

Effective Demand in the Recent Evolution of the US Economy

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Abstract. This paper puts forward the notion that the recent evolution of the US economy can be fully explained by demand-side variables. We empirically test some hypotheses about the role of fiscal and monetary policies and of income distribution in shaping effective demand. Using a rigorous and demanding econometric analysis, we estimate a macroeconomic model, test the validity of its probability and statistical underlying assumptions, and conclude that fiscal and monetary variables, together with the wage share, do in fact influence effective demand and thus shape the overall evolution of the US economy.

1 Introduction

The discussion about the primacy of effective demand in determining the macroeconomic evolution of capitalist economies continues to this day, after three quarters of a century since the publication of **The General Theory**. The objective of this paper is to contribute to this discussion, and to show that economic development in the US can be fully explained by the behavior of demand-side variables¹. For this purpose, we use modern econometric procedures.

We test some hypotheses about the role of income distribution and of fiscal and monetary policies in shaping effective demand, and hence output and employment. Our paper is inspired

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¹In this approach, the effects of supply shocks and institutional variables are not neglected. Indeed, shocks and institutions exert their effects by affecting demand. This is precisely Keynes' and Kalecki's main insight, which is in stark contrast with the mainstream view that supply side variables fully determine output with demand simply adjusting.

by the theories of Keynes and Kalecki and we refute with an empirical research based on their vision, today's dominant view whereby supply rules the roost.

2 Literature Review

This section reviews a sample of applied works dealing directly with estimations of the interactions between output and the variables we use in our econometric model for the recent evolution of the US economy. Due to space limitations, our review of applied works is very brief and selective, and it aims most of all to show the diversity of empirical results.

This diversity may seem surprising because differences can be found even among authors adopting a similar theoretical perspective and analyzing comparable periods. Surely in any other discipline this situation would stimulate a thorough reflection about the rigor of the underlying empirical methodology. Indeed, given such diversity of results, how is one to assess which of them are valid and which cannot be relied on? Unfortunately, in economics this is apparently not considered important. We are convinced however that this is a critical issue and we briefly explain our methodology before proceeding with the review.

Our econometric work stresses the use of statistically adequate models as the basis for drawing reliable inferences (see Spanos [4] and [28]). The methodological basis of econometrics is the notion that all variables are random, and are therefore endowed with a certain joint density function and type of dependence. Therefore, the form of the regression function depends in a very precise way on the joint density function and type of dependence characterizing the set of chosen random variables². The success of econometric modelling depends on how correct the postulated assumptions embedded in the model parameters are in capturing the probabilistic and statistical information in the data. Thus, under 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 model³. Thus, we claim that only econometric results validating these assumptions can be accepted.

Below we justify the selection of variables for our model, but to organize our review we mention that in our specification GDP depends on the wage share (as our proxy for shifts in the distribution of income), taxes on corporate income and other budget revenues (both measures

²For example, only if the joint density is normal will the regression function be linear in the parameters and the variables.

³Interested readers will find in [22] more details about the econometric methodology we have followed in this paper.

of the effectiveness of fiscal policy), outstanding credit and the interest rate (measuring credit availability and monetary policy) as well as OECD GDP (a variable representing demand from abroad). The review of the literature is carried out in that same order.

We deal first with the association between wages, or the wage share, and growth⁴. Following the terminology coined by Bhaduri and Marglin ([12]), some Post-Keynesian authors have empirically tested whether the US economy is wage-led or profit-led by estimating econometric models using the share of wages in total output (or its counterpart: the profit share) as a determinant of accumulation, or some measure of economic growth⁵.

Thus, Stockhammer and Onaran ([29]) found a negative relationship between the profit share and the accumulation rate. With this conclusion they coincide *grosso modo* with Hein and Vogel ([18]), with Barbosa-Filho and Taylor ([9]), and with Tarassow ([30]). However Naastepad and Storm ([24]) found a negative relationship between the wage share and investment, as well as a positive one, though less important than the former, between the growth rate of the wage share and consumption growth. Thus, the results about the point at issue are not conclusive and, in any case, since no statistical tests are presented, there is no way to assess whether the models estimated by the authors are or are not statistically valid.

In connection with the effectiveness of fiscal policy⁶ Laramie et al. ([20]) study the direct impact of taxes on profits and private investment in the US and concluded that increases in taxes on 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. This conclusion coincides to some extent with the one reached by Blanchard and Perotti ([14]), Perotti, ([25]), and with Bilbiie, Meier and Müller ([13]). Thus, with regards to this issue there appears to be a greater degree of coincidence between different authors. But again, except in the case of Laramie et al., no misspecification tests are provided.

Turning now to credit issues, in his study of the effectiveness of monetary policy in the US Fair ([26]) concludes: "The net effects of, say, a decrease in r [the interest rate] on the

⁴For a comprehensive review of neoclassical macroeconomic theories of distribution and growth and their limitations see [6] and the literature cited therein.

⁵This literature defines a profit-led demand regime when in a given economy a shift in income from workers to capitalists implies demand expansion or stimulates accumulation, and conversely for a wage-led regime.

⁶Romer's ([27]) excellent paper discusses the difficulties to adequately measure the impact of government expenditure on demand and output, and reviews works showing possible ways to surmount the complexities involved. Another recent contribution to the debate of fiscal policy effectiveness is that of DeLong and Summers ([16]).

U.S. output ...[is]... positive". Generally speaking his conclusion coincides with the study of Lown and Morgan ([23]) Bayoumi and Melander ([11]) and Bayoumi and Darius ([10]) who, interestingly enough, include also credit standards in their models and find that high credit standards negatively affect output. However, again, the robustness or otherwise of their results is difficult to evaluate due to lack of the requisite tests.

Finally, the link between foreign demand and domestic output for the US, to our knowledge, has not been empirically tested, at least not as we do in the econometric specification. In the model we estimate below foreign demand is duly taken into account.

