distribution and economic activity. Nevertheless, the contrast between the negatively sloped short-run relationships shown in Figures 4-6 and the mostly positively sloped longer-run relationships shown in Figures 1, 7, and 8 is so striking that they suffice to make the point. Even these simple correlations show that the relationship between income distribution and economic performance may differ notably between the short run and the long run, and this evidence is consistent with profit-led growth (or utilization) prevailing in the short run and wage-led growth (or utilization) in the long run for the US economy. Applying more advanced econometric techniques to obtain more precise estimates of the short-run and long-run relationships involved, and testing whether the differences are similar in other countries besides the US, are left for future research.

## 5 CONCLUSIONS

This paper has argued that the positive effects of a higher profit share (lower wage share) on investment and net exports are likely to be felt mainly in the short run, while the negative effects on consumption are likely to be felt more strongly in the long run, in which case aggregate demand and growth are more likely to be profit led (or weakly wage led) in the short run and wage led (or more strongly wage led) in the long run. This hypothesis was suggested by an extensive review of the previous literature, in which the studies that have most explicitly emphasized short-run, cyclical effects (especially those using an aggregative estimation strategy) have been the most prone to find profit-led results. The paper has also provided theoretical arguments and some suggestive empirical data in support of this view.

If this argument is correct, then the policy implications of the studies (mainly using an aggregative approach) which have found that demand or growth is profit led in the short run need to be reconsidered. If, as argued here, such results only pertain to short-run, cyclical behavior, then they have no implications for long-run economic performance. It is entirely possible that, in a typical business cycle (and note that the present one starting with the financial crisis and recession of 2008-9 may not be typical!), profits drive investment both up in the recovery and down in the recession, and yet a higher profit share of income will not lead to higher utilization or growth in the long run. On the contrary, by their nature cyclical recoveries are temporary, and end in the next economic downturn; the forces that determine whether the economy expands more rapidly or more slowly on average in the long run may be quite different from those that determine the cyclical upswings and downturns. In particular, it is entirely possible that a significant long-term fall in the wage share, as has been experienced in the US and many other countries, can depress long-run growth, even if rising profits may (*ceteris paribus*) be helpful for stimulating a short-run

recovery via their impact on investment and (through reduced unit labor costs) net exports.

Nevertheless, the empirical evidence that has been provided here is nothing more than a very initial, suggestive look at some descriptive data and simple correlations for the US economy. Thus, the next step in this research project should be to apply more sophisticated econometric tools to distinguish the short-run and long-run effects of distribution on demand and growth in a wider spectrum of countries. Cointegration methods applied to time-series data may be of some use, since a cointegrating equation (for data series that have unit roots) is supposed to capture the long-run relationship between the variables. There are various methods for identifying long-run relationships in time-series data, including the Johansen VEC approach, Pesaran bounds testing, and Stock-Watson dynamic ordinary least squares. In principle, comparing the results of cointegration equations or other long-run estimates with more short-term estimates (e.g., a VAR with the data expressed in log differences) should enable us to get some perspective on whether the long-run effects differ from the short-run impacts. Nevertheless, when these methods are applied to high or medium frequency data (e.g., quarterly or annual), the “long-run” relationships that they identify may actually be relatively short-run in nature (operating over, say, just a few years).

To identify truly long-run relationships, many studies now use data averaged over long periods such as five years or more, usually with panel data given the small number of time periods that results from this method. Just to cite a few examples, León-Ledesma (2002) used data averaged over long periods for a panel of OECD countries to estimate a Kaldorian model of export-led growth with cumulative causation, while Chirinko et al. (2011) used firm-level data averaged over long periods to estimate a long-run investment function for US corporations. Certainly, a panel data study for a group of countries using data averaged over periods of, say, a decade or longer, might give us greater insights into the long-run effects of distribution on demand than researchers have been able to obtain to date, using only annual or quarterly data.

