Globalization and the Declining Share of Labor Income in the United States

Draft: June 2007

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This paper was prepared for the 28th International Working Party on Labor Market Segmentation, Aix-en-Provence, France, July 5-7, 2007. Traci Kuratomi provided invaluable research assistance.

We investigate cyclical movements and secular trends in labor's share of U.S. GDP since the middle of the last century. For much of the 20th Century labor's share of national income was believed to be "one of the great constants of nature" (Solow, 1958: 618) and its constancy treated as one of the "stylized facts" of growth (Gollin, 2002: 45). More recently, however, there has been a growing recognition of a secular decline in labor's share in the U.S. and other advanced economies, including Japan, Germany, Canada, Australia, and Norway (Porter, 2006). In this paper, we argue that labor's share in the U.S. has indeed declined over the past three decades and that the decline is due to a multitude of pressures resulting from an increasingly integrated global economy.

Labor's Share

We take our measure of labor's share from a data series for factor shares in the corporate sector developed by Piketty and Saez (2003) from the U.S. National Income and Product Accounts (NIPA).[1] Figure 1 shows this series fluctuating around 70%, with a weakly discernable decline from a peak of 75% in the early 1970s to 69% in 2005. We believe that this measure understates the decline in labor's share due to the rapid growth of top executive salaries, bonus payments, and stock options in the past 25 years and their treatment as wage and salary income in the NIPA. (See Krueger, 1999; Gomme and Rupert, 2004; Poterba, 1997.)

These payments go overwhelmingly to corporate executives who occupy a position closer to capital than labor in the social relations of the firm. These managers control the firm's capital, acting as representatives of its owners, and their compensation

[1] Data from this paper are available at http://emlab.berkeley.edu/users/saez.

is designed to align their interests with the owners. We (perhaps, somewhat arbitrarily) identify the share of the top 0.5% of wage and salary income as payments to corporate officers on the basis of their 'proximity to capital.' The top 0.5% share of wages (also taken from Piketty and Saez) is shown in Figure 1 to rise from around 3% in the early 1970s to 9% in 2005. Our 'adjusted' measure of labor's share is obtained by subtracting the top 0.5% share of wages from the NIPA labor's share (*i.e*. transferring it from labor to capital). This series – also graphed in Figure 1 – peaks at around 71% in the early 1970s and declines by over 10 percentage points by 2005.[2]

Globalization, Trade, and Off-Shoring

> "I don't have to hire one more person in the U.S. I don't have to invest one more dollar here – and we'll be just fine." –Steven R. Appleton, CEO of Idaho-based Micron Technology (Mandel, 2007:31).

According to the Hecksher- Ohlin model, international trade tends to equalize factor returns across countries. In a two factor model, advanced capital-rich countries specialize in the production of capital-intensive goods and import labor-intensive goods, and returns to labor and labor's share of GDP will fall. This theory assumes that capital and labor are immobile, but trade in the goods they produce act as a substitute for factor mobility. Increasing factor mobility that characterizes globalization only strengthens this effect. In addition, the mobility of capital strengthens its bargaining power relative to the less mobile factor, labor. Capital mobility also strengthens capital's bargaining power *vis*

[2] A second way in which labor's share is overestimated is in the undercounting of profit (part of capital's share) in the NIPA due to the treatment of research and development costs as a current expense, rather than an investment that generates future revenues (see Corrado, Hulten and Sichel, 2006.) The Bureau of Economic Analysis recently began publishing an experimental GDP account that treats R&D as a capital investment rather than an expense. This reduces labor's share more than one percentage point (although it's not clear how much it would affect the decline in labor's share over the past 30 years).

a vis national governments and its influence on their trade, tax and labor policies (see Rodrik, 1997).[3]

Researchers investigating trade openness have used a variety of measures, including the ratio of trade (exports + imports) to GDP, the ratio of foreign direct investment (both inward and outward) to GDP, the ratio of capital flows to GDP, measures of capital account openness, the ratio of trade taxes to trade, and others (Ortega and Rodriguez, 2001; Harrison, 2002; Guscina, 2006; Jayadev, 2007). Those analyzing off-shoring have used the share of imported inputs to total purchased inputs (Feenstra and Hanson, 1996; Amiti and Wei, 2005) and the share of imported intermediate inputs to total intermediate inputs (IMF, 2007; Burke and Epstein, 2007).

