

RECOLLECTING KALECKI'S STUDIES OF THE US ECONOMY

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Kalecki wrote a few empirical papers dealing with the economic evolution of advanced capitalist countries, and particularly of the USA economy. For that purpose, he devised a novel methodology of analysis which, unfortunately, did not have the impact it deserved on applied research; even among his followers.

The objective of the present paper is twofold. First of all, to discuss and revisit some of Kalecki's hypotheses, as well as his methodology for applied economics. And second, to put them to test for a study of the recent development of the USA economy. For the latter purpose, we use modern econometric procedures.

The two hypotheses we want to explore in our work are, (i) the impact on effective demand and output of a higher wage share, on one hand; and (ii) the impact of increased government expenditure, on the other. Therefore, it is beyond our objectives to carry out an overall study of the US economy; and we limit ourselves to deal with these two very specific issues. Readers will probably recognize that the two points we will discuss in this paper have been at the center of the economic debate for several decades; and that different school of thought give different, and even contradictory, answers, to the issues under consideration. An additional investigation of these two questions may not therefore be redundant.

Kalecki's hypotheses and methodology

Let us first of all discuss two of Kalecki's hypotheses. The first one refers to the positive effect on demand and output of redistribution of income in favor of wage earners. The second one has to do with the positive impact of government expenditure, when it is not financed by taxing wages.

It is important here to give due weight to Kalecki's first hypothesis, for which it will be useful to make a short detour. A central notion of classical and neoclassical economics is that *laissez faire* capitalist economies are endowed with an endogenous full employment mechanism, triggered by the wage and price fall caused by unemployment. The mechanism relies on several effects. In a closed economy the first effect is the reduction in interest rates, which would arise from the increased real amount of money, when prices fall and the amount of nominal money is given; namely, the so-called "Keynes effect"¹. The second effect, also pertaining to a closed economy, the "Pigou effect", is based on the notion that the wage reduction and the ensuing price decline would stimulate aggregate demand due to higher spending from creditors which, with lower prices, would feel richer. The third effect, which has to do with an open economy, adds to the two previous effects the improved competitiveness following from the wage and price fall and the depreciation of the domestic

¹ It is as well to mention that Kalecki independently discovered what came later to be known as "the Keynes effect". In Kalecki (1934) he showed that wage and price reduction was the basic mechanism underlying Say's Law, because in a monetary economy with given amount of nominal money, that reduction would bring about an interest rate fall which would stimulate investment and effective demand (See also López and Assous, forthcoming).

currency, and the consequent demand expansion associated with the improvement in the trade balance.

Now, Kalecki put forward three major criticisms to the classical-neoclassical full employment mechanism. In the first place, his endogenous conception of money led him to reject the view whereby the real amount of money would rise. He claimed that in fact banks would accommodate a lower demand for credit and rather maintain the real interest rate (Kalecki, 1943). In the second place, we recall that Kalecki was also the first to reject the “Pigou effect”. He objected that a generalized price decline would not only make creditors feel richer, but it would also make debtors feel poorer; adding that widespread and persistent wage and price decrease would likely bring about a “crisis of confidence” which would slow down private spending (Kalecki 1944). His third objection came from his argument that a wage reduction would likely imply a smaller proportional fall in prices than in wages, and that the consequent drop in the wage share would depress workers’ consumption and effective demand, thus amplifying the original situation of unemployment. Though Kalecki’s main emphasis was on a closed economy, he also considered the case of an open economy, concluding that the improvement in the trade balance might not occur, or might not be large enough to offset the negative impact on domestic demand ensuing from the fall in workers’ consumption consequent upon the shift of factor shares from wages to profits (Kalecki 1939).

On the other hand, we call to mind that some years before Keynes had published **The General Theory**, Kalecki emphasized the expansionary role of government deficits on profits, and on demand and output. More generally, he argued that the impact of government expenditure depends not only on its

amount, but also on the way it is financed. In his view, greater government expenditure, financed either with deficit or with higher taxes on profits, stimulate effective demand. In the first case this happens because private income is not reduced, while in the second this is the consequence of taxes affecting income that would otherwise have been saved rather than spent. Moreover, he dismissed the notions that a higher deficit necessarily entails higher interest rates, showing that an appropriate monetary policy could ensure that the higher demand for money for transaction purposes did not bring forth a higher interest rate (Kalecki, 1944 [1991]).

Let us now briefly formalize Kalecki's theory. Kalecki's enlarged formula for profits reads:

$$P^b = I + Ck + B + J + H - S^w \quad (1)$$

where P^b is (gross) profits **before taxes**, I is private investment, C_K is capitalist consumption, B is the Budget deficit, J is the export surplus, H is total taxes on corporate profits and S^w is wage workers' savings. Kalecki assumed that capitalist expenditure ($I+C_K$) is predetermined, in that it follows from decisions previously taken, which are difficult to cancel; thus, today's capitalist spending is determined by yesterday's profits (Kalecki 1954 [1991]: 281; López and Mott, 1999, López and Assous, forthcoming).

On the other hand, Kalecki also showed that total effective demand depends on total profits before taxes and on the relative share of profits in national income. Namely:

$$Y = \frac{I + Ck + B + J + H - S^w}{e} = \frac{P^b}{e} \quad (2)$$

where e is the relative share of profits in national income, which depends on the degree of monopoly; i.e. on the ratio of the price to the unit prime cost. Now, if the productive capacity is not fully employed, when investment or capitalist consumption, or net exports or the budget deficit go up, then total profits before taxes will rise which, given total taxes on profits, induces also an increase in after tax profits. Similarly, if taxes on profits rise, the remaining items on the right-hand side of equation (1) will not change so that, given the relative share of profits in national income, according to equation (2) total demand and output will rise by so much, that after tax profits will remain constant². On the other hand, if the rise of taxes on profits brought about an increase in the degree of monopoly (and consequently in the relative share of profits in national income), the denominator of (2), e , would go up, and the impact on effective demand and output of higher government expenditure would be nil.