3 Stylized Facts

Before proceeding with our empirical work, we offer a brief description of the evolution of GDP as well as the components of aggregate demand in Figure 1. The figure shows the evolution of GDP and its components. Panels A, B, C and D show, respectively, personal consumption (C^P), private investment (I), government expenditure (G) and the trade balance (XN) in bold lines along with GDP (Y) in the dashed line. Panels A', B', C' and D' show the same series detrended. The series have been adjusted to have the same mean and range.

Of the four GDP components, personal consumption has followed output the closest with only slight discrepancies most noticeable throughout the stock market boom (1995-2000), when output increased more than commodities' demand or, to put it in Keynesian terms, the increase in consumption was proportionally less than the increase in income. In the years following the boom, and due to improved households' optimism, the marginal propensity to consume was perhaps larger than unity, which is a possible explanation of why consumption appears to have grown at higher speed than income in the Figure.

Private investment has been more sensitive to output than consumption, declining during the second half of the eighties and increasing significantly throughout the second half of the nineties, also due to the boom. Private investment has been perhaps over-sensitive to profitability or, in Keynesian terms, animal spirits have in fact played an important role in shaping the evolution of investment.

Government expenditure has followed a mixed pattern of pro- and counter-cyclical policies; a clear increase above that of output during the period that runs from 1985 to 1995, and a reversal from then up to the dot-com crash, after which it turned more countercyclical.

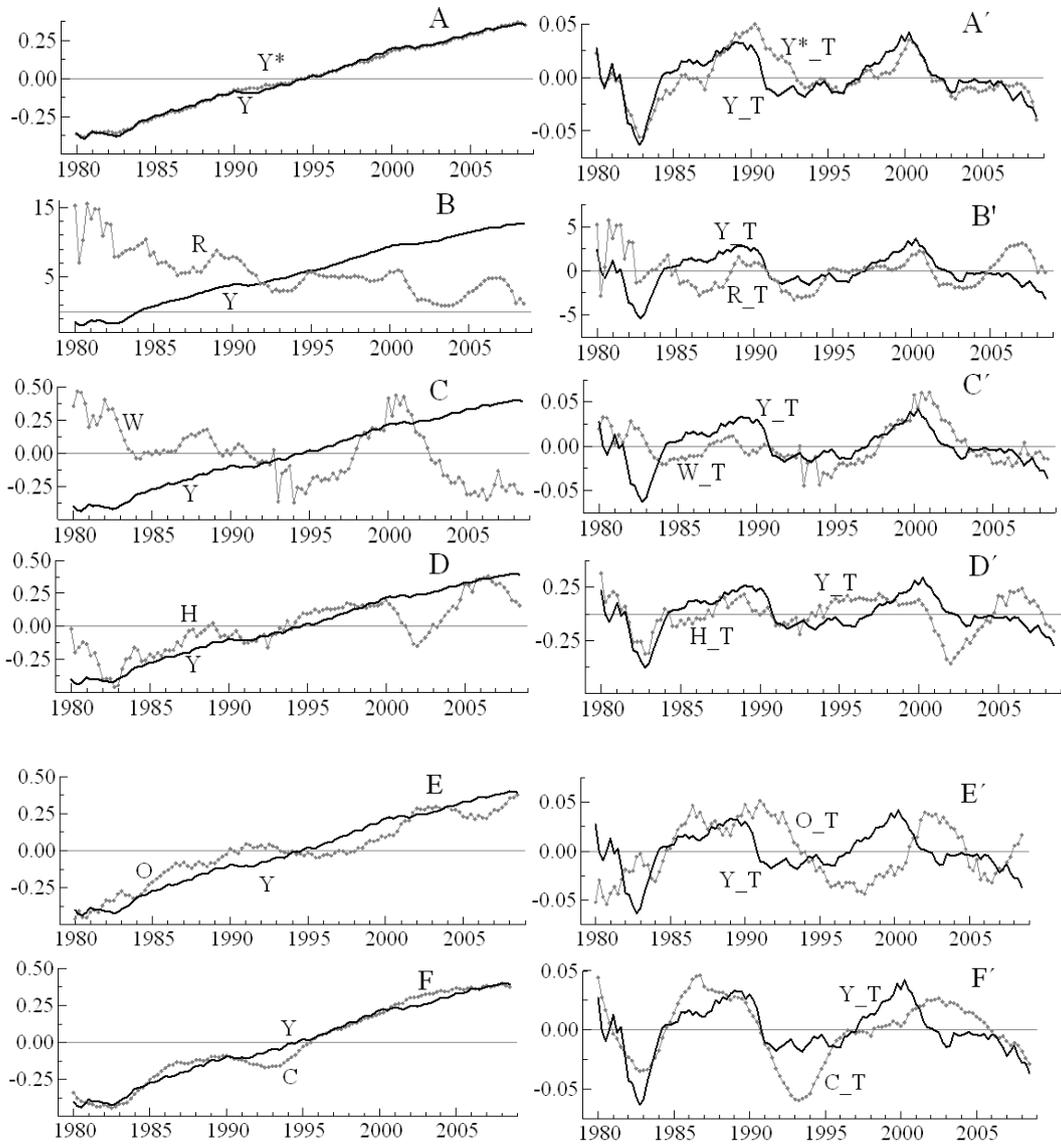


Figure 1: GDP and its Components in Levels (left) and detrended (right), adjusted by means and ranges

As expected, the trade balance has clearly deteriorated during booms and improved during recessions. In the first half of the eighties the trade balance tended towards equilibrium, reached it around the end of the same decade and stayed in surplus until the mid-nineties boom made imports exceed exports. The trade balance has remained in deficit since 2000.

4 The Model

4.1 Theoretical Basis

As mentioned in the introduction, our work is inspired by the theories of Keynes and Kalecki. We briefly summarize their position on the issues we want to study in this paper.

The first subject we deal with is monetary policy. Keynes maintained that, except during rather peculiar circumstances, availability of credit and low rates of interest would stimulate the pace of investment and expand effective demand, while lack of credit could abort a recovery. In contrast, Kalecki did not give much importance to monetary conditions and policy.