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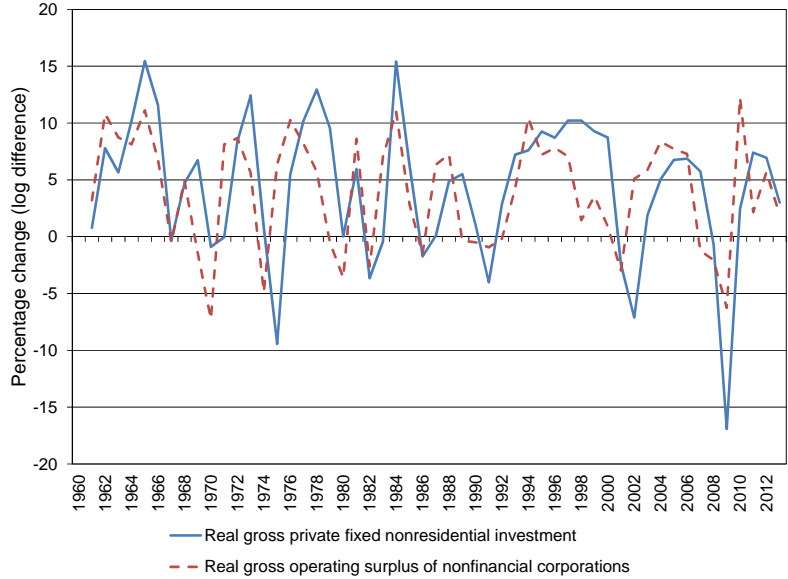
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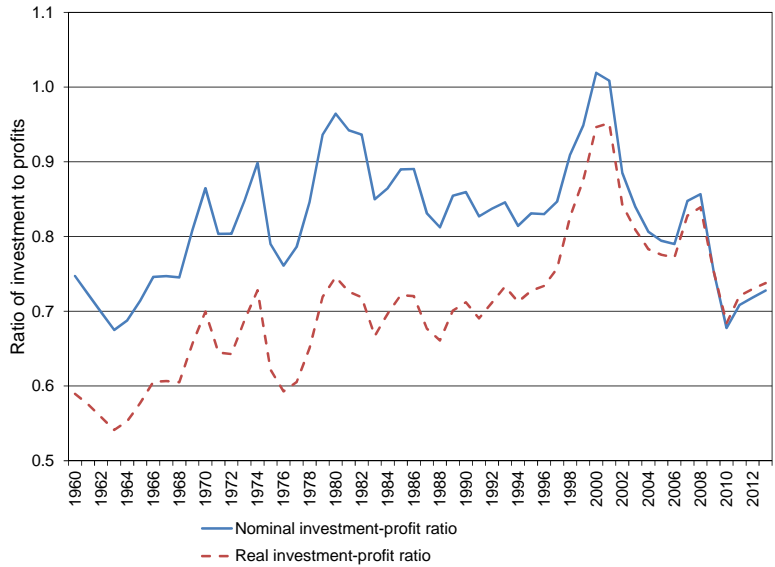
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**Figure 1. Short-run and long-run relationships between business investment and nonfinancial corporate profits, US 1960–2013**