We shall now consider the methodology Kalecki set up for his analysis, for which it will be useful to clarify the purposes he had in mind. Firstly, he wanted to separate those components of income which determine changes in its volume, from those which play a purely passive role. As is well known, in his theory consumption is a rather passive element because, with balanced external and government sector, and given the distribution of income, consumption simply follows the movement of investment.

² This is only approximately correct. Since the additional government expenditure leads to an expansion of effective demand, imports tend to rise and net exports (J) are reduced. Moreover, if higher total wages induce a rise in workers' savings, this will also tend to reduce profits.

Secondly, Kalecki aimed at analyzing the impact of government expenditure on effective demand; taking into account that the way of financing the expenditure affects its impact. He thus distinguished between (i) deficit financed expenditure, (ii) government expenditure financed by taxing profits, and (iii) net revenue of the government from persons; i.e. government expenditure financed taxing persons, which has a neutral effect on demand. Government spending on goods is equal to the sum of items (i) to (iii).

To conclude this section, it is as well to recall that Kalecki elaborated the essentials of his theory during the 1930s and 1940s; and that he wrote the study of the US we will discuss in the next section in the mid-1950s. The former was a period when his assumption whereby “workers spend what they earn” was probably close to reality; and until very recently the US economy was a relatively closed one. Therefore, his statements that a wage rise, or an increase of taxes on profits, do not encroach upon profits, which then may have been approximately valid, has probably lost strength in the present circumstances. It remains to be studied if his additional claims, whereby higher wages, and higher taxes on profits, stimulate effective demand and output, are or not still realistic. Let us now discuss some salient facts of the USA economic evolution in the recent past, using a Kaleckian approach.

A Kaleckian description of the US economic evolution

As a preliminary step before testing Kalecki’s hypotheses, we refer to one of Kalecki’s empirical papers (Kalecki 1956 [1997], where the author carried out a long-run comparison of the economic situation of the US economy, between 1937 and the mid-1950s.

Kalecki first of all pointed out that in that period the national product had more than doubled, with an annual growth rate of 4.2% per annum. He then argued that from the supply-side this was not difficult to explain, because both total employment force and labor productivity also grew, 1.6% and 2.6% per annum respectively; even as capital equipment also expanded considerably³.

The author then asked the following question: How was it possible that the productive facilities were in fact utilized? Indeed, he stated, “the discrepancy between the development of productive forces and the market for their products constitutes one of the main contradictions inherent in the capitalist system.... [a contradiction that] in the period considered tended to grow more acute... [because]... big business’s relative share of accumulation of the national product increased significantly” (Kalecki 1956 [1997]: 280). To answer this question the author produced a table where he organized the national income account according to his methodology.

In his study he found that the most important changes in the structure of final demand in the USA between 1937 and 1955 had been, firstly the change of sign of the trade balance, which went from a -0.5% of GDP to +1.3% of GDP. Secondly, there occurred a large rise in taxes on corporate profits. Thirdly, he called attention to the fall of the relative share of private consumption. Fourthly, he noticed the rise of what he called “Net government revenue from persons”;

³ By the way, we notice that between 1960 and 1980 GDP grew 3.7% (pa), with employment and labor productivity contributing 2.3% and 1.4% (pa) respectively. Between 1980 and 2007 US GDP grew at an annual rate of 3.2%; with total employment growing 1.45% and labor productivity 1.57% (pa).

namely, the net balance between personal taxes and transfers. He thus concluded:

“The increase in the relative share of private accumulation in the national product... did not cause any underemployment of productive resources for the following reasons: the additional private accumulation was absorbed by armaments and by the export surplus, whose increase was associated with ‘foreign economic assistance’ or with the construction of bases abroad which provided the wherewithal for importing American goods. (Kalecki 1956 [1997]: 284).

In this study Kalecki thus came to the notion that expansionary fiscal policy in the US was not based on budget deficit, but on expenditure financed with taxes on profits. Therefore, he saw substantiation for his hypothesis that a balanced budget can be expansionary when taxes are levied on corporate profits.

We shall now consider the main factors behind US evolution after 1980 and up until 2007, with the help of Table 1 and Graph 1. The Table was built on the basis of Kalecki’s methodology. We show data for the years in which an upswing took place.

Table X.1 US National Income, billions of chained (2000) dollars (left) and % of GDP (right).

<i>Comps. of Nat. Income</i>	1980		1981		1990		2001		2007	
1. Residential Investment	239.7	4.64	220.5	4.18	298.9	4.18	448.5	4.54	453.8	3.93
2. Non-residential Inv.	435.6	8.43	460.3	8.73	594.5	8.31	1,180.5	11.94	1,382.9	11.97
3. Change in priv. inventories	-8.0	-0.15	34.9	0.66	15.4	0.22	-31.7	-0.32	-2.5	-0.02
4. Foreign trade balance	12.6	0.24	8.3	0.16	-54.6	-0.76	-399.1	-4.04	-546.5	-4.73
5. Taxes on corporate income	167.1	3.23	145.5	2.76	182.3	2.55	190.1	1.92	320.7	2.78
6. Budget Deficit	142.8	2.76	125.4	2.38	318.9	4.46	38.3	0.39	300.4	2.60
I. Priv. Accumulation *	989.8	19.15	994.9	18.87	1,355.4	18.94	1,426.6	14.43	1,908.8	16.52
II. Net taxes on Persons	805.5	15.58	854.7	16.21	1,028.8	14.38	1,551.9	15.69	1,390.9	12.04
III. Personal Cons. Exp.	3,374.1	65.27	3,422.2	64.92	4,770.3	66.68	6,910.4	69.88	8,252.8	71.44
<i>National income inclusive of consumer services **</i>	5,169.4	100	5,271.7	100	7,154.5	100	9,889.0	100	11,552.6	100
Total Government Exp. and Inv. (4 + 5 + II)	1,115.4	21.58	1,125.5	21.35	1,530.0	21.39	1,780.3	18.00	2,012.0	17.42
Private Saving [(1 + 2 + 3) + 6 + 4]	822.7	15.91	849.4	16.11	1,173.1	16.40	1,236.5	12.50	1,588.1	13.75

* Private accumulation is the sum of items 1 through 6 in Table.