Measures of openness involve both *de jure* measures (e.g., presence of capital controls) and *de facto* measures (e.g., investment flows or the ratio of trade to GDP). *De jure* measures are theoretically preferred because they represent the quality of openness, rather than the result of openness. *De facto* measures are widely used, however, because they are more easily quantified and more readily available and have been defended on the grounds that they capture how effectively the *de jure* measures are actually enforced (Jayadev and Lee, 2005). In this study, we use a relatively crude, but readily available measure: the ratio of imports to GDP. We see in Figure 2 that this ratio began to rise in the early 1970s and more than doubled (from .075 to .16) between the mid-1970s and 2005.

Empirical studies of labor's income share have used both measures of trade openness (Harrison, 2002; Guscina, 2006; Jayadev, 2007) and of off-shoring

[3]This is seen within the U.S. in the competition among the states to attract investment by both domestic and foreign business (see Burke and Epstein, 2007).

(International Monetary Fund, 2007.) All have found evidence of negative effects of globalization on labor's share in advanced countries. Our study differs from these in its focus on changes in labor's share in a single country – the United States – over a relatively long time period – 1950-2005 – and in its attention to cyclical movements of, as well as secular trends in, relative income shares.

Cyclical Movements in Labor Share

Labor's share (LS) is defined as WH/PQ, where WH (the wage bill) is the hourly wage times the number of hours worked and PQ (the dollar value of output) is the quantity of final output produced times its price. Labor's share can also be expressed as (W/P)/(Q/H), which is the real (product) wage divided by labor productivity (output per hour), a.k.a. real unit labor cost. Writing labor's income share as the ratio of real wages to productivity, suggests the possibility of evaluating changes in labor's share over the business cycle in terms of the cyclical behavior of these two components of labor's share.

Most empirical studies have found that real wages vary procycically (Dunlop, 1938; Tarshis, 1939; Keynes, 1939; Bils, 1985; Mitchell, Wallace and Warner, 1985; Schor, 1985; Rayack, 1987; Hoehn, 1988). There is less evidence or agreement about the cyclical behavior of labor productivity, with Costrell (1982) finding procyclical behavior due to overhead labor effects, Gordon (1979) finding counter cyclical behavior due to adjustment lags at the end-of-expansion, and Bowles (1985) finding counter cyclical behavior due to the reserve army effect. We note that if real wages vary procyclically while labor productivity moves countercyclically, then labor's share will be procyclical. This is the prediction of the Marxian model of the "normal reproductive cycle," which

exhibits "a systematic inverse relationship between peak to trough changes in unemployment and real unit labor costs [labor's share]" (Gordon, Weisskopf and Bowles 1983: 155). [4]

The two variables that are key to the behavior or real (product) wages, labor productivity and labor's share over the business cycle, are the capacity utilization rate (CUR) and the unemployment rate (UNR). Dividing the business cycle into four phases, we argue that movements in these two variables combine to cause labor's share to rise at the end of an expansion and early states of a contraction (phases I and II) and to fall at the end of a contraction and the early stages of an expansion.

As shown in Table 1, we argue that the prevailing influence in Phase I (late expansion) is a favorable reserve army effect on the "bargaining power" of labor, which results in rising real wages, falling productivity and, as a result, decisively rising labor's share.[5] In Phase II (early contraction) the prevailing influence is the negative effect of a falling capacity utilization rate on labor productivity causing labor's share to continue rising. Labor productivity declines in this phase due to adjustment lags, overhead labor effects, and labor hoarding.[6] In Phase III (late contraction), the threat of job loss and the relative ease with which current employees can be replaced by the reserve army of unemployed job seekers gives employers the upper hand over the workforce in negotiating wages and the pace of work. Real wages fall, productivity rises, and labor's

[4] For a more detailed discussion Buchele and Christiansen, 1993.

[5] We refer here not only to the formal collective bargaining but to negotiations, formal and informal, between all employers and employees over pay and the pace of work.

[6] These refer, respectively, to time lags between management's realization that orders are falling off and the initiation of layoffs, the need to retain administrative staff (as opposed to production workers) during a business downturn, and the desire to retain trained employees who "know the ropes" and who will be costly to replace in the next upturn.

share declines decisively. Finally in Phase IV (early expansion), the rising capacity utilization rate causes labor productivity to increase (in a reversal of the Phase II process) and, as a result, labor's share to fall. Cyclical movements of capacity utilization, unemployment, and labor's share over time are shown in figure 3.