**(a) Short-run: growth rates of real investment and profits**

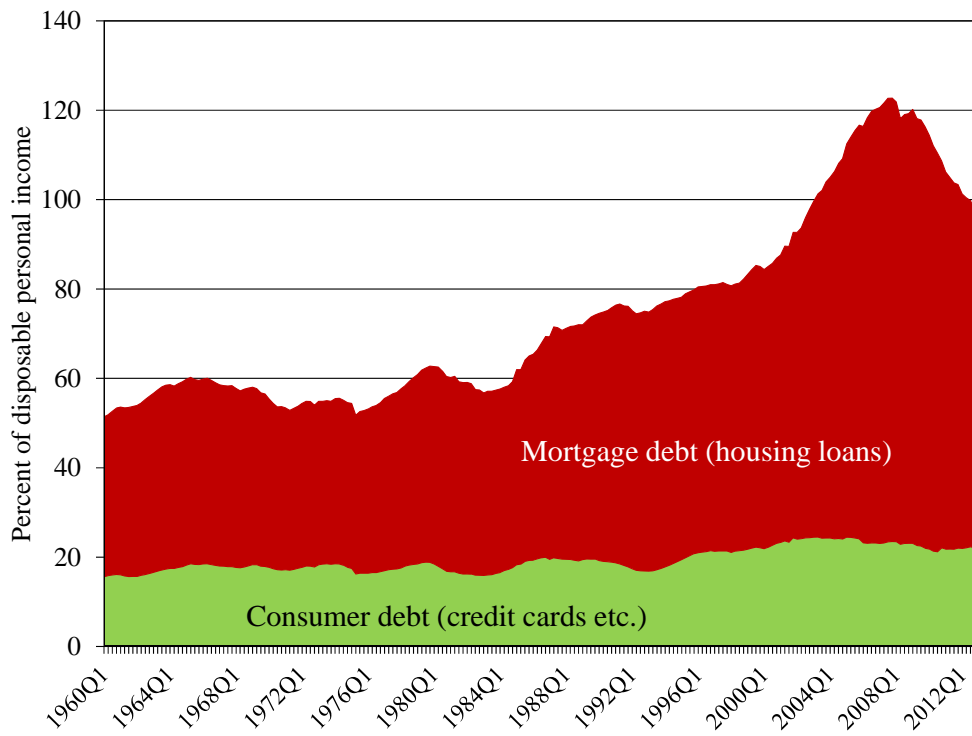


**(b) Long-run: ratios of investment to profits (nominal and real)**



Source: Author’s calculations based on data from US Bureau of Economic Analysis (BEA), National Income and Product Accounts (NIPA), releases of August 28 and September 26, 2014, [www.bea.gov](http://www.bea.gov). Business investment is measured by private fixed nonresidential investment; profits are measured by gross operating surplus of nonfinancial corporations. The quantity index from NIPA Table 1.1.3 was used for real investment. Real gross operating surplus was calculated by deflating the nominal surplus from Table 1.14 by the index of price per unit of real gross value added from Table 1.15.

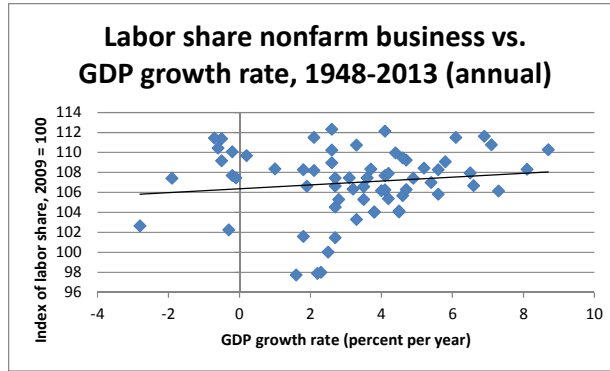
**Figure 2. US household debt (consumer + mortgage) as percentages of disposable personal income, 1960Q1 to 2013Q1.**



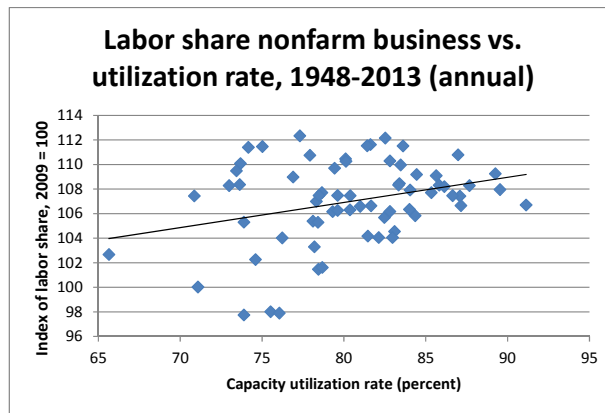
Source: Author's calculations based on data from: Federal Reserve, Z.1 Statistical Release for June 6, 2013, <http://www.federalreserve.gov/econresdata/statisticsdata.htm>; and BEA, NIPA Table 2.1, data released August 29, 2013, [www.bea.gov](http://www.bea.gov).

**Figure 3. Graphs of labor share in the nonfarm business sector versus three alternative measures of economic activity, annually 1948-2013 (labor share index lagged one year)**