** National Income might not add up to original GDP series due to approximations.

Sources: Own elaboration with data from the Bureau of Economic Analysis (NIPA Tables).

We follow Kalecki, and we divide the national product into three parts: “(i) private accumulation, (ii) ‘net revenue of the government from persons’, and (iii) personal consumption of goods and services” (Kalecki 1956 [1997]: 281). Investment in fixed capital, increase in inventories, and the export surplus, make up what he called “Gross (or Social) Accumulation”. Kalecki then defined “Private Accumulation”, which is a larger concept in as much as in it also “the budget deficit should be taken into consideration, because it means an increase in the government indebtedness to capitalists. Finally, we also include in private accumulation revenue from the corporate profit tax as accumulation ceded to the government” (Ibid, 281-282). On the other hand, “Item (ii) represents the budget revenue exclusive of taxes on corporate profits but only to the extent to which they are spent on business products. Thus this is a surplus of personal

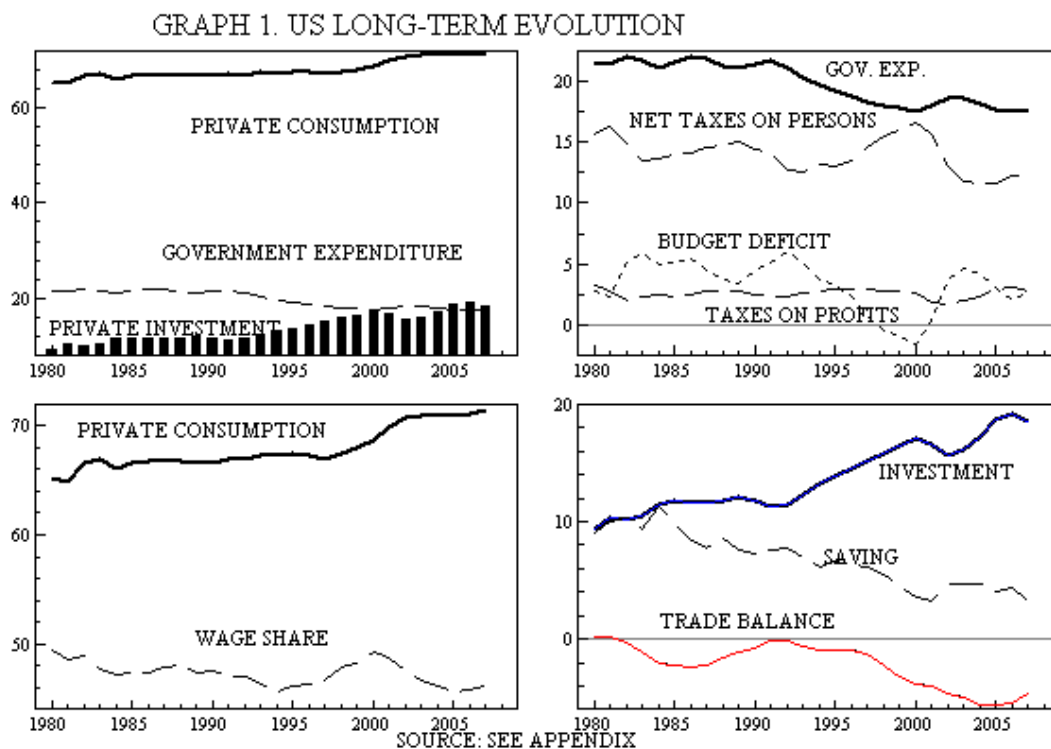
income tax, contributions to social insurance plans, and indirect taxes over and above the expenditure on the remuneration of the armed forces...and of government employees, on social insurance benefits, and on the interest of the public debt” (Ibid, 281-282). As mentioned, national income is the sum of: (i) private accumulation, (ii) ‘net revenue of the government from persons’, and (iii) personal consumption of goods and services. Finally, taxes are levied on corporate profits and on persons. Net taxes from persons⁴ are expressed as the difference between total government expenditure on goods and services, on the one hand; and on the other the sum of the budget deficit plus corporate income taxes. Accordingly, when it is positive this item represents a payment from persons to the government. The budget deficit is directly obtained from the NIPA tables; and is also known (in the official nomenclature) as net government dissaving. The remaining items in the Table and Graph should be clear to the reader.

As said, Kalecki showed that, assuming workers do not save, a rise in any of the items included in Gross (or Social) accumulation, or in government expenditure financed via budget deficit, raises by an equal amount profits and has a large multiplier effect on effective demand (see equations 1 and 2). On the other hand, when the government finances its expenditure taxing corporate profits, effective demand is boosted but after tax profits do not rise (see again equations 1 and 2). Finally, when government expenditure is financed with “net government revenue from persons”, it crowds out private expenditure because it

⁴ Another term for this concept, used by Kalecki, is “surplus of government revenue (exclusive of taxes on corporate profits) over government expenditure on compensation of employees and transfers”.

reduces the purchasing power of the population. Therefore, the increase in government expenditure leaves effective demand and output unchanged.

In the following Graph we include some of Kalecki's as well as other variables of importance. All the variables are taken as a percent of GDP.



The first point to notice is that the changes in the relative share of all variables in GDP are relatively mild, especially considering that our period of analysis extends beyond a quarter of a century. Since an exhaustive analysis of all the changes involved is beyond the scope of our paper, we shall only make some brief remarks on those of major relevance. In the first place, we point out the rise in the relative share of private consumption and of private investment in GDP. It is also important to notice that, as shown in Table 1, the rise involved both components of private investment, namely residential investment and non-

residential investment⁵. It thus appears that the old view whereby consumption and investment are in antagonist position does not receive support from the US data, insofar as these two variables move together.

