

# Replacement versus Historical Cost Profit Rates: What is the difference? When does it matter?

Deepankar Basu\*

January 4, 2012

## Abstract

This paper explains the BEA methodology for computing historical cost and replacement (current) cost measures of the net stock of capital in the U.S. economy. Historical cost profit rates are counter-clockwise (clockwise) rotated versions of replacement cost profit rates during periods of inflation (disinflation) in the price of capital goods. Hence, during periods when the price index for capital goods is flat, the two profit rates move together; an example of such a period for the U.S economy is the whole postwar period 1946–2010. Moreover, trends in both replacement cost and historical cost profit rates display very similar movements over long periods, making the choice of capital stock valuation irrelevant for empirical analysis of profitability trends.

**Keywords:** replacement cost, historical cost, capital stock, profitability trends.

**JEL Codes:** E01, B51.

## 1 Introduction

The Marxian tradition of political economy understands capitalism as a system driven by the needs of capital accumulation. Since profitability is the primary motive behind capital accumulation, the aggregate profit rate becomes one of the most important variables for Marxian political economy.

The profit rate is measured as the ratio of profit income (over a period) and the capital advanced (to generate that profit income). There are two different ways to measure the capital advanced: (a) as the *historical cost* value of the stock of capital, i.e., valuing elements of the capital stock at the prices at which they were purchased, and (b) as the *replacement (or current) cost* value of the stock of capital, i.e., valuing elements of the capital stock at prices at which they could be

---

\*Department of Economics, University of Massachusetts, 1012 Thompson Hall, Amherst, MA 01003, email: dbasu@econs.umass.edu. This paper emerged out of discussions with Duncan Foley and Fred Moseley on a companion paper on profitability trends in the US economy and its relation to understandings of the current crisis that I have co-authored with Ramaa Vasudevan.

purchased in the market in the current period. While economists close to the temporal single system interpretation (TSSI) of Marxian value theory usually use historical cost valuation (e.g., Kliman (2011)), most other Marxian economists use replacement cost valuation of the capital stock (e.g., Moseley (1992); Kotz (2009); Shaikh (2010); Duménil and Lévy (2011)).

When studying the U.S. economy, both groups of economists use capital stock data from the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce, one group using the historical cost series of capital stock and the other using the replacement (or current) cost series for the capital stock. This paper explains the differences in these two valuation methodologies adopted by the BEA, and draws out the relationship between them. In particular, it is shown that the time series of historical cost profit rates can be understood as “rotated” versions of the corresponding replacement cost profit rates. Moreover, the rotation derives from inflation in the aggregate price of capital goods in comparison to an initial period. During periods of inflation (disinflation) in the price of capital goods, the historical cost profit rate series is a counter-clockwise (clockwise) rotated version of the replacement cost profit rate series. In other words, during periods of inflation in the price of capital goods, historical cost profit rates will fall by less (or rise by more) than the corresponding replacement cost profit rates; during periods of disinflation, the opposite will be true.

This implies that during periods when the price index for capital goods is approximately flat, i.e., when there is no inflation, replacement cost and historical cost measures of the capital stock are approximately equal. During such periods, comparison of profitability trends using replacement and historical cost capital stock measures will give similar results. Hence, during such periods, the choice of capital stock valuation methodology becomes irrelevant to the empirical analysis of profitability trends (or movements). The postwar period of U.S. capitalism, 1946–2010, is an example of such a period. Hence, for comparison of profit rates at the two ends of the period, 1946 and 2010, the choice of capital stock valuation is largely irrelevant.

The next section explains the methodology adopted by the BEA to compute estimates of historical and replacement cost measures of the net stock of capital in the U.S. economy. The following section discusses how the time series of historical cost profit rates can be understood as “rotated” versions of the time series of the corresponding replacement cost profit rates; the rotation argument is illustrated with data from the U.S. economy for the period since 1933. The next section discusses long term trends in profitability with special reference to the postwar U.S. economy. The last section concludes the discussion.

## **2 Alternative Measures of Capital Stock**

The net stock of capital, which supports the generation of surplus value in a capitalist economy, can be valued in at least two different ways. The first method is to use historical cost valuation, where the capital stock is valued at prices prevailing when the capital assets were purchased. The second method is to use replacement (or current) cost valuation which, in principle, is the market value at which the stock of capital assets could be bought or sold in the market in the current period.

For both historical cost and replacement cost measures, the BEA of the U.S. Department of Commerce uses the perpetual inventory method (PIM) to estimate the net stock of capital (i.e.,

fixed assets and durables). The PIM entails adding up all the gross investment flows over the past (i.e., from an initial period to the current period); by correcting the gross investment flows for depreciation, the PIM arrives at the estimate of the net stock of the capital stock.<sup>1</sup>

## 2.1 Historical Cost Valuation

To work out the differences between the replacement and historical cost valuation methodologies in a rigorous manner, let  $b$  refer to an arbitrarily chosen base year, and let the economy have  $j = 1, 2, \dots, J$  capital assets. Let  $I_{ij}$  denote the current-dollar value of gross investment in year  $i$  for purchase of capital asset  $j$ , where gross investment includes new investment (i.e., purchase of new assets) and net purchase of used assets.