Fiscal policy is another type of intervention whose effects we want to assess. Keynes and Kalecki had rather similar views on this issue, except for one particular point. They both agreed about the positive impact on demand of deficit-financed government expenditure, but Kalecki ([3]) considered in more detail how financing expenditure with other sources would affect demand. He argued that in a given period, financing public expenditure with taxes on wages would *crowd-out* (he did not use the term) private spending. However, spending financed by taxes on corporate income would raise aggregate demand **in that same period** because investment (and capitalist consumption) would not be curtailed. Moreover, as aggregate demand increases, profits before taxes will increase enough for profits after taxes to remain stable, so that future investment will not be discouraged. Keynes criticized and rejected Kalecki's view on this issue.

Finally, the two authors viewed income distribution as an important determinant of effective demand and output. In the General Theory, Keynes claimed: "To suppose that a flexible wage policy is a right and proper adjunct of a system which on the whole is one of *laissez faire*, is the opposite of the truth" (Keynes [2], p. 269). However, he thought, at least in this book, that upon an increase in employment, real wages would have to fall⁷. Kalecki, on the other hand,

⁷Keynes did not imply that a lower wage would stimulate employment. Rather, higher employment would bring about a (real) wage decline. This hypothesis was based on his acceptance of the principle of decreasing marginal returns in the short run. Afterwards, and in the light of empirical evidence, he recanted from his

argued that a higher real wage and higher wage share does expand demand, and with it output and employment.

Let us set out our theoretical model. Our variable of interest is US GDP. As said, we want to study only if and how, fiscal, monetary and distribution variables affect GDP. However, in order to guarantee substantive adequacy of our model ([28]), we must take into account all the variables that are likely to affect GDP, as well as their interactions. Thus, we need a very general specification, within which to nest fiscal policy, monetary and factor share variables. Therefore, starting from the National Accounts identity, let Y stand for output, C^P private consumption, I private investment, and J the trade balance (i.e. net exports). G is government expenditure on goods and services.

$$Y = C^P + I + J + G \quad (1)$$

We now have to establish which the most basic factors are determining the right-hand side variables. Unfortunately, however, the range of our choice is limited because we must save enough degrees of freedom to carry out the estimation and misspecification tests. Besides, lack of adequate information will force us to use variables that are only imperfect proxies for our theoretical variables of interest. We now explain how we deal with this situation⁸.

We shall assume that the trade balance (J) depends on domestic output, on external output (Y^*), and on the real exchange rate. To save some degrees of freedom, and given that the exchange rate depends on (and moves in opposite direction than) the share of wages in value added for a given nominal exchange rate ([21]), we take the wage share as an argument of the trade balance⁹. As can be seen from the top panel of Figure 2, once the stock-market boom was over, wages reached a high 49.1% as share of national income in the first quarter of 2001, in order to begin its downward path to today's 43.5%. In the same period, the real and nominal effective exchange rates continued their upward trend for four more quarters following a downward trend afterwards. From 2007 to 2009 the exchange rate continued its downward

previous opinion, and recognized that higher employment could be accompanied by an increase in real wages ([19]).

⁸We tried many models, with different information sets. We finally selected the model we present below because it was the best one from a statistical point of view. That is, it was subjected to, and was not rejected by, a large battery of misspecification tests.

⁹We recall readers Kalecki's (1954) specification for the wage share ω : $\omega = \frac{1}{1+(\mu+1)(j(\Phi)+1)}$ $\mu > 1$, $\frac{dj}{d\Phi} > 0$ where μ is the "degree of monopoly", or the ratio of aggregate proceeds to aggregate prime costs (which is also equal to the price/unit direct cost ratio), and j is the ratio of aggregate cost of materials to the wage bill, which depends (positively) on the real exchange rate (Φ). The differential of this expression with respect to Φ is unambiguously negative for a given μ .

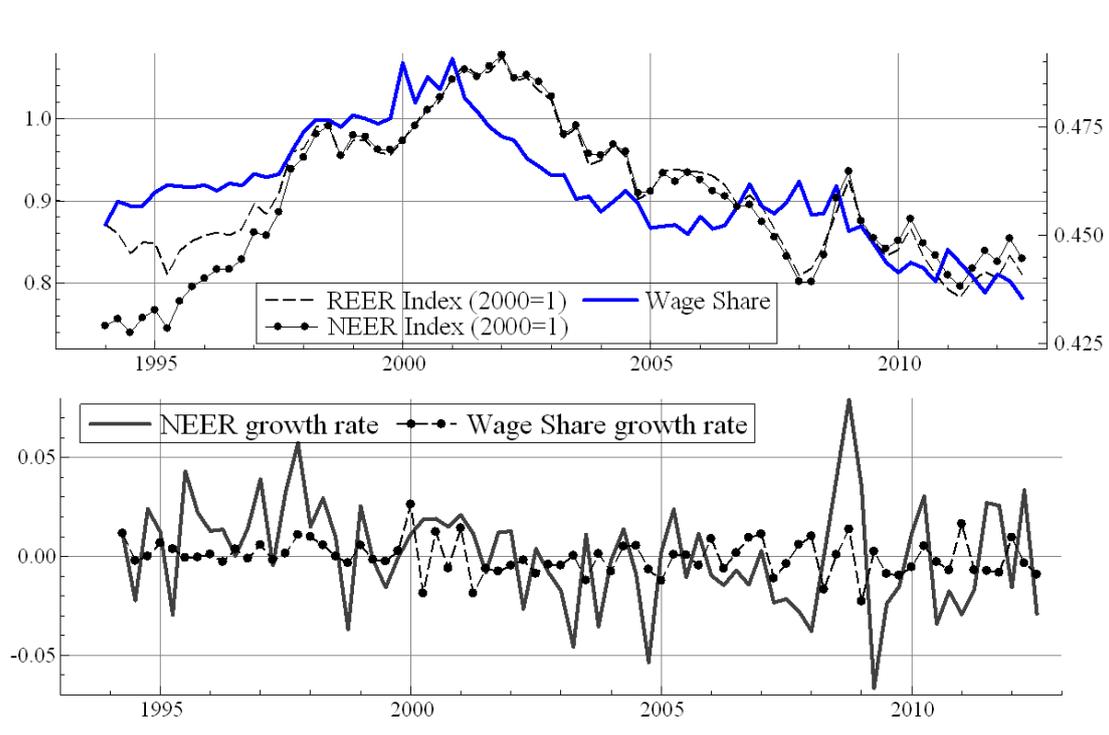


Figure 2: Real and Nominal Exchange Rates and the Wage Share

path whereas the wage share remained at a higher level. Although the long-term evolution of these series seems to be positively correlated, the bottom panel of Figure 2 shows that their growth rates may be negatively correlated, especially after the first quarter of 2000, once the stock market boom was over.