We also notice that the rise in the relative share of private consumption was not aided by a shift of factor incomes from profits to wages, except for a brief lapse between 1996 and 2000 when the wage share actually grew. But the latter share fell, though moderately, between 1980 and 1995. Between 1994 and 2000 it regained its previous level, but it fell again between 2000 and 2006⁶. In this latter period private consumption and the wages share moved in opposite directions. The latter upswing in private consumption was surely aided by the spectacular rise in the price of assets and on wealth, which probably stimulated a fall in personal savings. An additional stimulus may have come from fall of the net government taxes from persons.

The fall of the share of private savings is another important change that took place in the period, and it has been one of the most regular and unrelenting ones. Many analysts have observed this fall with apprehension, but we do not share this attitude because a falling share of savings creates additional effective demand and profits (see equations 1 and 2) and, if anything, stimulates capital accumulation. On the other hand, let it be remembered that private savings is a passive, not an active element of the macroeconomy

⁵ Although the former's relative share fell, between 2005 and 2007; while the latter maintained its growth.

⁶ By the way, the fall in the relative share of wages in the US was milder than the one that took place in the European countries after 1980, where that share fell between six and ten percentage points.

(Steindl, Laski,). As any sophomore should know, private savings are necessarily equal to the sum of private investment, plus the budget deficit, plus the surplus in the current account balance. Such that, paraphrasing Keynes (14: 222), we can say that “the public can save ex ante, and ex post, and ex anything else until they are blue in the face”, but savings will not rise unless the right-hand side of that equation rises. Now, for the US in the period under consideration, the main factors behind the fall of private savings were the decline of the budget deficit and the growth of the deficit of the current account balance. Since the relative share of private investment in GDP increased all along the period, the rise in the propensity to consume would not have brought about a decline in the share of savings if the government deficit had remained stable, or the current account deficit had not worsened, or both.

This last observation brings to the fore the worsening trade deficit of the US economy, another regular and unrelenting phenomenon we observe in this period. Here again, we depart from the mainstream views, that see behind the growing deficit a loss of technological leadership of this country vis-à-vis its trade rivals⁷. We do not wholly agree with this view, and we simply observe that during the period under consideration the share of non-residential investment in GDP almost doubled, i.e. rising from 7% to 13% between 1980 and 2007; which is something that surely brought with it technological advance. Furthermore, we recall that, under the present international financial arrangements and institutions, a growing US trade deficit is one of the few sources of demand injections into the world economy. We may not like those financial

⁷ See for example Koo (2009).

arrangements and institutions, but unless and until something new comes into being, the world economy benefits from a growing US trade deficit.

We already mentioned the fall of the budget deficit. From Graph1 we can see that the budget moved in ups and down, so that the deficit peaked in 1992, reaching 6.1% of GDP, then fell until turning into a surplus of 1.6% of GDP in 2000, and in 2007 the deficit represented 2.6% of GDP. On the other hand, taxes on corporate profits remained stable during the whole period. Finally, net taxes on persons also moved with ups and downs, reaching its peak at 16.6% of GDP in 2000, to fall to 12% of GDP in 2007.

Putting the hypothesis to test: A Kaleckian-VAR approach

Before proceeding with the analysis, we consider it useful to say a few words about the methodology we shall follow; and to briefly discuss some papers where the hypotheses we will explore have been previously studied.

There is an important controversy amongst econometricians about the most adequate procedure to carry out empirical modeling. Colander (2009), for example, contrasts two alternative perspectives in empirical macroeconomics. He distinguishes on the one hand what he calls the “European perspective”, based on “the general-to-specific Cointegrated Vector AutoRegressive (CVAR)” approach; and on the other the currently dominant “Dynamic Stochastic General Equilibrium (DSGE) models”. However, the latter one can be “... better described as a Pre-Eminence of Theory standpoint, where the data are assigned a subordinate role broadly described as quantifying theories presumed adequate. In contrast, the European general-to-specific CVAR perspective attempts to give data a more substantial role in the theory-data confrontation and is more accurately described as endeavouring to accomplish

the goals accorded by sound practices of frequentist statistical methods in learning from data” (Spanos, 2009).

In the applied part of this paper, we shall follow the “European” approach to econometrics. Accordingly, we emphasize the use of *statistically adequate* models as the basis of drawing reliable inferences; where the term *statistically adequate* refers to the validity of the probability and the statistical assumptions underlying the estimated model. The foundation of this approach is a purely probabilistic construal of the notion of a statistical model, considered to be a set of internally consistent probabilistic assumptions aimed to capture the statistical information in the data (chance regularity patterns). In other words, economic theory suggests the potential theoretical relationships and the relevant data, but the statistical model is specified by viewing the observed data as a realization of a generic vector stochastic process with a probabilistic structure that would render the observed data a truly typical realization thereof. Thus, we distinguish between the structural model, which is based on substantive subject matter information, and the statistical model, which is chosen to reflect the systematic statistical information contained in the particular data. The way the two sources of information can be blended harmoniously is to embed the structural model into a statistically adequate statistical model (Spanos 1999). The structural and the statistical models will coincide when we can give an adequate, and sufficient for the purpose at hand, economic rationalization to the latter one. When this is not the case, we will need to reformulate (reparametrize/restrict) an estimated well defined statistical model in order to arrive at a structural model.

The success of econometric modeling depends on how appropriate the postulated assumptions are in capturing the statistical information in the data.

Thus, in this approach, misspecification testing plays a fundamental role, to ensure the statistical adequacy of the model and the reliability of the inferences based on such a model. This is because all statistical inferences will be misleading unless the probability and the statistical assumptions of the estimated model are valid.

We now refer to a small sample of previous studies where the authors have empirically considered the main hypotheses we want to test in the present paper. Thus, Barbosa-Filho and Taylor (2006), analyzed the relationship between effective demand and income distribution. In the authors' view: "On the one hand, effective demand is expected to affect the functional distribution of income through cyclical fluctuations of the real wage and labor productivity. On the other hand, income distribution should influence consumption and investment expenditures through cyclical changes in the average propensity to save and in the rate of profit on fixed capital. The objective of this paper is to investigate these transmission mechanisms in the US economy." (Barbosa-Filho and Taylor, 2006: 389).