Let  $P_{ij}^b$  denote the value of a price index (with base year  $b$ ) for asset  $j$  in year  $i$ . Then, the constant-dollar investment in year  $i$  on asset  $j$  is given by  $(I_{ij}/P_{ij}^b)$ . If  $\delta_j$  denotes the depreciation rate for asset  $j$ , then for  $t \geq i$

$$N_{tij} = \frac{I_{ij}}{P_{ij}^b} \left(1 - \frac{\delta_j}{2}\right) (1 - \delta_j)^{t-i},$$

and

$$H_{tij} = I_{ij} \left(1 - \frac{\delta_j}{2}\right) (1 - \delta_j)^{t-i},$$

where  $N_{tij}$  and  $H_{tij}$  are the constant-dollar and current-dollar, respectively, *contribution* to the net stock of asset  $j$  in year  $t$  arising *due to investment* in year  $i$  on asset  $j$ .<sup>2</sup>

Summing over all vintages of constant-dollar investment flows gives the constant-dollar net stock of asset  $j$  in year  $t$

$$N_{tj} = \sum_{i=1}^t N_{tij} = \sum_{i=1}^t \frac{I_{ij}}{P_{ij}^b} \left(1 - \frac{\delta_j}{2}\right) (1 - \delta_j)^{t-i}; \quad (1)$$

In an analogous manner, summing over all current-dollar investment flows gives the current-dollar net stock of asset  $j$  in year  $t$

$$H_{tj} = \sum_{i=1}^t H_{tij} = \sum_{i=1}^t I_{ij} \left(1 - \frac{\delta_j}{2}\right) (1 - \delta_j)^{t-i}. \quad (2)$$

---

<sup>1</sup>The only exception to the use of the PIM is for estimating the net stock of autos, for which the physical inventory method is used. With the physical inventory method, independently estimated prices are multiplied by the number of each type of auto to arrive at an estimate of the nominal value of the net stock of autos. The discussion of alternative methods of capital stock valuation, in this section, draws on BEA (2003).

<sup>2</sup>The term  $\delta_j/2$  comes from the implicit assumption that capital goods are incorporated into the production process, on average, in the middle of the year of purchase.

Summing the constant-dollar investment flows over all the  $j$  capital assets gives the constant-dollar net stock of capital assets in year  $t$  for the whole economy as

$$N_t = \sum_{j=1}^J N_{tj} = \sum_{j=1}^J \sum_{i=1}^t N_{tij} = \sum_{j=1}^J \sum_{i=1}^t \frac{I_{ij}}{P_{ij}^b} \left(1 - \frac{\delta_j}{2}\right) (1 - \delta_j)^{t-i}. \quad (3)$$

Similarly, summing the current-dollar investment flows over all the  $j$  capital assets gives the historical net stock of capital assets in year  $t$  for the whole economy as

$$H_t = \sum_{j=1}^J H_{tj} = \sum_{j=1}^J \sum_{i=1}^t H_{tij} = \sum_{j=1}^J \sum_{i=1}^t I_{ij} \left(1 - \frac{\delta_j}{2}\right) (1 - \delta_j)^{t-i}. \quad (4)$$

Note that the only difference between (3) and (4) is that the former deflates investment flows by the relevant price index for all the  $J$  assets whereas the latter uses current-dollar investment flows.

## 2.2 Replacement Cost Valuation

The replacement cost valuation of the capital stock builds from the constant-dollar net stock at the level of asset  $j$  by inflating it with the value of the price index for the relevant asset. Let  $C_{tj}$  denote the replacement (or current) cost net stock of capital asset  $j$  in year  $t$ ; if  $P_{ij}^b$  is the value of the price index (with base year  $b$ ) for asset  $j$  in year  $t$ , then

$$C_{tj} = P_{tj}^b N_{tj} = P_{tj}^b \sum_{i=1}^t N_{tij}.$$

Using (1), this becomes, for  $t \geq i$ ,

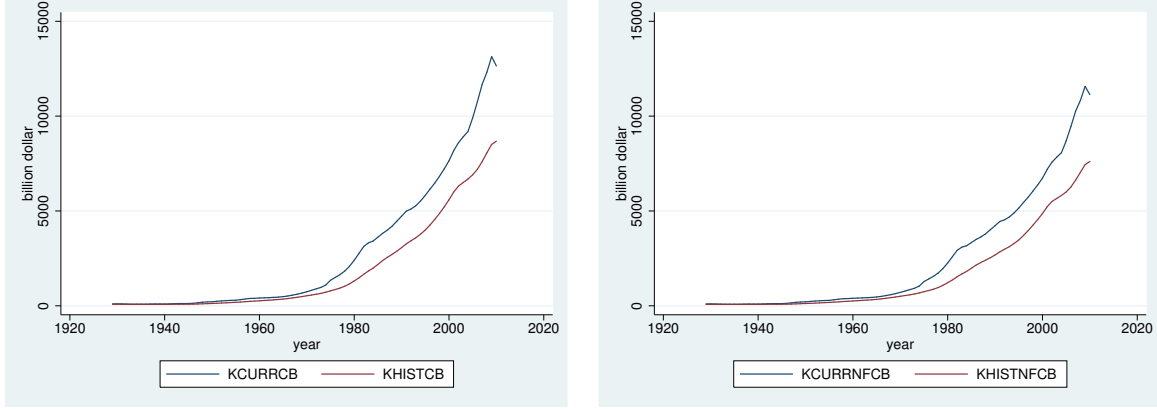
$$C_{tj} = P_{tj}^b \sum_{i=1}^t N_{tij} = \sum_{i=1}^t I_{ij} \left(\frac{P_{tj}^b}{P_{ij}^b}\right) \left(1 - \frac{\delta_j}{2}\right) (1 - \delta_j)^{t-i}. \quad (5)$$