We assume private consumption and private investment depend on income and on the share of wages in value added. Following Keynes' view, we also assume that both depend on private credit outstanding (C) and on the interest rate (R)¹⁰.

Finally, in our model we decompose government spending on goods and services according to the source from which it is financed. Thus H and O are Taxes on Corporate Profits and Other Government Revenues, respectively. It would have been preferable to separate the budget deficit from net taxes from workers. However, the actual budget deficit, for well-known reasons, is highly pro-cyclical, and we did not find a satisfactory variable measuring the discretionary

¹⁰By the way, we also tried to have variables reflecting private wealth into our specification, but we did not find a statistically valid model including this variable.

budget deficit¹¹.

Therefore, the reduced form of equation (1) is as follows:

$$Y = C^P(w, Y, C, R) + I(w, Y, C, R) + J(Y, Y^*, w) + H + O \quad (2)$$

where R is the 3-month Treasury bill rate¹². Simplifying again, our model will be specified as:

$$Y = Y(w, Y^*, C, R, H, O) \quad (3)$$

where the right-hand side variables are also, a priori, endogenous.

4.2 Behavior of the Variables and Econometric Procedure

We begin the modelling exercise with a brief description of the data used for our model¹³. The sample is on a quarterly basis, and it runs from 1980 to 2008(3)¹⁴. All monetary variables have been brought to 2000 prices. In Figure 3 we plot each variable together with GDP. This will give us a first informal hint on how each of the selected variables may be connected. To facilitate visual inspection of their possible association we show on the left-hand panel the seasonally adjusted variables and the variables in deviation from their trend on the right-hand panel.

As seen in the figure, the aftermath of the crisis at the beginning of the eighties was hard to overcome, and only after the first half of the same decade did output start growing steadily. The nineties started with a mild but lasting recession, but the stock market boom fuelled recovery, which was followed by another recession at the beginning of the following decade.

OECD output exhibits a similar evolution as that of US output, except at the beginning of the nineties, which is mainly due to lower dependence of world trade with respect to the economy under study (as well as to the increasing importance of the so-called BRICs). This dependence virtually disappeared afterwards.

¹¹We also estimated models where we split the (actual value of) the budget deficit from net taxes from persons, but we confronted the problem of lack of degrees of freedom. Besides, the resulting estimates were not statistically valid.

¹²We tried different interest rates until we could identify one that resulted in a solid statistical specification. It must be noticed (see Appendix) that the long-run (and even the short-run) evolution of the nominal short-term interest rate (the one we use in this model) does not differ much of that of the real long-term interest rate. We do not claim that inflation did not play a key role in determining output evolution in the period under study, rather that it did not substantially modify the evolution of interest rates.

¹³See the Appendix for the model data sources.

¹⁴We do not include the period corresponding to the crisis because, in our view, this situation demands a different type of statistical procedure.