To carry out their empirical study, the authors use a Vector Auto Regression VAR(2) model, which includes the following variables: capacity utilization and the wage share; as well as private consumption, private investment, government expenditure and net exports (the last four variables expressed as a share of potential output). The period under analysis is 1948-2002 on a quarterly basis. Their results show a negative association between the wage share and capacity utilization. More specifically, a three-percentage point increase in the labor share would result in a fall of about one-percentage point in capacity utilization. They also set up different sub-periods, finding

similar results in all of them. They thus concluded that when the labor share grows, this has a negative effect on effective demand, and hence on the degree of utilization of productive capacity.

The second paper we discuss is by Blanchard and Perotti (2002). The authors study the dynamic effects of government spending and tax shocks on the US post-war economy. Their methodology is a mixed structural VAR/event study approach, for which the (quarterly) sample period is 1960:1-1997:4. They define 'net taxes' as the sum of *Personal Tax and Nontax Receipts*, *Corporate Profits Tax Receipts*, *Indirect Business Tax and Nontax Accruals*, as well as *Contributions for Social Insurance*, less *Net Transfer Payments to Persons* and *Net Interest Paid by Government*. 'Government spending' is defined as Purchases of Goods and Services, both current and capital, and their variable of interest is 'output'. Their main conclusions are the following:

(i) Whenever public spending increases, output moves in the same direction. The opposite happens with net taxes.

(ii) Multiplier effects are close to unity. An increase in public spending increases personal consumption (crowding in), but it also diminishes private investment (crowding out).

From a different perspective Laramie, Mair, Miller and Stratopoulos (1997) study the direct impact of taxes on profits and private investment in the US for the period 1980-1993 on a quarterly basis. The aim was to prove Kalecki's argument that taxes on corporate income do not necessarily depress private investment, by means of a reduced form Kaleckian investment function. They consider that taxes on corporate profits and on wages translate into changes in the flow of profits and in the depreciation rate, so their effects on

investment can actually be measured. Their investment equation is a time function (to take into account the innovation factor) of the average taxes on wages and profits, as well as of investment itself with a 12-quarter lag, due to the time span between decision making (mainly in spending) and current changes in investment. Moreover, they assumed government spending equaled taxes. They estimated distributed-lag models for different combinations of investment determinants. Their main conclusions were the following:

(i) Increases in taxes to corporate income, if paid through a reduction of personal savings, may not have an impact on profits. Moreover, if such increase is accompanied by purchases of government infrastructure or by transfers to the unemployed, it may increase after-tax profits, resulting in new investment.

(ii) It is possible to stimulate investment with a minimum impact on the budget deficit, satisfying at the same time equality goals.

Finally, it is important to mention that only the Laramie et. al. study carry out misspecification testing to assess the validity of the underlying statistical assumptions of the estimated model. Lacking this, in our judgment indispensable, step, the results achieved by Blanchard and Perotti, and by Barbosa-Filho and Taylor, may be misleading.

Taking stock of the previous discussion, we can now proceed to the empirical part of our research. To adequately test the hypotheses we want to investigate in this paper, we would need a detailed macroeconometric model. Since this is beyond our possibilities, we have estimated a Vector Auto Regression (VAR). We choose this methodology because most variables of interest are interrelated, and because there is no scientific basis for an **a priori** distinction between endogenous and exogenous variables (Spanos, 1990;

Sims, 1980). Another aspect of empirical modeling that plays an important role in what follows is the use of recent developments in system-based cointegration methods. These methods allow us to deal with the non-stationary nature of economic time series.

By the way, the VAR approach is sometimes rejected allegedly by its lack of theoretical content. This may, but need not necessarily be the case. When we select the variables to be included in the VAR (and we omit others) we can try to capture the underlying economic model, and we can interpret the statistical results with a theoretical reasoning. Besides, as mentioned above, a structural model must be embedded into a well specified statistical model, where the statistical properties of the data, and especially the joint probability distribution of the variables, are explicitly considered. This is precisely what VARs allow us to do⁸.

Our main variable of interest is the US GDP. To adequately take into account all the variables that are likely to affect GDP, as well as the interactions amongst them, we need a very general specification, within which to nest the fiscal policy and the factor share variables whose influence on GDP we want to ascertain. Thus we start from the Kaleckian demand equation (2) slightly modified. Let, let Y stand for output, C private consumption, I private investment, J the trade balance (i.e. net exports). Further, H is taxes on corporate profits, B is the budget deficit, and T is net taxes from persons. As

⁸ VARs are superior to structural multi-equation models, unless the latter are derived through valid statistical reductions from a statistically well-specified VAR model.

already mentioned, the last three items make up government spending on goods.

$$Y = C + I + J + H + B + T \quad (3)$$

Since modeling the behavior of Y using as regressors the variables on the right-hand side of the equation would amount to estimating an identity, we have to ascertain which are the most basic of the variables on which the right-hand side variables depend. Here we shall assume that the trade balance J depends on domestic output, on external output Y^* , and on the real exchange rate. Now, since the exchange rate depends on and moves in opposite direction than the share of wages in value added for a given **nominal** exchange rate (López and Perrotini, 2006), we take the wage share as an argument of the trade balance. To keep matters as simple as possible, we assume private consumption and private investment depend on income and on the share of wages in the value added⁹. Now, departing somewhat from Kalecki, we assume that both private consumption and investment depend also on wealth \mathbf{W} , on liquidity \mathbf{L} and on the interest rate \mathbf{R} . With these assumptions we try to take into consideration some important factors. First, the importance of wealth and of the cost of credit on private expenditure, and the pervasiveness of credit rationing, which implies that some economic agents sometimes cannot carry out their planned expenditure (i.e. Keynes's "fringe of unsatisfied borrowers". See Stiglitz and Greenwald, 2003). Therefore, we can reduce (3) as follows:

⁹ When the wage share goes up, we would expect private consumption to rise. Private investment may decline or fall, depending on the relative strength of the elasticities of investment with respect to profits and with respect to the degree of utilization of the capacity.

$$Y = C(\omega, Y, W, L, R) + I(\omega, Y, W, L, R) + J(Y, Y^*, \omega) + H + B + T \quad (4)$$

where the last three variables are policy determined.