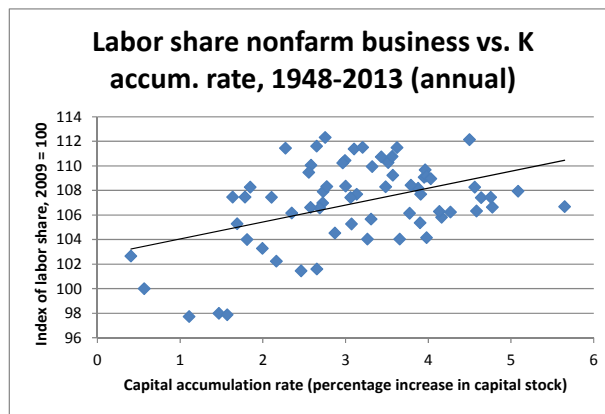
**(a) GDP growth rate**



**(b) Capacity utilization rate**



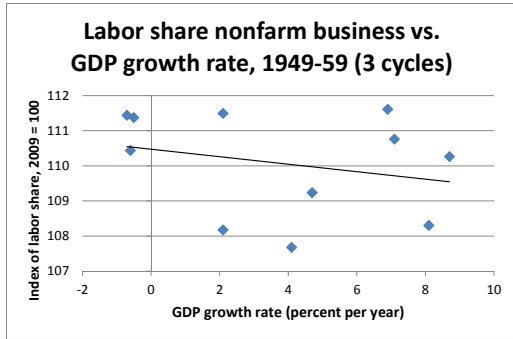
**(c) Capital accumulation rate**



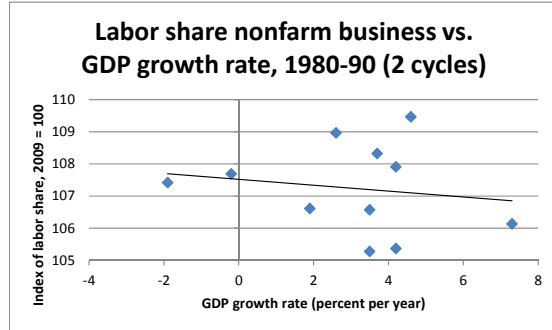
Sources: Labor share index from BLS; GDP growth rate and capital stock (private nonresidential assets, used to calculate the accumulation rate) from BEA; capacity utilization from the Federal Reserve Board of Governors.

**Figure 4. Short-run relationships between the labor share in the nonfarm business sector and the GDP growth rate (labor share index lagged one year)**

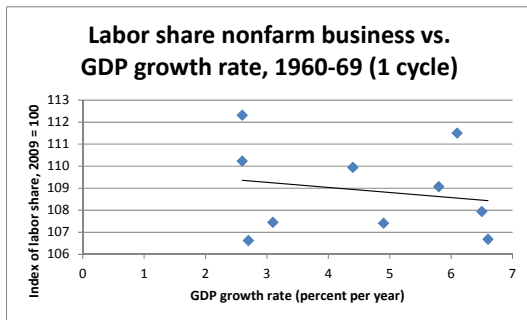
(a)



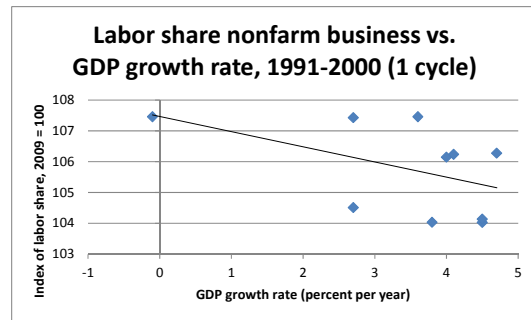
(d)



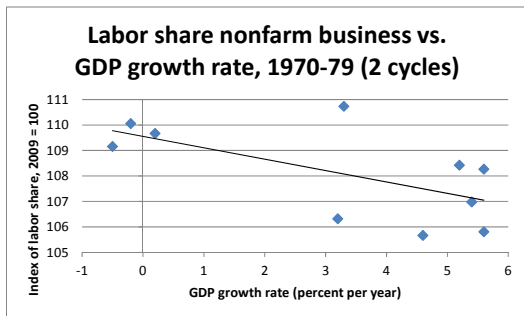
(b)



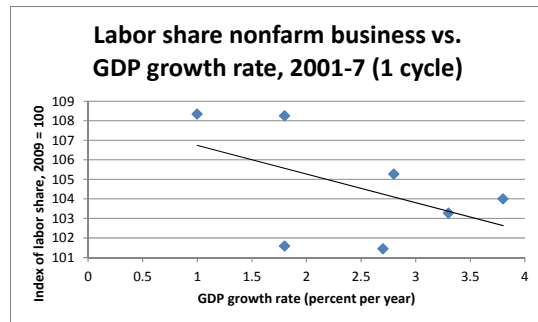
(e)



(c)



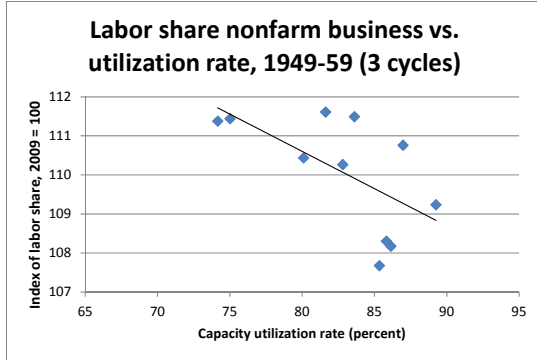
(f)



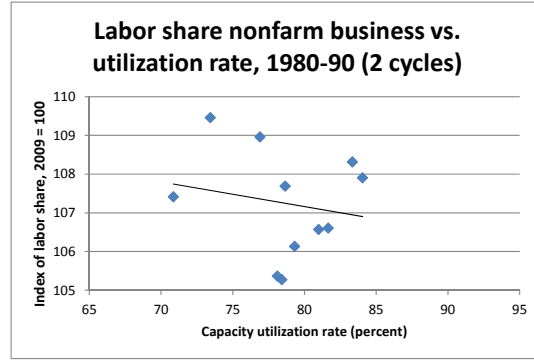
Sources: Same as for Figure 3.