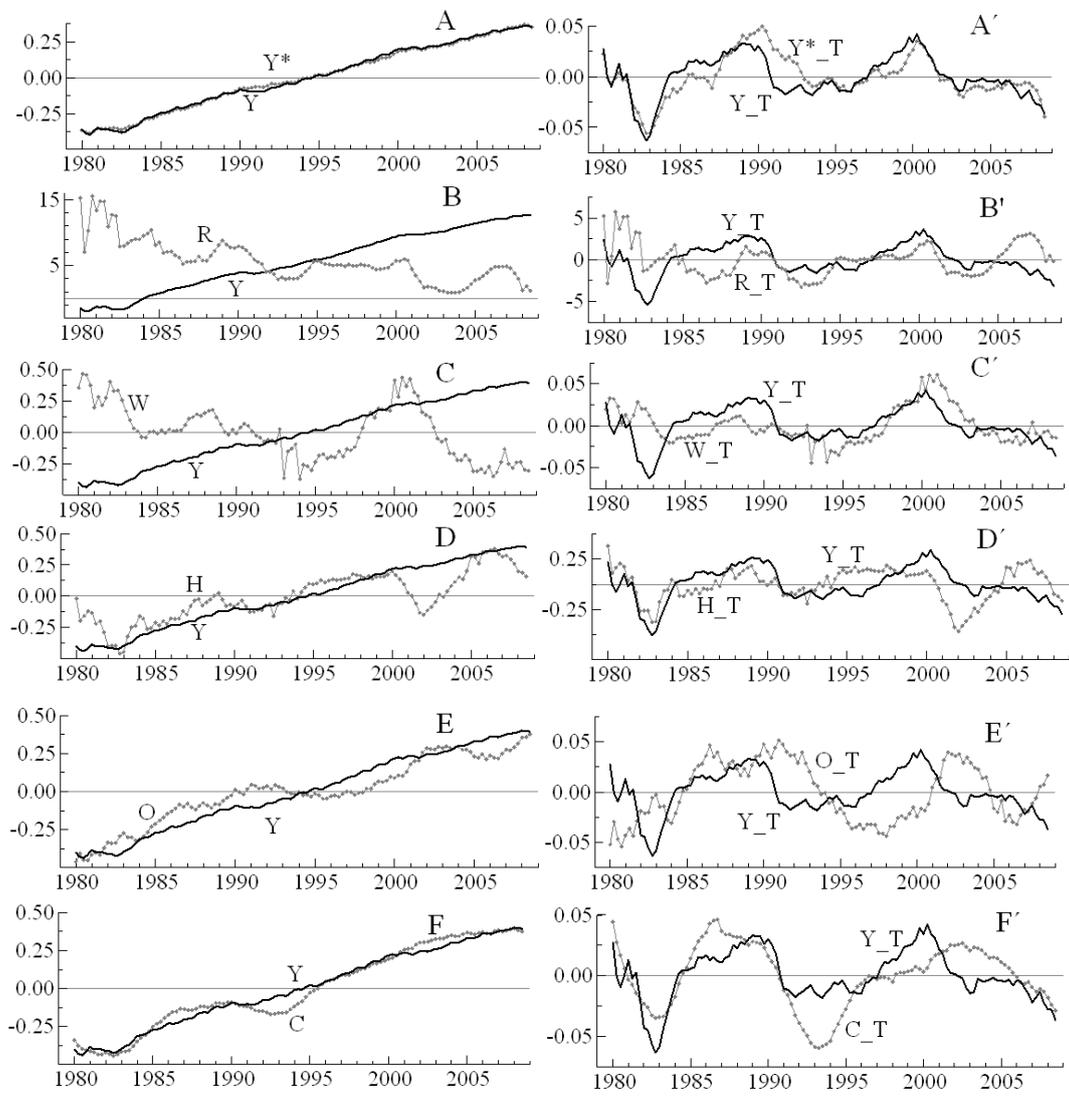


Figure 3: GDP and Model Determinants in levels (left) and detrended (right) adjusted by means and ranges

The interest rate has gradually fallen since the beginning of the eighties, with drastic drops during recessions, increasing along most booms, with the important exception of the stock-market-boom the second half of the nineties, and in general fluctuating with no clear trend.

Income distribution (here proxied by the share of wages in GDP) did not worsen for workers immediately and/or as deep as output during the 81-82 crisis, but from the beginning of the nineties on it has moved more pro-cyclically.

Taxes on corporate income have become more responsive to fluctuations in GDP, whereas the budget deficit and taxes on workers (lumped together as other budget revenues) do not present a clear trend. It must be noticed, however, that taxes on workers' income represent a higher proportion on this series, thus that redistributive fiscal policy through taxes on workers has changed drastically.

Finally, credit availability showed a clear sensitiveness recovery from the crisis of the early eighties. In other words, ease of access to credit has been more important than output expansion, especially so in the recession of the beginning of the nineties. Its fluctuations have been milder since then but following more or less the same pattern.

As shortly explained in the preceding paragraphs, at first sight we can see a close positive association between Y and Y^* (panels A and A'); between Y and w (panel C'); between Y and H (D'); between Y and C (F'); and probably also between Y and O (E'). The nature of the association between Y and R is less clear. Anyway, **prima facie** the information conveyed by the figures seems to support the notion that demand-side variables strongly influence the US economy. More specifically, they appear to validate Keynes' conjecture about the importance of credit and the interest rate, of Kalecki's hypothesis regarding the expansionary role of distributive policy in favor of wage earners, and of Keynes' and Kalecki's hypotheses about the relevance of government expenditure on demand and output. But our econometric work will tell us whether or not this is actually the case.

From a statistical point of view, graphs of the variables suggest that all of them are non-stationary, i.e. they have a trending mean and/or a variance which depends on time; also their underlying density function seems to be non-normal¹⁵. Unit root analysis of the series (not shown here) suggests that all series used in the model have the same order of integration (all are I(1)), even the wage share¹⁶.

¹⁵We checked this with normality tests, which rejected the null hypothesis of normality for all the variables. Non-normality may be due to the presence of outliers and volatility.

¹⁶We remind readers that *stationarity* of a series does not only depend on whether the mean of the series is constant; this statistical (not economic) property also depends on whether the variance of the series is constant

Given the statistical properties of our variables, to test the hypotheses we are interested in, we use a Vector Auto Regression (VAR) specification, and a system-based cointegration method ([5]). These methods allow us to deal with the non-stationary nature of economic time series, carrying out the modelling exercise with the series both in levels and in differences instead of relying exclusively on differentiation. Taking as the basis a VAR model, we can then estimate an error correction model (ECM) and a cointegrated Structural VAR model (SVAR), to carry out Impulse Response analysis. The use of these methodologies allows us to confirm the robustness of our empirical results.

4.3 Results

We thus estimated a VAR with quarterly data for the period 1980-2008(2), which includes US output (Y), OECD output (Y^*), private credit outstanding (C), profit-tax-financed government expenditure (H), other government revenues (O), the wage share (w), and the short-run interest rate (R); with all the variables, except the last two, in logarithms. We obtained a model including an unrestricted constant, four lags and four dummy variables¹⁷. The variable R was included as exogenous¹⁸. After testing for misspecification and confirming that the model was not rejected by individual-equation and vector misspecification tests, we checked for a long-run association between our set of variables with Johansen's cointegration test. The test suggests that up to five cointegration vectors can exist and we take the first one as implying the long-run association between US output and its determinants¹⁹. This long-run vector is as follows:

and if it is not auto-correlated. The share of wages in national income in level is by construction bounded between 0 and 1, therefore w does not exhibit a trend; but that does not in itself guarantee a constant variance or the absence of autocorrelation. The unit root tests presented in the Appendix show statistical evidence that the wage share is $I(1)$. A similar reasoning applies for the interest rate.

¹⁷These are for the following periods: 1982(1), 1987(1), 1993(1)-1994(1) and 2000(1). In technical jargon, the first helped to correct normality problems for Y and Y^* , in the middle of the 1981-1982 recession. The second was used to ameliorate a sudden change in C occurred at such point in time. The third dummy was useful in accounting for drastic falls in w in the first quarters of '93 and '94. The fourth one effectively eliminated non-normality in w and in H . In economic terms, these dummies account for unpredicted phenomena, where unpredicted is here interpreted as not accounted for by the variables included in our model. That is, these were purely exogenous shocks, either corresponding to recessions/slowdowns (1982, 1987 and 2000) or to relevant shifts in income distribution (1993-1994).

¹⁸We were unable to find a statistically adequate model with R endogenous, probably because the interest rate is in fact policy-determined, and is not exclusively associated with the variables included in our model. Thus, we estimated what in the technical literature is known as Restricted VARs (RVARs), which need to be estimated by Seemingly Unrelated Regression (SURE) method.