Summing over the assets, then, gives the replacement cost net stock of capital asset in year  $t \geq i$

$$C_t = \sum_j C_{tj} = \sum_{j=1}^J P_{tj}^b \sum_{i=1}^t N_{tij} = \sum_{j=1}^J \sum_{i=1}^t I_{ij} \left(\frac{P_{tj}^b}{P_{ij}^b}\right) \left(1 - \frac{\delta_j}{2}\right) (1 - \delta_j)^{t-i}. \quad (6)$$

## 3 Comparing Capital Stock Valuations

Now, we can use (4) and (6) to compare the historical cost and replacement cost value of the net stock of capital. From (4) and (6) it is obvious that the difference between the two valuations boil down to the ratio of the price index for assets in year  $t$  and  $i$ :  $(P_{tj}^b/P_{ij}^b)$ . We can distinguish two interesting cases.



**Figure 1:** Year-end estimates of fixed assets in the U.S. economy, 1929–2010, using both replacement (current) cost and historical cost valuation. The left panel is for the corporate business sector and the right for the nonfinancial corporate business sector. *KCURRCB*: replacement cost net stock of capital for the corporate business sector; *KHISTCB*: historical cost net stock of capital for the corporate business sector; *KCURRNFCB*: replacement cost net stock of capital for the nonfinancial corporate business sector; *KHISTNFCB*: historical cost net stock of capital for the nonfinancial corporate business sector. Source: NIPA Fixed Assets Table 6.1 and 6.3.

1. **Inflation:** if there is constant inflation in the price of all capital assets, then for all  $j$ ,  $P_{tj}^b \geq P_{ij}^b$  because  $t \geq i$ . Hence, for all  $j$  and  $t$ ,  $C_{tj} \geq H_{tj}$  (because in (5), for all  $j$ ,  $(P_{tj}^b/P_{ij}^b) \geq 1$ ). Thus, summing over all assets in (5) we get  $C_t \geq H_t$ . This gives us the following intuitive result: *if there is constant inflation in the price of capital assets, then the replacement cost value will always be greater than the historical cost value of the net stock of capital, and the divergence between the two valuations will become larger over time.*
2. **Deflation:** if there is constant deflation in the price of all capital assets, then for all  $j$ ,  $P_{tj}^b \leq P_{ij}^b$  because  $t \geq i$ . Hence, for all  $j$  and  $t$ ,  $C_{tj} \leq H_{tj}$ ; and summing over all assets, we have  $C_t \leq H_t$ . This gives a result analogous to the case with constant inflation: *if there is constant deflation in the price of capital assets, the replacement cost value will always be smaller than the historical cost value of the net stock of capital, and the divergence will widen over time.*

Figure 1 plots the historical and replacement cost value of fixed assets for both the corporate business and the nonfinancial corporate business sectors between 1929 and 2010.<sup>3</sup> The replacement cost value of the capital stock is greater than the historical cost value for every year, implying that there has been inflation in the price of capital assets for every year between 1929 and 2010, i.e., the price index for capital goods has increased by a positive amount from its value in the previous year.

The difference between the replacement cost and historical measures, as a percentage of the historical cost value, is plotted in Figure 2. It shows that the difference has been positive for

<sup>3</sup>The base year for these calculations is 1996 (BEA, 2003). Estimates of net capital stock is presented by the BEA from 1925 onwards.

all the years between 1929 and 2010. While the difference was small during the initial years, it has become larger since the mid-1940s, remaining above 35 percent. There are two periods of pronounced upward movement: 1933–1948, and 1967–1982; there is another, smaller, period of upward movement since 2000. There are two periods of decline: 1948–1967, and 1982–2000.

What do periods of upward (and downward) movement in the difference between the replacement and historical cost of the capital stock convey? From (6) and (4), we can see that periods of upward movement are periods when there is inflation in the price of (new) capital assets; similarly, periods of downward movement are periods of disinflation in the price of (new) capital assets. Hence, the periods 1933–1948 and 1967–1982 were periods of inflation in the price of capital goods; and the periods 1948–1967 and 1982–2000 were periods of disinflation in the price of capital goods. If the price of capital goods is related to the pace of technological change in the capital goods producing industries, then periods of disinflation are periods of rapid technological change, and periods of inflation are periods of muted or no technological change, in the capital goods producing industries.