As is often the case in empirical work, lack of adequate information forces us to use variables which are only imperfect proxies for our theoretical variables of interest. On the one hand, since precise data on Wealth and Liquidity are relatively difficult to come by, we shall take Real Money (M) and the real interest rate R as proxies for these concepts. More precisely, we include M2 and R in our model to take into account the financial side of the economy¹⁰. On the other hand, it would have been preferable to have taken a variable reflecting only the discretionary budget deficit, rather than the effective one, which for well-known reasons may be pro-cyclical. But we did not find a credible variable satisfying our purpose; thus we took the effective budget deficit. Therefore, our model will be specified as:

$$Y = C(\omega, Y, M2, R) + I(\omega, Y, M2, R) + E(Y, Y^*, \omega) + H + B + T \quad (5)$$

We remark that we do not make an a priori distinction between endogenous and exogenous variables, so that the right-hand side variables are also endogenous.

We begin the modeling exercise with brief description of the data¹¹. The sample is on a quarterly basis, and it runs from 1980 to 2004. All monetary variables have been brought to 2000 prices. Inspection of the graphs of the

¹⁰ We tried different concepts of money and different interest rates until we could identify those variables which resulted in a solid statistical specification. Thus we will use M2 and the US discount rate (end of period)

¹¹ See the Appendix for the model data source.

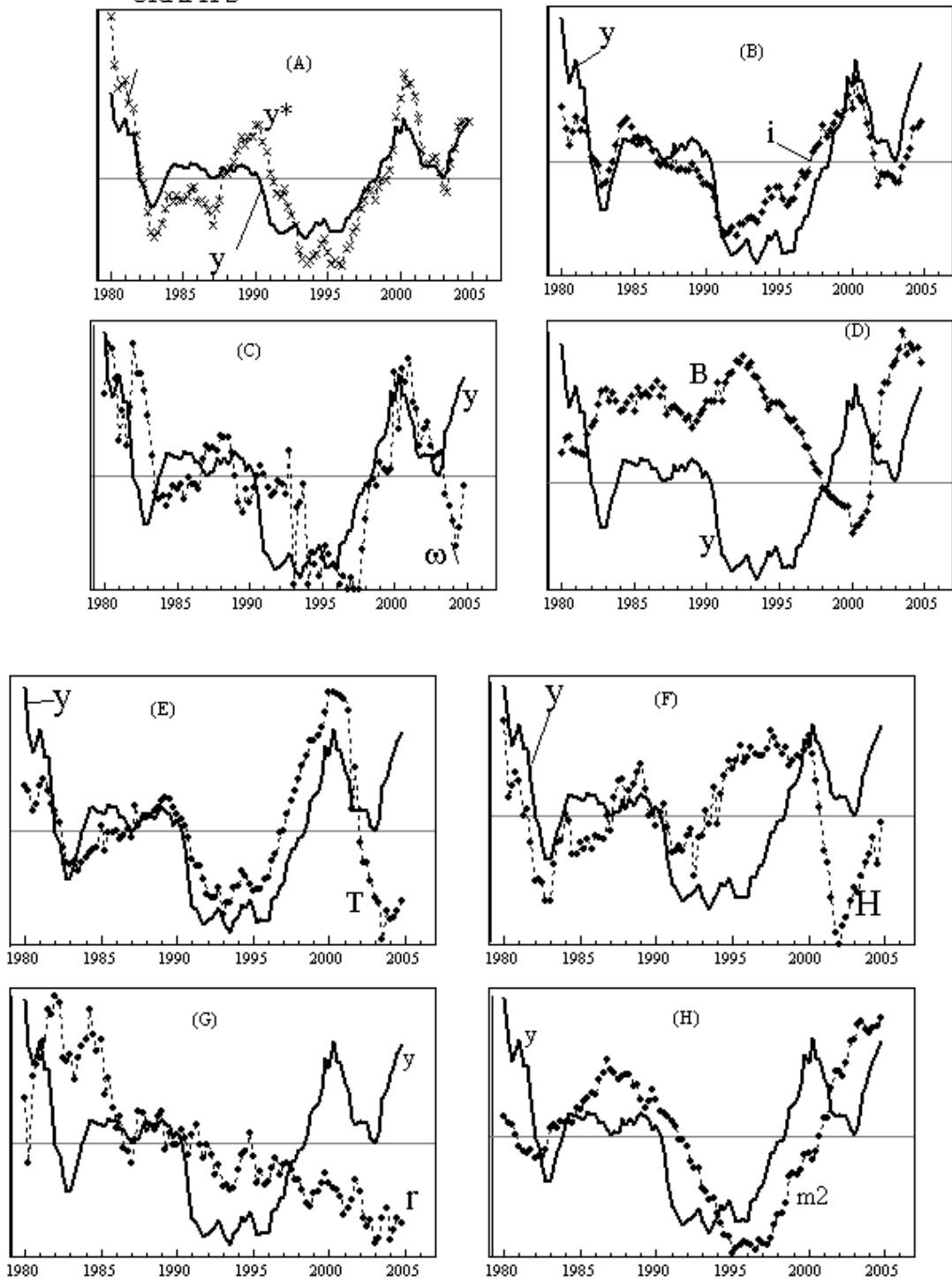
variables (graphs not shown here) suggests that all of them are non-stationary, have a trending mean; and that their underlying density function is non-normal¹². Unit root analysis of the series (not shown here) suggest that all series used in the model have the same order of integration (all are $I(1)$), and therefore we can test for cointegration via the Johansen procedure¹³.

Next, in graph 2 below we plot each variable together with GDP. This will give us a first informal indication on how they may be associated. To facilitate visualization of their possible association we show in deviation from their trend those variables that have a more definite trend, namely US and OECD GDP, Y and Y^* , investment I , the surplus of government revenue S , taxes on profits H and $M2$. However, the share of wages ω , the interest rate r , and the budget deficit B , are shown in their absolute values (though adjusted to make their mean and range coincide with Y).