**Figure 5. Short-run relationships between the labor share in the nonfarm business sector and the capacity utilization rate rate (labor share index lagged one year)**

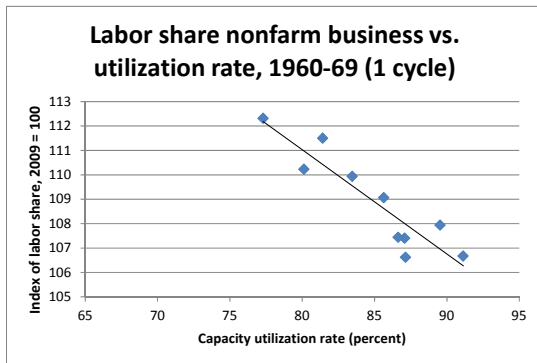
(a)



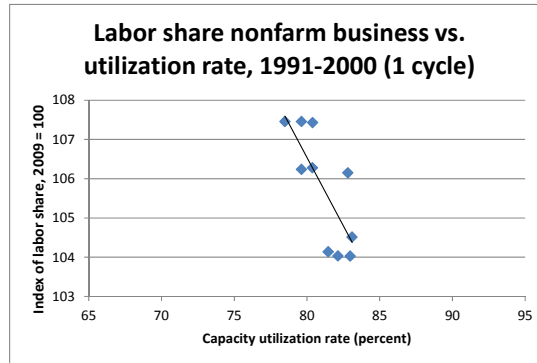
(d)



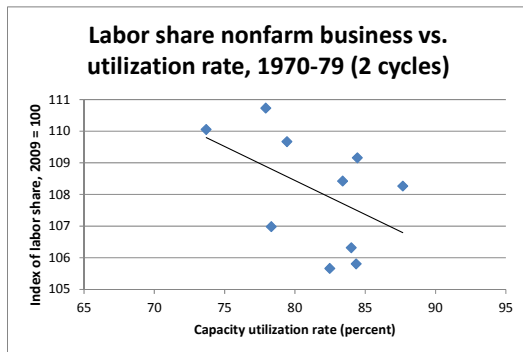
(b)



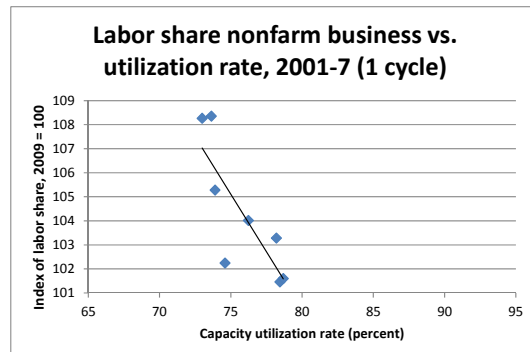
(e)



(c)



(f)

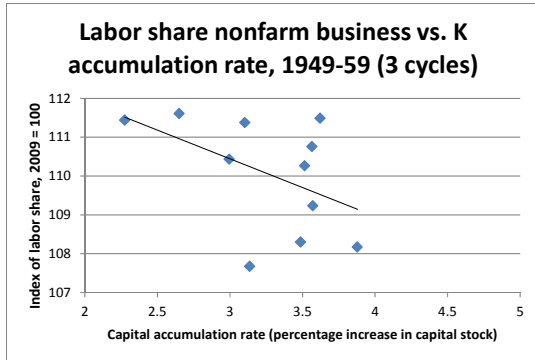


Sources: Same as for Figure 3.

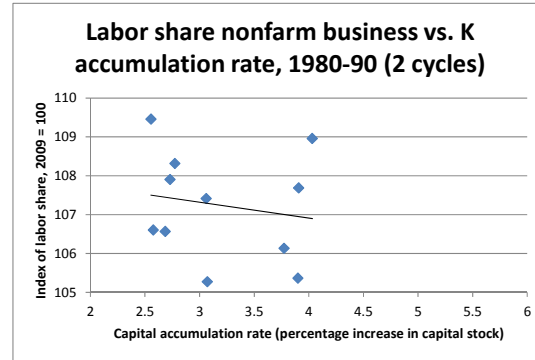


**Figure 6. Short-run relationships between the labor share in the nonfarm business sector and the capital accumulation rate (labor share index lagged one year)**