## 4 Rotation of Profit Rates

Let  $\pi_t$  denote the flow of profit income in period  $t$ ; then the profit rate is given by

$$r_t = \frac{\pi_t}{K_t},$$

where  $K_t$  is the value of the capital stock that supported generation of the profit income,  $\pi_t$ . When historical cost valuation is used, the profit rate becomes

$$r_t^H = \frac{\pi_t}{H_t}, \tag{7}$$

with  $H_t$  given by (4); when replacement (or current) cost valuation is used, the profit rate becomes

$$r_t^C = \frac{\pi_t}{C_t}, \tag{8}$$

with  $C_t$  given by (6). Thus,

$$\frac{r_t^H - r_t^C}{r_t^C} = \frac{C_t - H_t}{H_t}, \tag{9}$$

which shows that the percentage difference in the historical and replacement profit rates is equal to the percentage difference in the replacement and historical cost capital stock values.

This immediately shows us that the time series of the historical cost profit rate is a “rotated” version of the time series of the replacement cost profit rate, and that the magnitude of rotation depends on the *magnitude* of difference between the two valuations. During a time period when the replacement cost value of the net capital stock diverges *away* from the historical cost value of the net capital stock, the historical cost profit is a counterclockwise rotated version of the replacement

cost profit rate; during a time period when the replacement cost value of the net capital stock converges *towards* the historical cost value of the net capital stock, the historical cost profit is a clockwise rotated version of the replacement cost profit rate <sup>4</sup>

Does the sign of the difference between the replacement cost and historical cost value of the capital stock have no bearing on the rotation? It is worth noting that (6) suggests that the sign of the difference between the replacement cost and historical cost value of the capital stock matters. In principle, the difference could be negative. This would happen, for instance, when there is continuous deflation in the price of capital assets. But that has not happened in the US economy since 1929. That is why the replacement cost value has been always greater than the historical cost value.

Thus, the data shows that the difference has always been positive because the replacement cost value of the capital stock has always been greater than the historical cost value (see Figure 1 and Figure 2) over the period 1929–2010. Hence, given that the difference has always been positive, the “rotation” depends only on the magnitude of the difference even though, in principle, it could be affected by the sign of the difference.

Let us see how we can use this intuition about “rotation” of profit rates to approach profitability trends in the U.S. economy. Figure 3 plots the profit rate for the corporate business and the nonfinancial corporate business sectors between 1929 and 2010 using both historical cost and replacement cost measures of the capital stock (fixed asset) with two definitions of profit flows: (1) net operating surplus (net value added *less* compensation of employees and taxes on production and imports less subsidies), and (2) profit before tax (net operating surplus *less* net interest and miscellaneous payments and net business current transfer payments).

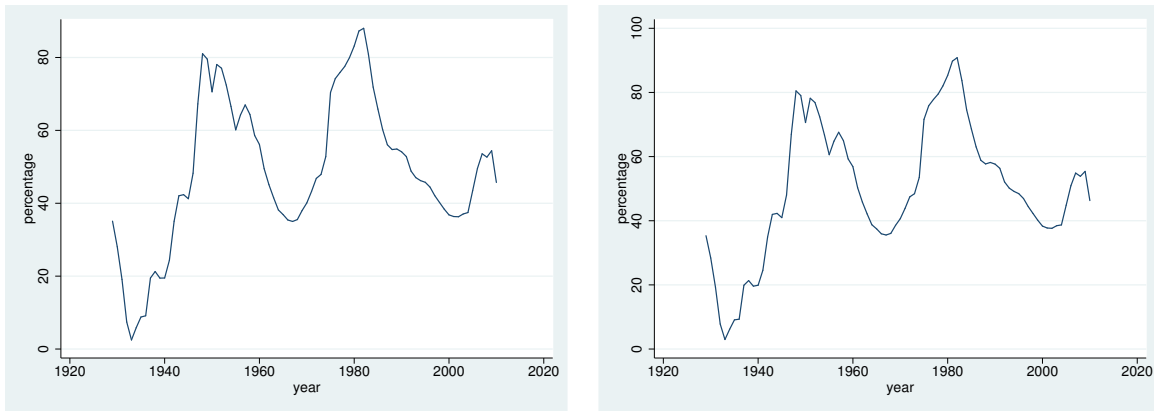
Figure 1 shows that the historical cost value of the capital stock is always lower than the replacement cost value. Hence, the historical cost profit rate is always higher than the replacement cost profit rate, as is obvious from Figure 3. Figure 2 shows that the difference between the historical cost and replacement cost value of the capital stock, though always positive, has a cyclical time profile. As we have pointed out earlier, there are two long periods of upward movement in the difference: 1933–1948, and 1967–1982; there is another, shorter, period of upward movement since 2000. These are broken by two periods of decline: 1948–1967, and 1982–2000. The periods of increase (decline) in the difference between the historical cost and replacement cost value of the capital stock are periods when historical cost profit rates are counter-clockwise (clockwise) rotated version of the corresponding replacement cost profit rates.