¹⁹This was not an a priori distinction between endogenous and exogenous variables; we estimated a valid VECM model and then we tested the validity of the restriction of the existence of an output equation. We are aware that other cointegration vectors exist but, as our goal is to study the determinants of aggregate demand, we focus on the output cointegration vector only.

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-value</i>	<i>t-prob</i>
Δy_{t-2}	0.154281	0.07638	2.02	0.0461
Δy^*_{t-1}	0.531254	0.1237	4.29	0.0000
Δy^*_{t-3}	-0.37127	0.1147	-3.24	0.0016
Δh_t	0.0547729	0.008761	6.25	0.0000
Δh_{t-2}	0.0213890	0.006702	3.19	0.0019
Δo_t	0.189058	0.04027	4.69	0.0000
Δo_{t-4}	-0.100629	0.02595	-3.88	0.0002
ΔW_{t-1}	0.169636	0.09954	1.70	0.0915
ΔR_{t-2}	-0.00181283	0.0004541	-3.99	0.0001
VC_{t-1}	-0.00105845	0.0002611	-4.05	0.0001
<i>dummy</i>	-0.0114360	0.003130	-3.65	0.0004

Table 1: Estimated Error Correction Mechanism, dependent variable: Δy_t . Estimation period: 1981(2)-2008(3), *dummy* equals 1 in 1981(4) and 1982(1).

$$y = 0.83y^* + 2.17W + 0.14c + 0.15o + 0.11h - 0.012R \quad (4)$$

where lower-case letters refer to the variable in logarithms²⁰.

In words, we find that **higher** output is associated with **higher** OECD GDP, with a **higher** share of wages in value added, and with **higher** government expenditure financed either via higher taxes on profits or via **higher** other government revenues. Finally, a higher interest rate is associated with lower output.

Since correlation does not imply causation, it is still necessary to study whether output is indeed determined by the right-hand side of (4). 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 Model (whose dependent variable is the growth rate of output), which describes the association between changes in US GDP and changes in its determinants, that is, the short-run equation. Table 1 shows the Error-Correction Model, where VC denotes the long-run cointegration vector.

Finally, and in order to provide further evidence related to our previous findings, in this section we estimate a Structural VAR, using the cointegrated VAR model from the previous section, and we conduct Impulse-Response Analysis. IRA graphs are shown in Figure 4²¹:

As we can see, shocks to government expenditure financed either with taxes on profits, or

²⁰The vector misspecification test statistics, which validate the above shown long-run estimation, are displayed in Table A.2 in the Appendix.

²¹Note; the variable R does not appear in the Impulse Response Graphs, because it is taken as exogenous in our estimated VAR.

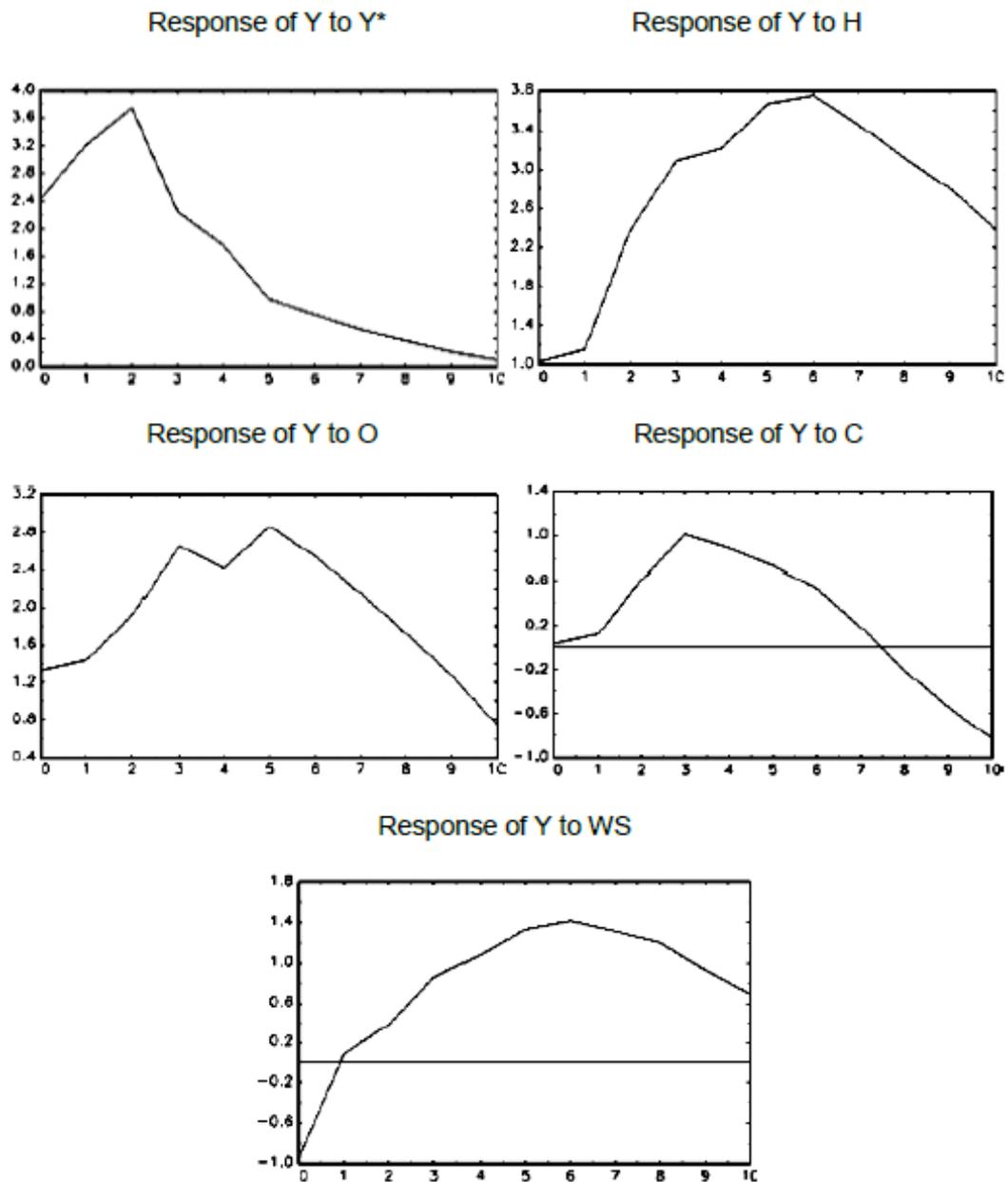


Figure 4: Impulse-Response of the Structural Effects over Output

other government revenues, as well as to world output and credit, have positive impacts on output and demand. Shocks to the wage-share have an initial negative effect, but this rapidly turns positive. One possible explanation is that higher wages and a higher share are initially saved, and are spent after a short delay.