¹² Non-normality may be due to the presence of outliers.

¹³ In order to test for the presence of unit roots in the series used in the model, we carried out ADF tests in the context of a set of autoregressive (AR) models ensuring that these models were not rejected by misspecification tests.

GRAPH 2



We can see at first sight a close positive association between Y and Y^* (panel A); between Y and I (panel B); between Y and T (E); between Y and H (F); between Y and $M2$ (H); and between Y and ω (C). The nature of the

association between Y and B (D), and between Y and R (G), is less clear. Anyway, **prima facie** the information conveyed by graphs seems to validate Kalecki's hypothesis regarding the expansionary role of the wage share, and of government expenditure, on demand and output. But our econometric work will tell us whether or not this is actually the case.

As mentioned, we estimated a VAR with quarterly data for the period 1980-2004, which included the US GDP, OCDE GDP, investment, net taxes from persons, taxes on profits, M2, the wage share, the budget deficit, and the interest rate; with all the variables, except the last three of them, in logarithms. We obtained a statistically well-specified equation, in a model with 3 lags and 4 'crash' *dummy* variables, for the periods 1991-1, 2000-1, 2001-3 and 2003-3¹⁴.

As a next step, we estimated the existence of a long-run association between our set of variables, with Johansen's cointegration test. We found out

¹⁴ The first dummy was used to account for important changes in the direction of the general trend of the budget deficit, for in such period there was a sudden increase of government debt. The second accounts for drastic changes in the wage share during the first quarter of the current decade. The third was useful to take account of a fall in corporate income tax in the middle of the 2000-2001 recession. The fourth accounts for an outlier in the government surplus at the end of 2003, coming together with a great variation of net taxes charged to persons. We subjected the estimated VAR to a series of equation and system misspecification tests, and found that our results can be accepted with 90% confidence; which is quite high considering the great number of variables included in our model. The tests are available from the authors upon request.

that up to five cointegration vectors can exist, and we assume that the first one can be taken to signify the long-run association between US GDP and its determinants. This long-run vector is as follows:

$$y = 0.62 y^* + 0.09 \omega + 0.07 m^2 + 0.0001 B + 0.09 t + 0.03 h + 0.2 i - 0.002 R \quad (8)$$

where lower-case letters refer to the variable in logarithms, and t is the logarithm of net taxes on persons.

In words, we find that higher output is associated with higher OCDE GDP, with higher liquidity (m^2), and with a lower interest rate R . In addition, higher output comes also together with a **higher** share of wages in value added, and with **higher** government expenditure financed via budget deficit, via **higher** government net revenue from persons, and via **higher** taxes on profits.

Since correlation does not imply causation, it is still necessary to study whether in fact output is determined by the right hand side of (8). Therefore, we carried out Granger causality tests and found out that this is in fact the case. This is confirmed by the estimated error-correction mechanism, which describes the short-run association between US GDP and its determinants. Table 3 below shows the error-correction mechanism, where CV denotes the long-run cointegration vector, and $TREND$ is a trend. Note, in a multi-variate context, Granger causality of variable X on variable ψ obtains when X is contained among the regressors in the equation for ψ , or in the cointegration vector which is included among the regressors for ψ , or both.

Table 3
Error-correction mechanism
Dependent variable: Δy

Variable	Coeficiente	Prob. t	Prob. F
Δy^*_t	0.6750	0.000	0.000
$\Delta \omega_{t-1}$	0.0986	0.126	0.123
$\Delta m2_{t-1}$	0.1037	0.009	0.007
ΔB_t	0.0001	0.000	0.000
Δs_t	0.0731	0.000	0.000
Δh_t	0.0125	0.019	0.017
Δi_t	0.0909	0.000	0.000
ΔR_{t-1}	-0.0012	0.006	0.005
CV_{t-1}	-0.0437	0.047	0.044
Constant	0.0477	0.042	0.039
Trend	0.0001	0.046	0.043

Source: authors' estimate

As we can see, both the wage share, and government expenditure financed either with budget deficit, taxes on profits, or taxes on persons, Grange-cause output and demand, with a positive effect on the latter. Besides, money has also a positive impact while an increase in the interest rate tends to depress demand and GDP.

Let us now give an economic interpretation to our results. We will not make an exhaustive discussion of the estimated equations, concentrating instead on the two hypotheses that are the main object of our inquiry.

First of all we notice that a higher share of wages stimulates demand and output in the short-run; an effect that, according to the sign of the variables in the cointegration vector, also carries over to the long run. From our estimate it thus appears that, contrary to what seems to be the conventional wisdom, in the USA a shift from wages to profits, stimulates the economy¹⁵. In other words, the expansionary effect of a higher wage share on domestic demand seems to

¹⁵ Our result contradicts also what Barbosa-Filho and Taylor (2006) found in their paper. As we previously mentioned, we have methodological reservations regarding their estimate.

more than offset its (possible) short run recessive impact on investment, as well as its negative impact on the trade balance.

In the second place, we have found that higher government expenditure financed with higher budget deficit, or with higher taxes on profits, tends to stimulate demand and output. In fact, even when government expenditure is financed via taxes on persons, such a stimulus takes place. This last result, which runs counter what Kalecki assumed, can be rationalize probably taking into account the importance of workers' savings. Thus, a higher government demand, financed taxing workers, does not crowd out their consumption by an equal amount. Now, our error correction equation shows that, in the short run, the expansionary effect of government expenditure financed taxing persons exceeds the expansionary effect of government expenditure financed taxing corporate profits. However, from our cointegration vector it follows that in the long-run the quantitative importance of the two effects is reversed. We can think of two possible, maybe complementary, explanations for this result. It may be the case that workers' savings tend to grow in time when they see their take-home pay reduced due to higher taxes. Also, it might be the case that investment slows down somewhat when profits are taxed, and then recovers with a certain delay when entrepreneurs see the expansion of sales and the higher utilization of the capacity, brought about by higher government expenditure. Finally, we found that the expansionary effect of the budget deficit is small; much lower than any of the two other sources of finance. We do not exclude the possibility that we obtained this result because we could not distinguish between the discretionary budget deficit and the one induced by a

slow-down of the economic activity. Anyway, this is an issue that surely deserves further research.