This can be equivalently stated as follows: during 1933–1948, and 1967–1982, and since 2000, historical cost profit rates must have grown relatively more (or fallen relatively less) than the corresponding replacement cost profit rates; during 1948–1967, and 1982–2000, on the other hand, historical cost profit rates must have fallen relatively more than the corresponding replacement cost profit rates.

The profit rate data in Table 1 confirms this. In Table 1, data for net operating surplus and profit-before-tax from NIPA Table 1.14 and the capital stock data in Figure 1 has been used to compute several profit rates for the corporate business and nonfinancial corporate business sectors

---

<sup>4</sup>By historical (replacement) cost profit rate I mean the profit rate that is computed with historical (replacement) cost measures of the capital stock.



**Figure 2:** *Percentage difference in the year-end estimates of fixed assets in the U.S. economy between replacement (current) cost and historical cost valuation. The left panel is for the corporate business sector and the right for the nonfinancial corporate business sector. The difference is expressed as a percentage of the historical cost value of the capital stock.*

of the U.S. economy for the period 1929–2010. For brevity, I have reported profit rates for selected years.

As an illustration of the intuition behind “rotation”, let us compare two periods, 1948–1967 and 1967–1982. During the former period the difference between replacement cost and historical cost capital stock values increased in magnitude; during the latter period, the difference decreased in magnitude. Hence, during the former period, the historical cost profit rates must have fallen relatively more than the corresponding replacement cost profit rates. During the latter period, on the other hand, historical cost profit rates must have grown relatively more (or fallen relatively less) than the corresponding replacement cost profit rates.

Starting with net operating surplus as the measure of profit income, we see that during 1948–1967, the profit rate (using replacement cost capital stock) in column (3) changed by 1.8%. During the same period, the profit rate (using historical cost capital stock) in column (4) changed by -23.5%. Moving to profit-before-taxes as a measure of profit income, we see that during 1948–1967, the profit rate (using replacement cost capital stock) in column (7) changed by -28%. During the same period, the profit rate (using historical cost capital stock) in column (8) changed by -46%. Hence, with both measures of profit income, the fall in the historical cost profit rate is larger in magnitude than the replacement cost measure.

Turning to the next period and starting with net operating surplus as the measure of profit income we see that during 1967–1982, the profit rate (using replacement cost capital stock) in column (1) changed by -45%. During the same period, the profit rate (using historical cost capital stock) in column (2) changed by -24%. Using profit-before-tax as the measure of profit income we see that during 1967–1982, the profit rate (using replacement cost capital stock) in column (5) changed by -62%. During the same period, the profit rate (using historical cost capital stock) in column (6) changed by -46%. Hence, with both measures of profit income, the historical cost profit rate fell by less than the corresponding replacement cost profit rate.



## 5 Profitability Trends

The object of primary interest to Marxian political economy is the rate of profit, and not the value of the capital stock *per se*. Hence, it seems natural to investigate the following question: does the specific method of valuation of the capital stock impact on profitability *trends*? The analysis in this paper suggests a straightforward answer: during periods when the price index of capital goods is flat, capital stock valuation becomes irrelevant to empirical analysis of profitability trends. This is because both replacement cost and historical cost profit rates witness similar movements during periods when the price index of capital goods is flat.

### 5.1 Comparing Time Points

Figure 2 suggests that the whole postwar period, 1946–2010, is a period at the end-points of which the price of capital goods were very similar. To see this note that the difference between replacement cost and historical cost values of capital stock for the CB sector was 48.25% in 1946, and 45.71% in 2010; for the NFCB sector the difference was 48.02% in 1946, and 46.28% in 2010.<sup>5</sup> Since the values in 1946 and 2010 are pretty close to each other, this suggests that the price index for capital goods in 2010 was very close in magnitude to its value in 1946. Hence, a comparison of the movements of the replacement cost and historical cost profit rates between 1946 and 2010 would give rise to very similar figures.

This is precisely what we see in the data. Comparing profit rates (with net operating surplus as the measure of profit income) for the CB sector in Table 1, we see that the replacement cost profit in column (1) changes by -0.88% between 1946 and 2010; over the same period, the corresponding historical cost profit rate in column (2) changes by -2.62%. If we use profit before tax as the measure of profit income, the corresponding change for the CB sector are: -38.37% for replacement cost profit in column (5), and -39.83% for historical cost profit in column (6).

Profit rates in the NFCB sector display similar patterns of changes. Using net operating surplus as the measure of profit income, we see that the replacement cost profit rate in column (3) changes by -18.05% between 1946 and 2010, and the historical cost profit rate in column (4) changes by -18.99%. If we instead use profit before tax as the measure of profit income, the corresponding change for the NFCB sector are: -51.21% for replacement cost profit in column (7), and -51.79% for historical cost profit in column (8). Thus, changes in the profit rates over the whole postwar period are very similar irrespective of which method of capital stock valuation is used.

This suggests that comparison of profit rates at the two ends of the post war period, 1946–2010, will not be affected by the choice of capital stock valuation methodology. On the other hand, periods during which the price index for capital goods witness significant inflation or disinflation, replacement cost and historical cost profit rates will register different magnitudes of change. Examples of such periods for the U.S economy are: 1933–1948, 1948–1967, 1967–1982, and 1982–2000.