A Dynamic Model of Relative Income Shares

We develop a partial adjustment model of relative income shares in which labor's share at time t (LS_t) is a weighted average of its "latent share" at the time t (LS_t^*) and its actual share in the preceding period (LS_{t-1}):

$$LS_t = \gamma\ LS_t^* + (1-\gamma)\ LS_{t-1}. \qquad (1)$$

Labor's latent share is the income share that would result if wages and productivity were determined *de novo* each period and depended only on current economic conditions. Labor's share in the preceding period is the point of departure for "negotiations" over income shares in the next period. LS_t will gravitate toward LS_t^*, rising if $LS_t^* > LS_{t-1}$ and falling if $LS_t^* < LS_{t-1}$. The parameter γ indicates the weight of current economic conditions v. the weight of inertia, indicated by $1-\gamma$.

Latent shares are not directly observed, but they depend on current economic conditions, more importantly the unemployment rate (UNR) and capacity utilization rate (CUR), as described in the preceding section, and on the degree of "openness" of the economy to imports or off-shoring by U.S. businesses (OPEN). We specify LS_t^* as a simple linear function of the change in CUR and the level of UNR and OPEN (lagged

one year because current perceptions of these conditions and their effect on relative bargaining power depend on recent past experience). Thus,

$$LS_t^* = \beta_0 + \beta_1 \Delta CUR_t + \beta_2 UNR_{t-1} + \beta_3 OPEN_{t-1} + \varepsilon_t, \qquad (2)$$

where $\beta_j < 0$, $j = 1, 2, 3$ and ε_t is a stochastic error term with usual desirable statistical properties.

Substituting equation (2) into equation (1) yields

$$LS_t = \alpha_0 + \alpha_1 \Delta CUR_t + \alpha_2 UNR_{t-1} + \alpha_3 OPEN_{t-1} + \alpha_4 LS_{t-1} + u_t, \qquad (3)$$

where $\alpha_j = \gamma\beta_j$, $j = 0, 1, 2, 3$, $\alpha_4 = 1-\gamma$ and $u_t = \gamma\varepsilon_t$.

Results and Some Implications

The actual variables used to estimate equation (3) are described in Table 2. We use the capacity utilization rate for the manufacturing sector because it is the only series that extends back to the 1940s. We use the unemployment rate for males age 25-54 to control for the effect of changes in the demographics of the labor force on the overall (civilian) unemployment rate. Our measure of economic openness is the ratio of imports to GDP, and labor's share is calculated as described at the beginning of this paper.

Table 2 presents OLS and Prais-Winsten FGLS estimates (correcting for serially correlated errors) of equation 3. The two estimators give very similar results, which is to be expected given the lack of evidence of first order serial correlation in the error term in the Breusch-Godfrey test ($p >> 0.5$) and the low estimate of ρ in the FGLS regression. All of the coefficients have the expected signs, and they are all significant at a 5% level or better.

The short-run effects of each variable on labor's share are indicated by their coefficients. We note in particular that, controlling for the other independent variables, a one percentage point increase in UNR reduces labor's share by just 0.2 percentage points in the short run. But in the long-run, a sustained increase in the unemployment rate will reduce labor's share by .2/(1–.8) = 1.0 percentage point.[7]

Likewise, taking the estimated coefficient of OPEN to be -.12 indicates that a one percentage point increase in the ratio of imports to GDP reduces labor's share in the short-run by .12 percentage points (*ceteris paribus*). But a sustained one percentage point increase in this ratio reduces labors share by .12/(1–.8) = 0.16 percentage points. Thus, the doubling of imports as a percentage of GDP (from 7.5% to 15%) may account for nearly half (.6(7.5%) = 4.5%) of the 10 percentage point decline in labor's share since the mid 1970s.

Holding CUR and OPEN constant, there is presumably some distributionally "neutral rate of unemployment" which equalizes the bargaining power of labor and capital and stabilizes relative income shares.[8] We can then ask how much the neutral rate of unemployment is reduced for each one percentage point increase in OPEN. Using the FGLS estimates in Table 2, we calculate that a one percentage point increase in the ratio of imports to GDP reduces the neutral rate of unemployment by 0.1237(.01)/.0021 = 0.6 percentage points. This implies that a one percentage point increase in the Imports/GDP ratio has as big a negative effect on labor's bargaining power – and income share – as a 0.6 percentage point increase in the 25-54 year old male unemployment rate. This is

[7] In equilibrium $LS_{t-1} = LS_t$. Substituting LS_t for LS_{t-1} in equation 3 and solving for LS_t gives the long-run effect of a one unit increase in the j^{th} independent variable as $\alpha_j/(1-\gamma)$.