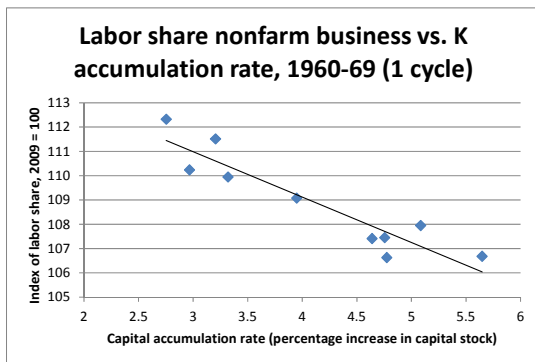
(a)



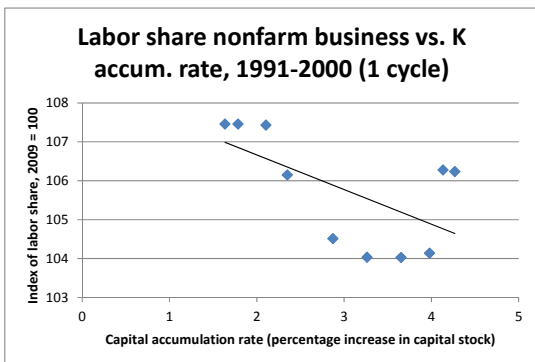
(d)



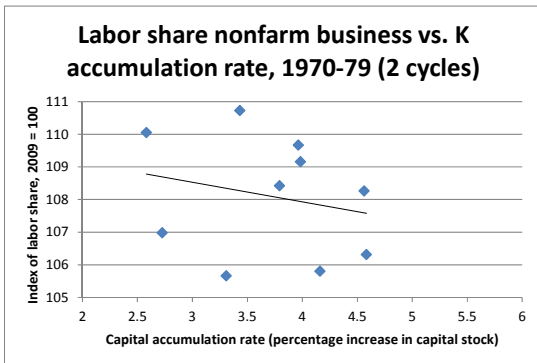
(b)



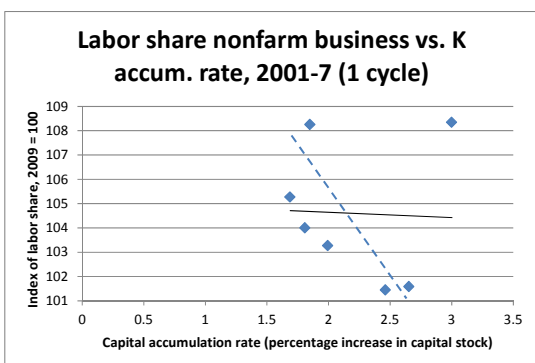
(e)



(c)



(f)

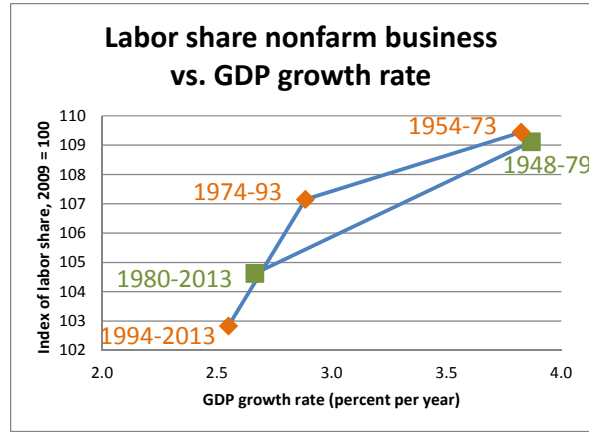


Sources: Same as for Figure 3.

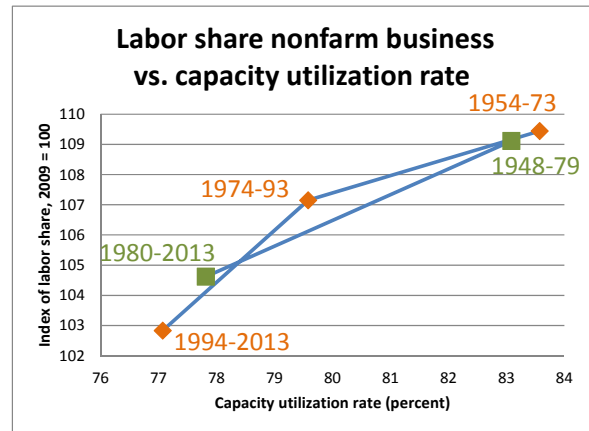
NOTE: Sources for Figures 7-10 below are also the same as for Figure 3.