---

<sup>5</sup>The difference is expressed as a percentage of the historical cost value of the capital stock.

## 5.2 Comparing Trends

But comparing two points in time can be problematic. The results might be driven by the specific points chosen. An alternative is to compute trends in the series and compare those trends.<sup>6</sup> Figure 4 plots the profit rates for the post war period, 1929–2010, but now with Lowess trends (computed with a bandwidth of 0.4) inserted into the time series plot.<sup>7</sup> What patterns does the trend in the profit rate series show? The trends in the replacement cost and historical cost profit rates display similar movements, especially for the postwar period, 1946–2010.

Using net operating surplus as the measure of profit income, we see in Figure 4 that there is a distinct decline in the trend of the replacement cost and historical cost profit rate series for both the CB and the NFCB sectors over the period 1946–2010: the average of the trend profit rate is higher in the immediate postwar decades (regulated capitalism) than the later decades of the 20<sup>th</sup> century (neoliberal capitalism). There is a minor difference between the trends in replacement and historical cost profit rates: while the former has a flat (or mildly increasing) portion after the early 1980s, the declining trend in the latter runs till the late 1990s (CB sector) or mid 2000s (NFCB sector).<sup>8</sup>

If we, instead, use profit-before-tax as the measure of profit income, then trends in the replacement cost and historical cost profit rates display a strikingly similar pattern. For both the CB and NFCB sectors, there is a period of almost secular decline from 1946 to the early 1980s (with a flat period in the early to mid 1960s), followed by a period of mildly upward sloping trend. The average value of trend profit rates is significantly lower in the neoliberal period than in the regulated period of post war capitalism.

## 6 Conclusion

Drawing on BEA (2003), this paper explains the construction of the historical and replacement cost measures of the net capital stock by the BEA of the U.S. Department of Commerce. A comparison of the two measures between 1929 and 2010 show that replacement cost value is always higher than the historical cost value of the net stock of capital. This is caused by the increase, on average, in the price index of capital assets between 1929 and 2010.

By construction, the difference between the replacement cost and historical cost values of the net capital stock measures the change in the price index for capital goods (from some initial year). A closer look at this difference (between the replacement cost and historical cost measures of the net capital stock) over the whole period (1929–2010) show that periods when the difference

---

<sup>6</sup>Some researchers compare peak-to-peak profit rates. While this is better than comparing arbitrary time points, it suffers from the problem of ignoring information in the downturns. A trend uses information for the whole series and is, therefore, a better method for comparison.

<sup>7</sup>There is no single method for extracting the trend from a time series; hence, there is no unique trend. The computation of trends depend on the specific methods adopted and the parameters chosen to implement the method. Some common examples of trend-cycle decomposition are: Hodrick-Prescott filter, locally weighted regressions (Lowess), unobserved components model. In this paper, I present results with Lowess trends.

<sup>8</sup>These divergences, recall, must be driven by the movements in the price index of capital goods summarized in Figure 2.

**Table 1: U.S. Profit Rates (%) for Selected Years<sup>a</sup>**

YEAR	Net Operating Surplus				Profit before Tax			
	CB		NFCB		CB		NFCB	
	CURR	HIST	CURR	HIST	CURR	HIST	CURR	HIST
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1933	1.58	1.62	1.25	1.29	2.06	2.11	1.12	1.16
1946	13.64	20.23	12.80	18.95	18.45	27.34	17.36	25.70
1948	15.89	28.76	15.54	28.04	18.20	32.95	17.33	31.27
1967	16.45	22.21	15.82	21.45	13.99	18.88	12.50	16.94
1982	8.98	16.89	8.08	15.43	5.31	9.99	4.79	9.13
2000	11.96	16.36	10.53	14.56	8.20	11.22	6.43	8.89
2010	13.52	19.70	10.49	15.35	11.37	16.57	8.47	12.39

<sup>a</sup> This table gives the profit rate (= profit income divided by the value of capital stock) for selected years for the corporate business (CB) and nonfinancial corporate business (NFCB) sector of the U.S. economy where profit income is defined as (1) net operating surplus, and (2) profit before tax. CURR: replacement cost value of capital stock; HIST: historical cost value of capital stock. Source: net operating surplus and profit-before-tax data is from NIPA Table 1.14; capital stock data from NIPA Fixed Assets Table 6.1 (replacement cost) and NIPA Fixed Assets Table 6.3 (historical cost).