Let us now give an economic interpretation to our results, concentrating on the hypotheses that are the main object of our inquiry.

In the first place, we have found that higher government expenditure, either financed with higher taxes on profits, or with other government revenues, tends to stimulate demand and output. As anticipated by Kalecki, the magnitude of the impact depends on how government expenditure is financed. Let us put numbers to this notion and assume that in 2007 government expenditure had been US \$ 4,530.0 (billions of US dollars) instead of US \$ 4,430.0, i.e. 100 billions (only 2.26%) higher than it actually was. If that rise had been entirely financed taxing corporate profits, then the latter item would have risen from US \$ 420.6 to US \$ 520.6; i.e. an increase of 23.8% with respect to its original value. Since the long-run elasticity of GDP with respect to taxes on corporate profits is 0.11 (see equation 4), that rise in government expenditure would have brought about a long-run increase in GDP amounting to 2.6%²²; namely, of US \$ 366.9 billion. On the other hand, if the US \$ 100 billions of additional government expenditure had been financed via other budget revenues, the latter would have risen 4.4%, and in the long-run output would have been US \$93.4 billion higher. Thus, according to our estimates, financing government expenditure taxing corporate profits has a more expansionary effect on demand than financing with other budget revenues.

Second, we have found that monetary conditions do affect demand and output, not only in the short but also in the long-run. Thus, our result validates Keynes' hypotheses and contradicts the conventional view that denies any long-run effect of monetary variables on the real economy. Larger credit availability has a positive impact on demand, and a higher interest rate tends to depress it.

Third, the positive association between OECD GDP and US GDP implies an improved demand for the home country (US) coming from abroad, with its corresponding multiplier effect.

Finally, we notice that a higher share of wages stimulates demand and output, with a

²²Since both output and taxes on corporate income are in logs, we know from our model that $(\Delta Y_t/Y_{t-1})/(\Delta H_t/H_{t-1}) = 0.11$, thus that $\Delta Y_t/Y_{t-1} = 0.11 * (\Delta H_t/H_{t-1})$. Obviously, the same applies to other budget revenues.

certain delay, and that in the long-run its impact is clearly positive. In other words, the expansionary effect of a higher wage share on domestic demand seems to more than offset any (possible) recessive impact on investment, as well as its (most likely) negative impact on the trade balance. This finding clearly validates Kalecki's conjecture.

5 Policy Implications

In this work we have been able to statistically test Keynes and Kalecki's conjectures on the relevance of effective demand in the US economy, which in turn suggests that the authors' policy conclusions are also applicable in current circumstances.

After many years of being considered by both governments and the economics mainstream as a forbidden weapon, as a consequence of the depth of the current world crisis, public spending (even deficit financed) regained for a brief lapse a place of honor in the arsenal of acceptable economic policy instruments. This was a short "Indian summer", and after a small period the clouds and the cold weather came back with vengeance. Anyway, the new situation was hailed as a revival of Keynes and Keynesianism, especially, but not only, by Post-Keynesian writers (see for example [31] and the bibliography cited therein).

There is much truth in the previous opinions. However, let us recall that Keynes was not alone in underlining the utilization of government expenditure as a tool to fight unemployment. Also Michal Kalecki, 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 added two twists to that notion, claiming that the deficit would also raise profits, and that even financing government expenditure with taxes on profits would have an expansionary effect. This hypothesis was also found valid in our research.

Let us now discuss the influence of income distribution on demand and employment, which is an issue we may relate to the discussion amongst Post-Keynesian economists on the so-called "wage-led" and "profit-led" regimes. 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 its negative impact on workers' consumption is, 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. Indeed, the wage fall may raise profits in an open economy in the short run (though this is by no means certain), but may

reduce demand and capacity utilization, which are two arguments that we may assume should be included amongst the determinants of investment.

Our empirical results for the US economy suggest that in this country the shift from wages to profits did indeed cause a short-term fall in effective demand. Moreover, in the long-run demand and output also appear to be discouraged by this shift. This is clearly brought to light both by the Long-run Equilibrium Equation (4), and by the Error Correction Equation (Table 1).

We may suggest that the evolution has gone more or less along the following lines. Let us consider, just for the sake of our discussion, a situation where a fall of the wage share improves the trade balance and profits, even as it depresses aggregate demand and output in the short run. Let us moreover assume a simple investment function where investment depends positively on only two arguments: profits and capacity utilization. Then, if the elasticity of investment with respect to profits is lower than its elasticity with respect to utilization, the negative short-run impact of the wage-share fall on demand and output will persist. Indeed, investment will be growing at a lower rate, dragging with it internal demand, due to the demand (and capacity utilization) fall. This would be an example of what has been labelled in the previously cited literature as 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 economy²³.

Finally, let us say a few words about the monetary aspects of our estimated model. As is well known, Keynes' main message was that monetary policy can be very powerful. More specifically, he thought that open market operations should be the driving factor in monetary policy affecting the real economy, with the interest rate playing a major role²⁴; and he also emphasized the importance of banks as the most important providers of loans to the private sector²⁵. Needless to mention, today's US financial system is extremely sophisticated and well diversified, which suggests that the importance of monetary policy is further reinforced in comparison with what the case was in Keynes' times. And our results insinuate that the two main channels through which Keynes thought that monetary developments affect the macroeconomy, namely the interest rate and loans provided by banks, have indeed played a significant role in

²³We may add to this a repercussion effect, which is important because of the size of the US economy. If a lower wage share depresses domestic demand, then US demand for imports declines, which brings about a decline in demand and output for US trading partners, which then entails lower US exports.