[8] This is calculated by setting $\Delta CUR = 0$, assigning a value to OPEN, setting $LS_{t-1} = LS_t$ and solving for UNR.

perhaps an implausibly large effect (a 15% decline in this unemployment rate which in 2005 stood at 4%), but one that emphasizes the substantial pressure of globalization on labor's income share.

There is one obvious conclusion to draw from this analysis. It is that globalization, what ever its benefits, threatens the incomes not just of the relatively few workers who are displace by trade and off-shoring but of workers as a class. As long as employees depend solely on wages and do not share in the gains from globalization accruing to owners of capital, there is no reason to expect them to share mainstream economists' and the 'business community's' enthusiasm for free trade.

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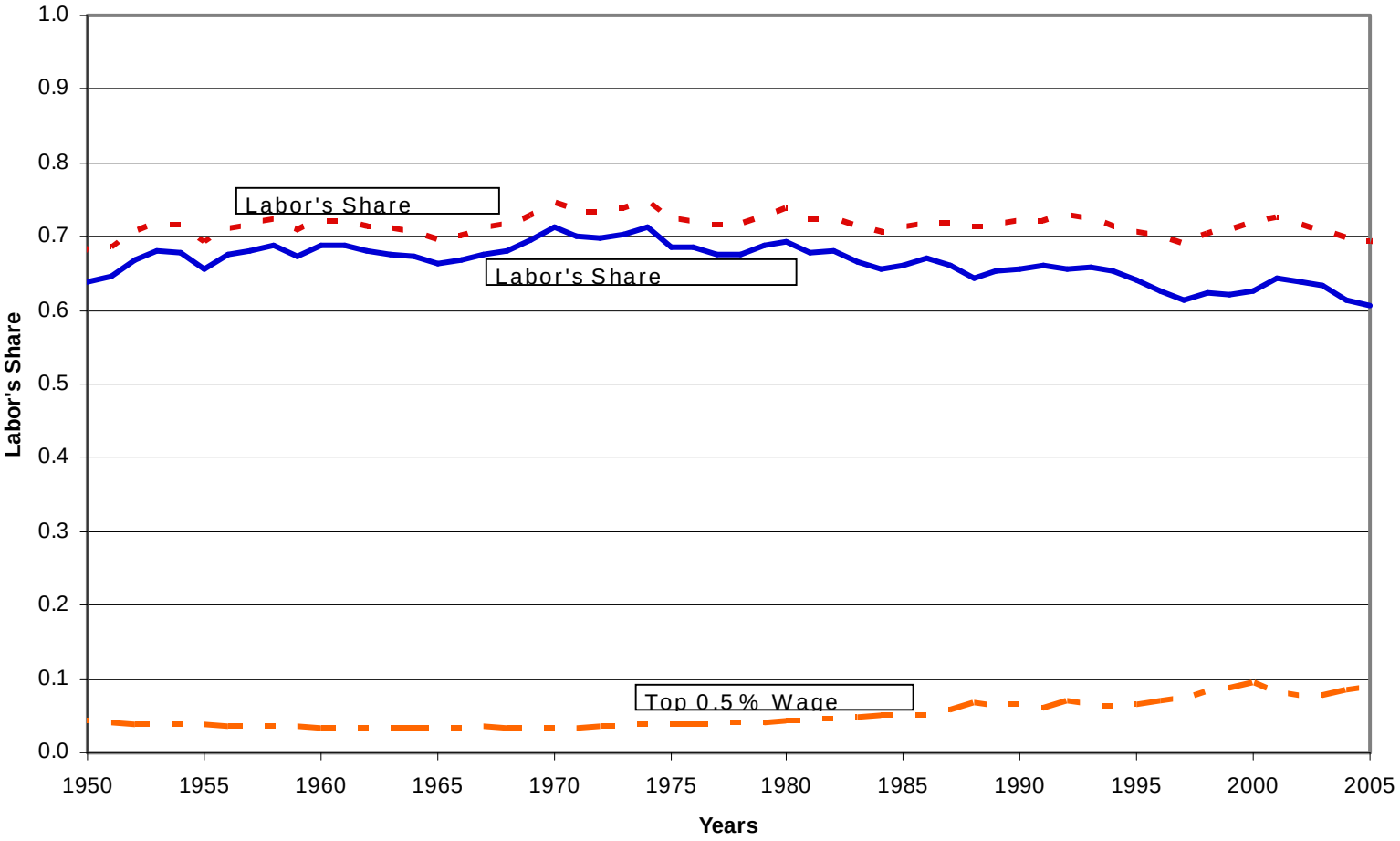
Figure 1. Labor's Share in the Corporate Sector, 1950-2005



Data Source: http://emlab.berkeley.edu/users/saez. See Data for Fig. 6a and Table B2.