**Figure 7. Long-run relationships between the labor share in the nonfarm business sector and three alternative measures of economic activity, various periods**

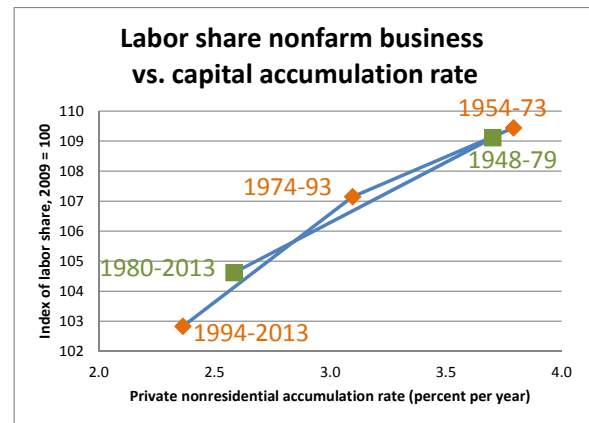
**(a) GDP growth rate**



**(b) Capacity utilization rate**

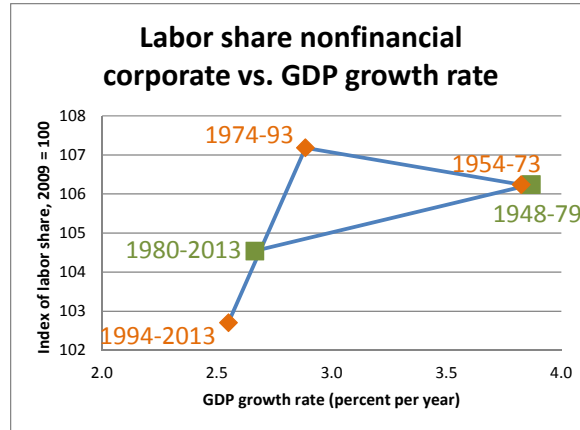


**(c) Capital accumulation rate**

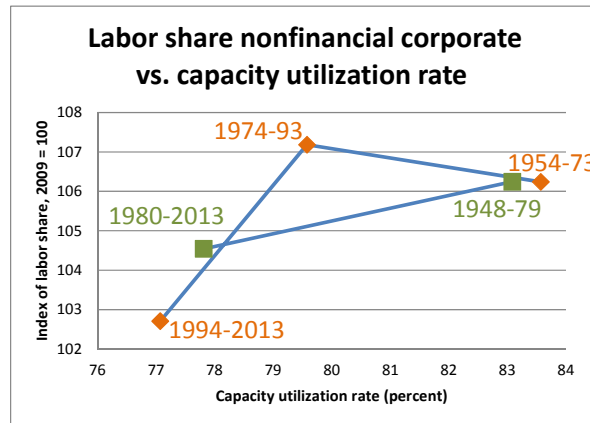


**Figure 8. Long-run relationships between the labor share in the nonfinancial corporate sector and three alternative measures of economic activity, various period averages**