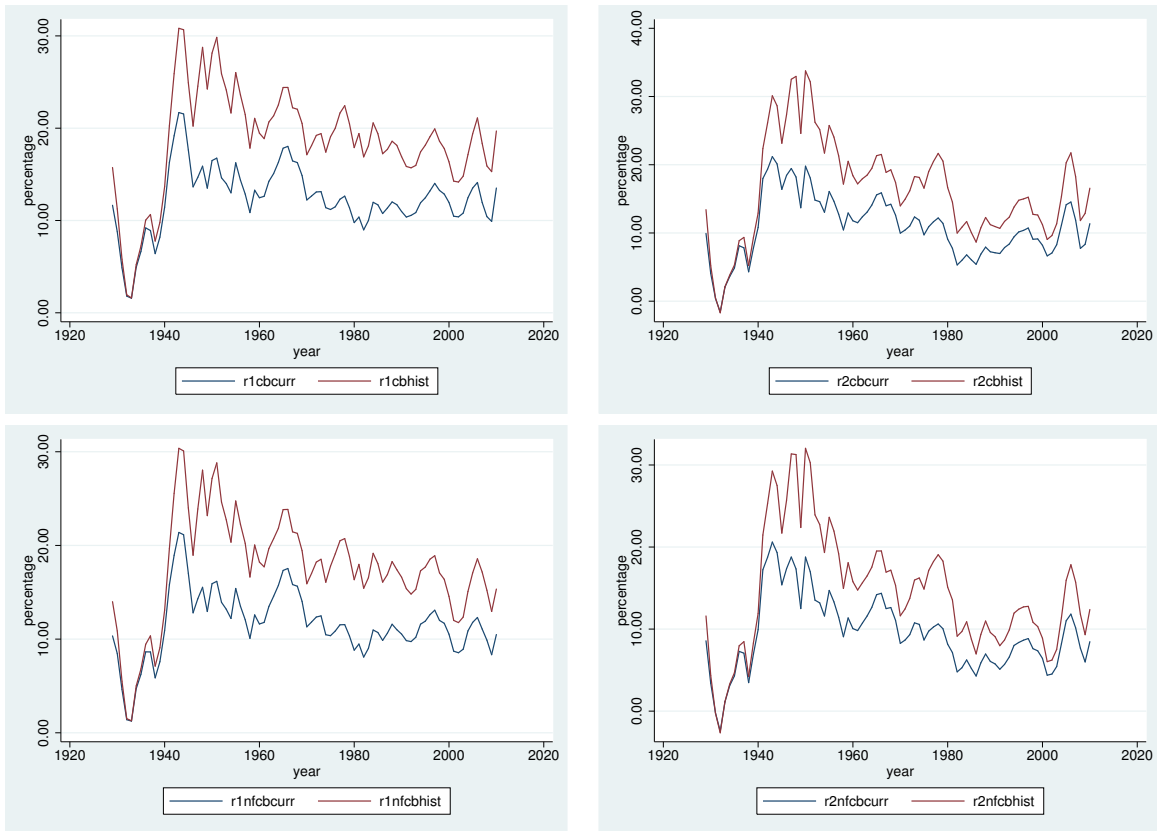
grows in magnitude alternates with periods when the difference becomes smaller, the difference always remaining positive nonetheless. Periods during which the difference grows in magnitude are periods when there is inflation in the price of capital assets; periods during which the difference becomes smaller are periods when there is disinflation in the price of capital assets.

If these medium-run changes in the price of capital assets is driven by technological change, then periods of disinflation are periods of technological improvement in the capital goods industries, and periods of inflation are periods of technological stagnation. Hence, comparison of the two measures of capital stock has interesting information to offer about the pace of technological change in the capital goods sector.

Since the profit rate is the ratio of profit income (suitably defined) and the value of the capital stock, systematic divergence in the replacement cost and historical cost values of the net capital stock make historical cost profit rate series “rotated” versions of replacement cost profit rate series. During periods of growing (narrowing) difference between replacement cost and historical cost values of the capital stock, the historical cost profit rate is a counter-clockwise (clockwise) rotated version of the replacement cost profit rate.

Since the rotation is driven by the divergence between the replacement and historical cost valuation of the capital stock which is, in turn, driven by the inflation in the price index of capital goods, periods of zero inflation in capital goods prices make the two valuations equal. During such periods, the choice of capital stock valuation becomes irrelevant to analysis of profitability trends.