Figure 2. Trade Growth, 1950-2005

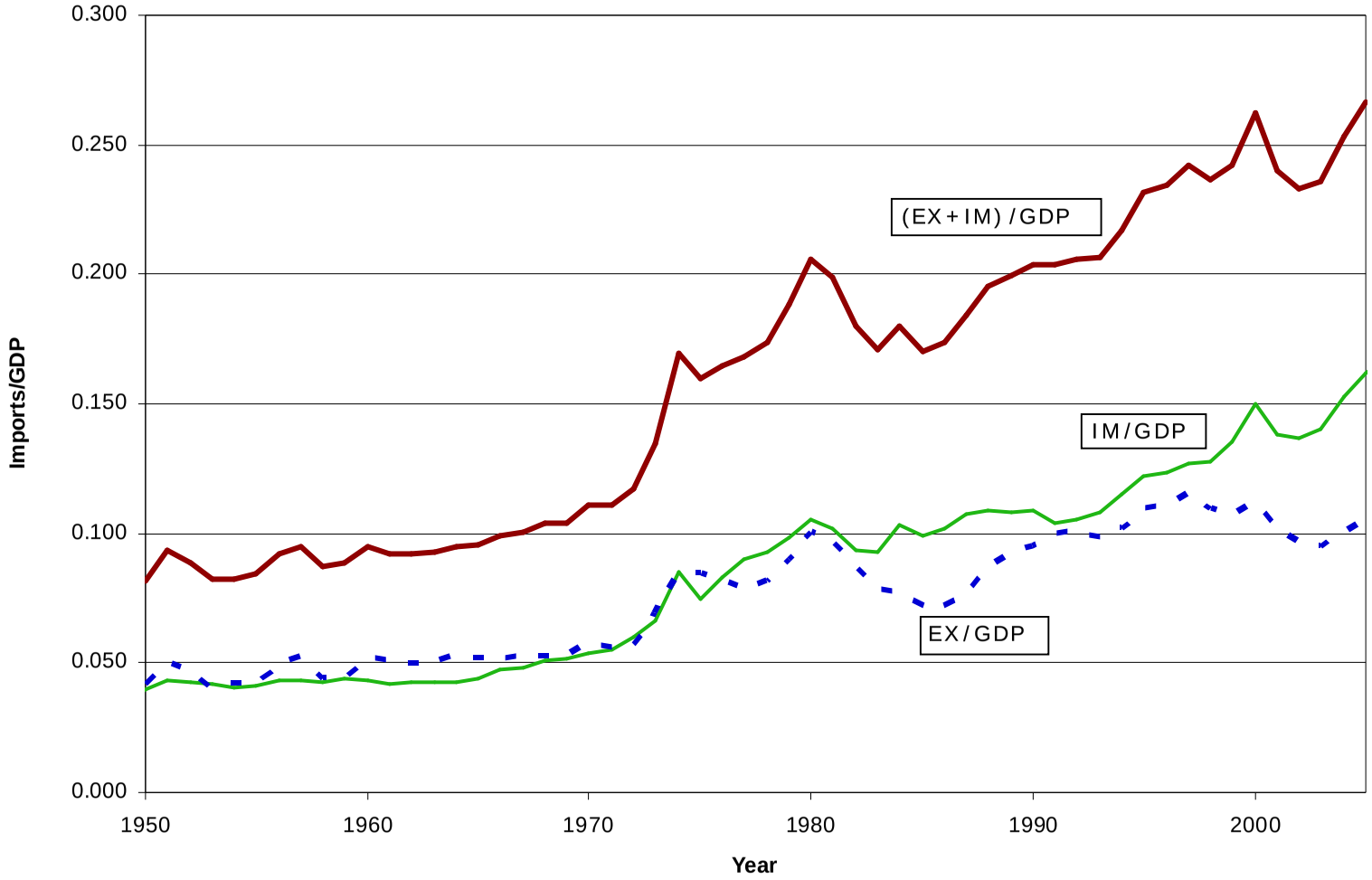