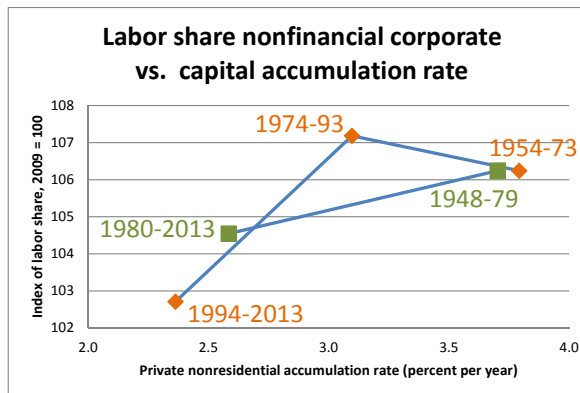
**(a) GDP growth rate**



**(b) Capacity utilization rate**

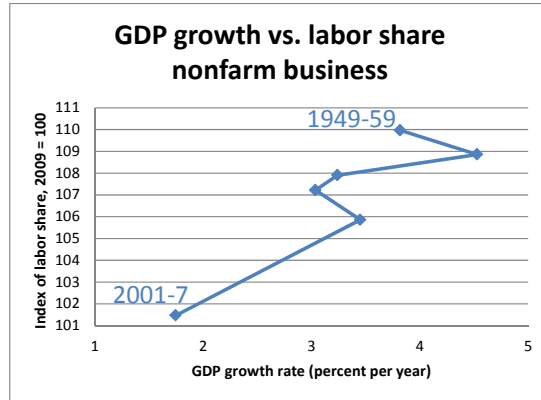


**(c) Capital accumulation rate**

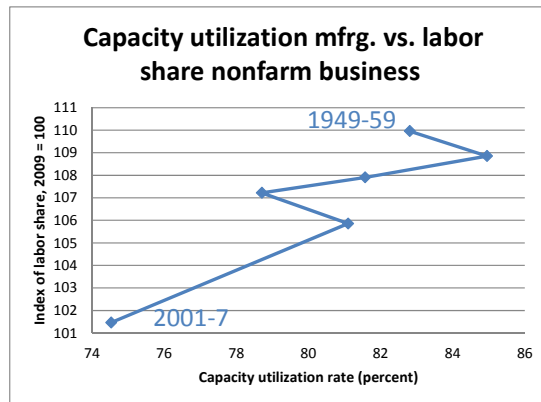


**Figure 9. Medium-run relationships between the labor share in the nonfarm business sector and three alternative measures of economic activity, average for short-run cycles**

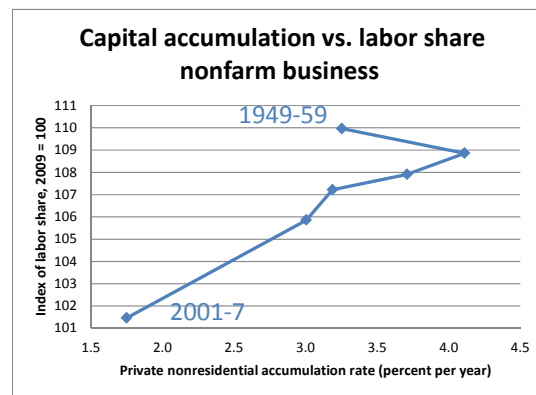
**(a) GDP growth rate**



**(b) Capacity utilization rate**



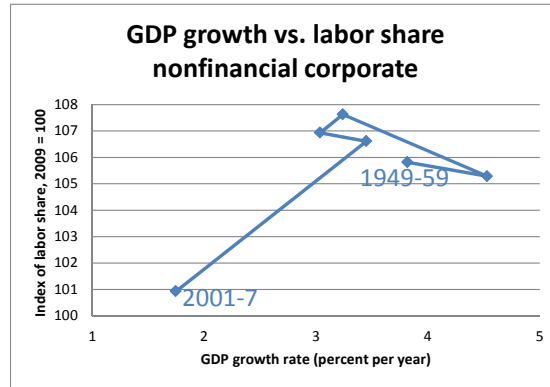
**(c) Capital accumulation rate**



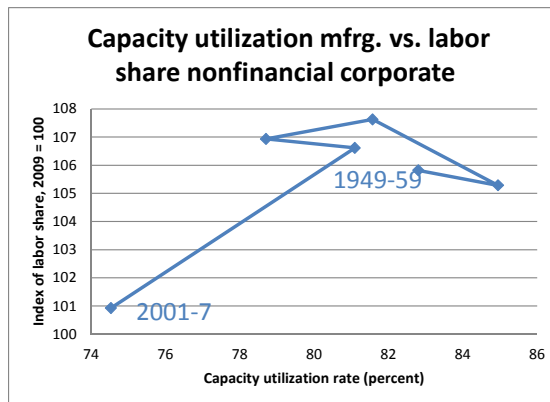
Note: ♦ indicates periods in chronological order as follows: 1949-59 (3 cycles); 1960-69 (1 cycle); 1970-79 (2 cycles); 1980-90 (2 cycles); 1991-2000 (1 cycle); and 2001-7 (1 cycle).

**Figure 10. Medium-run relationships between the labor share in the nonfinancial corporate sector and three alternative measures of economic activity, averages for short-run cycles**

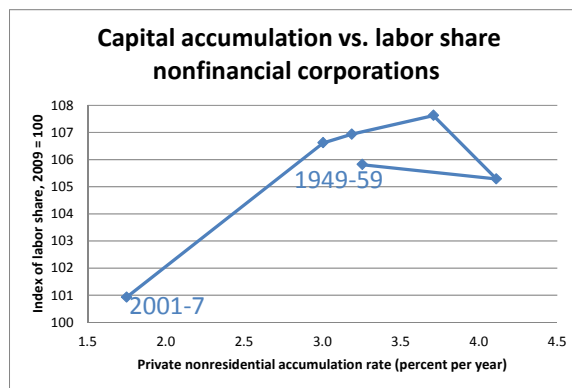
**(a) GDP growth rate**



**(b) Capacity utilization rate**



**(c) Capital accumulation rate**



Note: ♦ indicates periods in chronological order as follows: 1949-59 (3 cycles); 1960-69 (1 cycle); 1970-79 (2 cycles); 1980-90 (2 cycles); 1991-2000 (1 cycle); and 2001-7 (1 cycle).