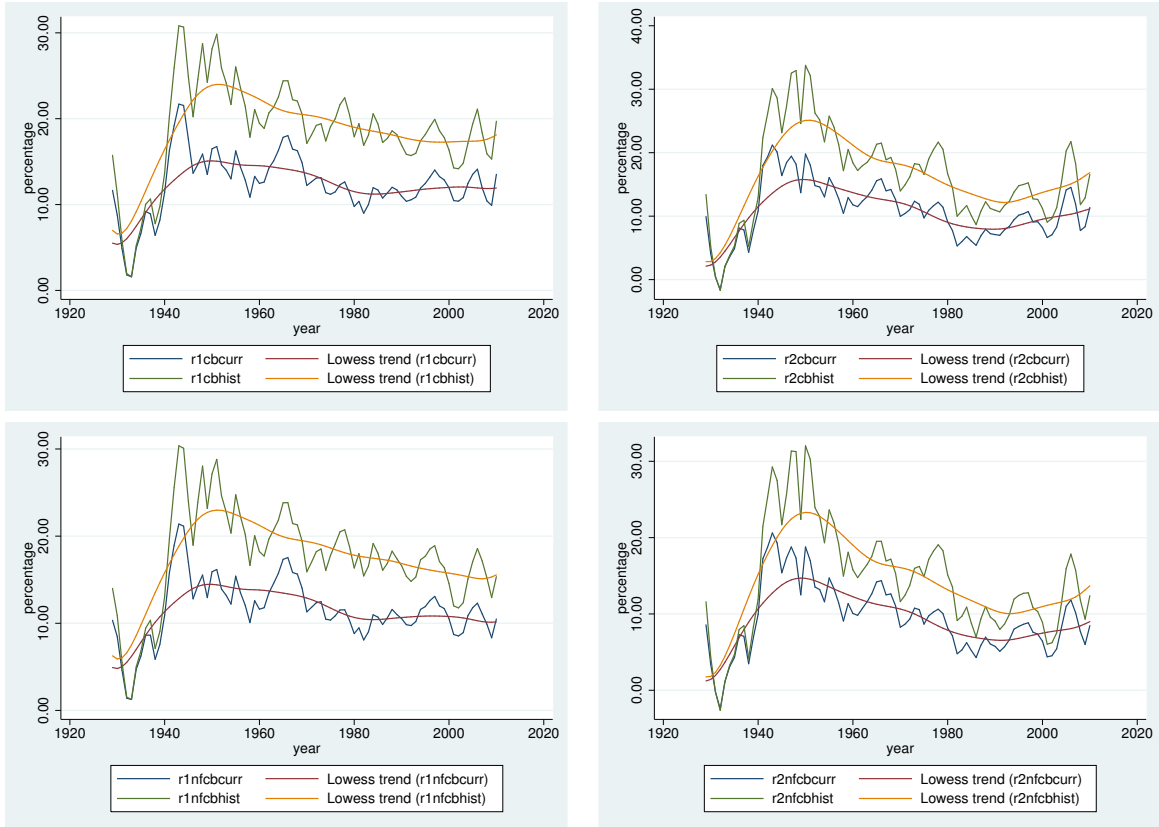
The postwar period of U.S. capitalism is precisely one such period. As can be seen from Figure 2, the value of the price index of capital goods in 2010 was roughly equal to its value in



**Figure 3:** Annual estimates of profit rates in the U.S. economy, 1929–2010, using both replacement (current) cost and historical cost valuation of fixed assets. The top panel is for the corporate business (CB) sector and the bottom for the nonfinancial corporate business (NFCB) sector. “r1” uses net operating surplus as a measure of profit; “r2” uses profit-before-tax as the measure of profit. Source: net operating surplus and profit-before-tax data is from NIPA Table 1.14; capital stock data from NIPA Fixed Assets Table 6.1 (replacement cost) and NIPA Fixed Assets Table 6.3 (historical cost).

1946. Hence, both replacement cost and historical cost profit rates show similar movements over this period. On the other hand, periods during which the price index for capital goods witness significant inflation or disinflation, replacement cost and historical cost profit rates will register different magnitudes of change. Examples of such periods for the U.S economy are: 1933–1948, 1948–1967, 1967–1982, and 1982–2000. It is also interesting to note that long term (Lowess) trends in the profit rates for both the corporate business and nonfinancial corporate business sectors in the U.S. display remarkably similar movements, especially over long periods of time, e.g., the postwar period 1946–2010.<sup>9</sup>

<sup>9</sup>For a detailed analysis of profitability trends in postwar U.S. capitalism, see, for instance Basu and Vasudevan (2011).



**Figure 4:** Annual estimates of profit rates (with Lowess trend, bandwidth=0.4) in the U.S. economy, 1929–2010, using both replacement (current) cost and historical cost valuation of fixed assets. The top panel is for the corporate business (CB) sector and the bottom for the nonfinancial corporate business (NFCB) sector. “r1” uses net operating surplus as a measure of profit; “r2” uses profit-before-tax as the measure of profit. Source: net operating surplus and profit-before-tax data is from NIPA Table 1.14; capital stock data from NIPA Fixed Assets Table 6.1 (replacement cost) and NIPA Fixed Assets Table 6.3 (historical cost).

## References

- D. Basu and R. Vasudevan. Technology, distribution and the rate of profit in the us economy: Understanding the current crisis. Department of Economics, University of Massachusetts, Amherst Working Paper 2011-32., 2011.
- BEA. *Fixed Assets and Durable Goods in the United States, 1925–97*. U.S. Department of Commerce. Bureau of Economic Analysis, 2003.
- G. Duménil and D. Lévy. *The Crisis of Neoliberalism*. Harvard University Press, 2011.
- A. Kliman. *The Failure of Capitalist Production: Underlying Causes of the Great Recession*. Pluto Press, 2011.
- D. Kotz. The financial and economic crisis of 2008: A systemic crisis of neoliberal capitalism. *Review of Radical Political Economics*, 41(3):305–17, 2009.
- F. Moseley. *The Falling Rate of Profit in the Postwar United States Economy*. St. Martin’s Press, 1992.
- A. Shaikh. The first great depression of the 21<sup>st</sup> century. In L. Panitch, G. Albo, and V. Chibber, editors, *The Crisis this Time: Socialist Register 2011*, pages 44–63. The Merlin Press, 2010.