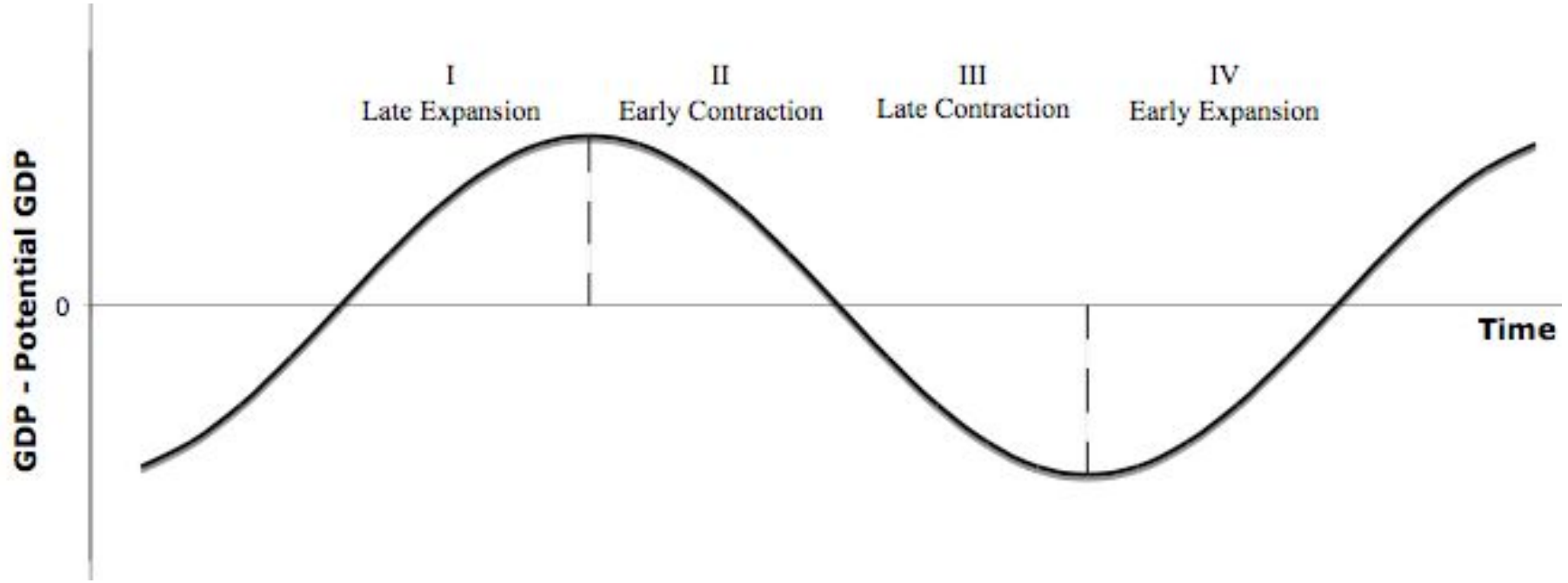