Final remarks

To conclude our study, we may first of all recall the discussion that has taken place amongst Post-Keynesian economists on the so-called “wage-led” and “profit-led” regimes¹⁶. This discussion has made it clear that whether a wage-share fall will stimulate demand or not in the short run, depends on how strong is its negative impact on workers’ consumption, vis-à-vis its supposed positive effect on profits, investment and the trade balance. On the other hand, the long-run effects of such a fall depend on the weight of the different determinants of the investment function, and on how strongly investment impinges on the competitiveness of domestic producers. Indeed, the wage fall raises profits in an open economy, but may reduce demand, which are two arguments that we may assume that should be included amongst the determinants of investment.

Our empirical results for the US economy suggest that in this country a shift from wages to profits does indeed cause a short-term fall in effective demand; and the long-run growth also appears to be negatively affected. We may suggest that the evolution goes more or less along the following lines. Let us consider a situation where a wage-share fall brings about an improvement in the trade balance and in profits, but causes a decline in aggregate demand. Let us moreover assume a simple investment function, where investment depends positively on profits and on capacity utilization. Let us finally assume that the

¹⁶ See for example Bhaduri and Marglin (1990); Bowles and Boyer (1995); Blecker (1999); and the literature cited therein.

trade balance depends on the competitiveness of domestic producers. Then, if the elasticity of investment with respect to profits is lower than its elasticity with respect to utilization, a wage-share fall will have a short-run negative effect on output and employment. Moreover, that effect will persist, because investment will be growing at a lower rate due to the demand fall, and the trade balance will not improve sufficiently because competitiveness will tend also to grow at a lower rate. This would be a typical example of what has been labelled in the previously cited literature a “wage-led” regime; and we may infer from our empirical results that this type of regime may be the one prevailing in the US economy.

Let us now discuss the second one of the hypotheses we have considered in this study. After many years of being considered by both governments and many economists as a forbidden weapon, as a consequence of the depth of the current world financial crisis, public spending, and even deficit spending, has regained a place of honour in the arsenal of acceptable economic policy instruments. This new situation is hailed by publicists and pundits as a revival of Keynes and Keynesianism, especially because writers who identify themselves with the so-called Post-Keynesian school, have always insisted on the beneficial effect of government expenditure, and of government deficit, when idle resources are abundant (see especially Wray 1998, and Arestis and Sawyer 2003 and the bibliography cited therein).

There is much truth in the previous opinions. However, it is as well to recall that Keynes was not the first economist to put forward the idea of utilizing government expenditure as a tool to fight unemployment; and that he saw the deficit only as an instrument of last resort. It was rather Michal Kalecki who,

when he firstly put forward his version of the principle of effective demand, gave a prominent place to government spending as an additional source of demand. He also emphasized the expansionary effect of deficit financing and of financing government expenditure with taxes on profits. In our study we have been able to verify Kalecki's hypotheses. Of course, as is usually the case when we go from theoretical statements to the empirical facts, the hypotheses alluded to are not necessarily confirmed in all its details. However, in most general terms, the idea that the government can stimulate a business upswing by raising its expenditure, and that this stimulus takes place even when it finances its expenditure with higher taxes on profits, appear to us to be empirically valid for the US economy.

We do not claim of course that what we find for the US takes place in the same way in other advanced economies: the reaction of an economy to shocks depends on its structure and institutions. But we would suggest that the methodology we have used in this work may be useful to study other national cases.

Appendix

All variables expressed in dollars were modelled as natural logarithms (except the budget deficit). Output, investment and M2 were brought to 2000 prices using the CPI reported by the Bureau of Economic Analysis, through the NIPA tables. World output is presented in dollars as well, brought at 2000 prices by

OECD considerations. Taxes on corporate income, net taxes on workers and the budget deficit were deflated using the price index for government consumption expenditures (G_CPI). R is the real long-run interest rate (10 years) and w^* is compensation of employees (received) divided by US GDP.

Model Data Sources

Variable	Variable name at source	Source	Description
Y	US Gross Domestic Product (at 2000 prices)	BEA	Table 1.1.6, item A191RX1
CPI	US Consumer Price Index (2000=100)	BEA	Table 1.1.4, item B191RG3
I	US Gross Domestic Private Investment (at 2000 prices)	BEA	Table 1.1.6, item A006RX1
Y*	OECD Gross Domestic Product (at 2000 prices)	OECD	OTF.VPVOBARSA.2000.S1____ GROSS DOMESTIC PRODUCT
W*	US Wage as share of GDP Compensation of Employees, received (=W/Y, both at nominal values)	BEA	Table 2.1, item A576RC1 (W) and Table 1.1.5, item W209RC1 (Y)
M2	US Monetary Aggregate M2 (at 2000 prices)	IMF	IFS, item 11159MB.ZF
G_CPI	US Price Index for Government Consumption Expenditures and Gross Investment (2000=100)	BEA	Table 3.9.4, item B822RG3
G	US Government Consumption Expenditures and Gross Investment	BEA	Table 1.1.6, item A822RX1
B	US Budget Deficit (Total Receipts minus Total Expenditures)	BEA	Table 3.1, item AD01RC1
S	US Surplus of Government Revenue over Government Expenditure on Compensations to Employees and Transfers	Own calculation	Variable calculated as: $S = G - (B + H)$
H	US Taxes on Corporate Income	BEA	Table 3.1, item W025RC1
R	Long-run interest rate (10 years)	?	

Colander, D. (2009), "Economists, Incentives, Judgement, and the European VAR Approach to Macroeconometrics," Economics|The Open-Access, Open-

Assessment E-Journal, Vol. 3, 2009-9, <http://www.economics-journal.org/economics/journalarticles/2009-9>.