Table 1. The Behavior of Labor's Share over the Business Cycle



Prevailing Influence:	Low UNR	Falling CUR	High UNR	Rising CUR
Effects on				
Real (Product) Wage (RW):	↑	—	↓	—
Labor Productivity (OPH):	↓	↓	↑	↑
Labor's Share (RW/OPH):	↑↑	↑	↓↓	↓

Definitions: CUR: Capacity Utilization Rate; UNR: Unemployment Rate

Figure 3. Behavior of Labor's Share, Capacity Utilization and Unemployment, 1950-2005

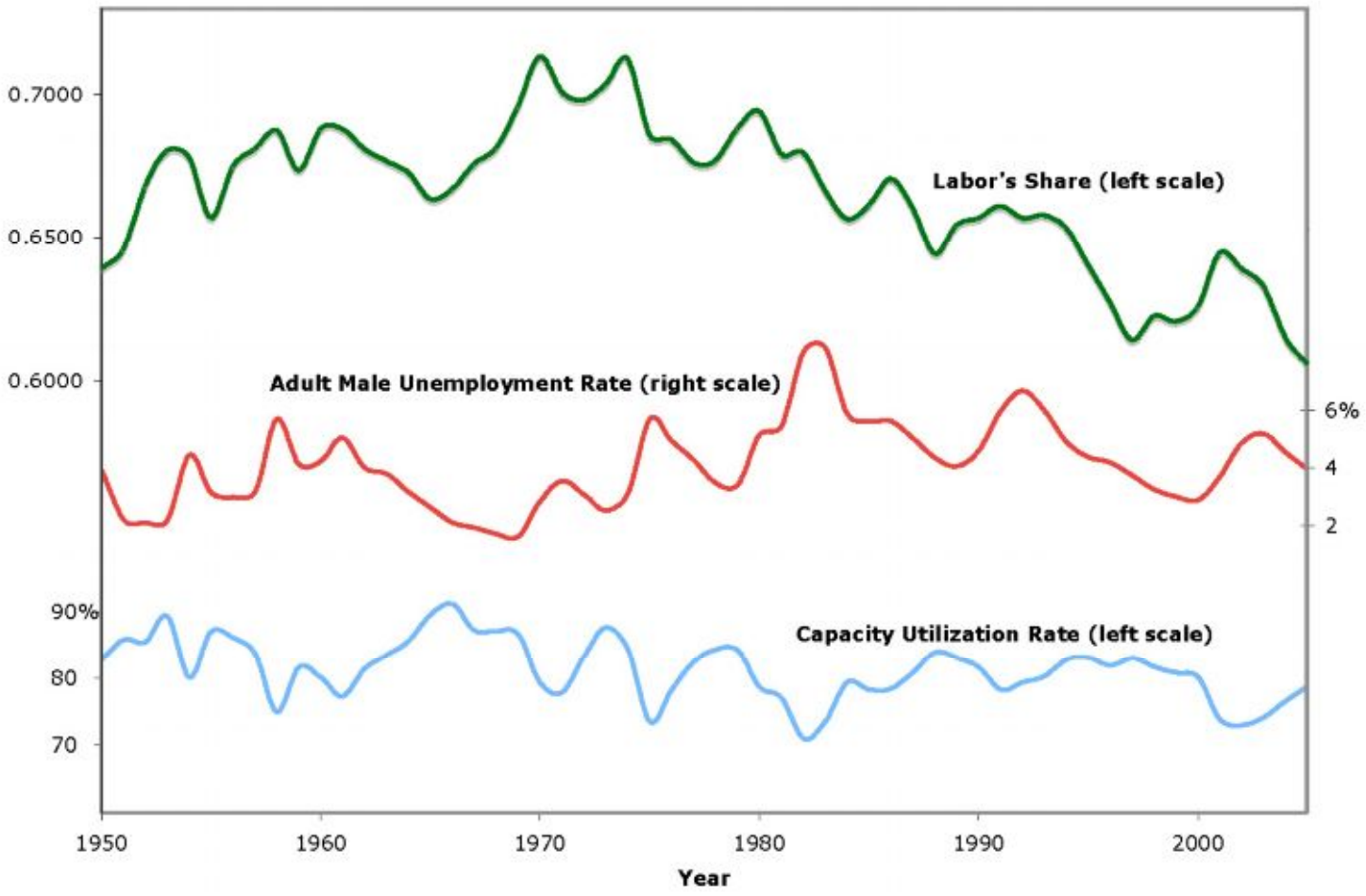


Table 2. Estimates of Equation 3
Dependent Variable: LS_t

(standard errors in parentheses)

Independent Variables	OLS Estimates	P-W FGLS Estimates
Constant	.1371**	.1545**
	(.050)	(.053)
ΔCUR_t	- .0798*	- .0800*
	(.039)	(.039)
UNR_{t-1}	- .0020*	- .0021*
	(.001)	(.001)
$OPEN_{t-1}$	- .1132*	- .1237*
	(.054)	(.058)
LS_{t-1}	.8194**	.7946**
	(.137)	(.077)
$\hat{\rho}$		.0945
n	56	56
$\overline{R}^2$	.866	.845
Breusch-Godfrey test:	χ^2 = .328	
	p = .567	

* and ** denote statistical significance at .05 and .01 levels, respectively, in a one-tailed t-test of significance.

Definitions of variables:

LS – Labor's share of value added in the corporate sector (measured as a decimal fraction).

CUR – Capacity Utilization Rate in manufacturing (measured as a decimal fraction).

UNR – Unemployment rate for males age 25-54 (percent).

OPEN – Ratio of imports to GDP.