²⁴In Keynes' own words "The new post-war element of 'management' consists in the habitual employment of an 'open-market' policy (...). This method seems to me to be the ideal one" ([1], pp. 206-207).

²⁵"[I]n general, the banks hold the key position in the transition from a lower to a higher scale of activity" (CWJMK, Vol. 14, 222).

the recent evolution of that economy. In fact, we think that our results appear to support a view advanced by other authors²⁶, who argue that growing household indebtedness somewhat compensated for the negative demand effect resultant from the shift from wages to profits, thus contributing to sustain effective demand in the US economy.

Finally, we must add to the above that Keynes' scepticism about the efficacy of monetary policy in times of recession, as well as his, and especially Kalecki's emphasis on fiscal policy, are also borne out by recent economic events. We cannot go into details about this point, because this would take us away from the main subject of our paper. But a few basic facts are here worth mentioning²⁷.

Between the third quarter of 2008 and the second quarter of 2011, the FED's balance sheet practically tripled, with the monetary base growing from an index of 100 to one of about 300. Concurrently, the Fed maintained the interest rate at its historical low. But this extremely bold monetary policy did not stimulate enough private spending, which fell from 10,075 billions of (2000) dollars in 2007 to 9,201, and recovered mildly to only 10,319 in 2010.

Concurrently, government spending rose from 2,221 to 2,342 and then to 2,371 US billions between 2007 and 2010, and its share in GDP from 19 to 20.9 and then to 20.6 percent of GDP. Equally important: the sum of Taxes on Corporate Income plus the Budget Deficit went from 543 to 1,239 and then to 1,332 billions of US, more than doubling its total value between 2007 and 2010, with its share rising from 4.7 to 11.1 and then to 11.6 percent of GDP. To put it differently, while in 2007 about 75 percent of government spending was financed taxing persons, in 2010 only 43.5 percent of its finance came out of taxes on persons. This implies that not only was government spending larger but also that its multiplier effect was greatly magnified, because a much smaller part of it was crowding out private spending.

Fiscal expansion therefore took on the leading role and surely it was the main factor thanks to which a collapse could be avoided. We will put some numbers to the idea. In our model we estimated that the short-run (two quarters) output-elasticity of government spending financed via taxes on profits was 0.07. To simplify we will suppose the same elasticity for the budget deficit. Now, between 2007 and 2010 the sum of Taxes on Corporate Income plus the Budget Deficit grew 790 billions of (2000) dollars; i.e. 145%. This means that, absent this fiscal push, GDP would have been 10.15% (145 times 0.07) lower, that is \$ 1,194 billions of dollars, smaller than it actually was (\$ 10,569 instead of \$ 11,620 billions). There can be not doubt that the

²⁶See Cynamon and Fazzari ([15]), Barba and Pivetti ([8]); and Fitoussi and Saraceno ([17]).

²⁷See López ([7]) for details.

course of the crisis would have been much more critical had the expansionary fiscal policy been absent.

6 Conclusion

It is a fact of life that inferences arrived at in social sciences, and in sciences in general, are never definite. As time goes by new information becomes available and new and more powerful methods of analysis and techniques develop. Anyway, using the most complete set of information at our disposal, and what we consider a rigorous (and demanding) statistical analysis, we have reached what we consider robust conclusions. In a nutshell, we hope to have convinced readers that the effective demand approach can be used to explain the recent evolution of the US economy, and that the main intuitions of their founding fathers, Keynes and Kalecki, were essentially correct.

We do not claim, of course, that what we found for the US takes place in the same way in other advanced economies: the reaction of economies to shocks and to economic policy measures depends on their structure and institutions. We would, nonetheless, suggest that the institutions and structure of most highly developed countries are not too different, therefore that the results we have found for the US cannot be too dissimilar in most of them. This is an issue deserving further research, and we suggest that the methodology we have used in this work might be useful to study other national cases.

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<i>Variable</i>	<i>Variable Name at Source</i>	<i>Source</i>	<i>Description</i>
Y	GDP (2000 prices)	BEA	Table 1.1.6, item A191RX1
Y^{nom}	GDP	BEA	Table 1.1.5, item A191RC1
C^P	Personal Cons. Exp.	BEA	Table 1.1.5, item A002RC1
I	Gross Pri. Dom. Inv.	BEA	Table 1.1.5, item A006RC1
J	Net Exports Goods & Services	BEA	Table 1.1.5, item A019RC1
G	Govt. Cons. Exp. & Gross Inv.	BEA	Table 1.1.5, item A822RC1
Y^*	OECD GDP	OECD	OTF.VPVOBARSA.2000.S1
W	Wage Share	BEA	Table 2.1, item A576RC1
C	Credit Outstanding	FED	Federal Reserve
G_{CPI}	Price Index of G	BEA	Table 3.9.4, item B822RG3
H	Taxes Corporate Income	BEA	Table 3.1, item W025RC1
B	Budget Deficit	BEA	Table 3.1, item AD01RC1
S	Surplus of Govt. Revenues	Authors	$S = G - (B + H)$
O	Other Budget Revenues	Authors	$O = G - H$
R	3-Months Int. Rate	FED	Treasury Bill Sec. Market
r	Long-Run (10 years) Int. Rate	FED	Market yield U.S. Treas. Secs.
$[N]REER$	Eff. Exch. Rate Inds.	BIS	BIS effective exchange rate

Table 2: Data Sources.

<i>Test</i>	<i>Statistics Values</i>
Vector AR 1-5 test : F(180,250)	0.99467 [0.5124]
Vector Normality test : $\chi^2(12)$	20.663 [0.0555]
Vector Hetero test : F(1050,231)	0.24489 [0.990]

Table 3: VAR Misspecification Tests.

<i>Variable</i>	<i># lags diffs.</i>	<i>Const.</i>	<i>Trend</i>	<i>ADF-Test</i>	<i>ADF Series</i>
Y	3	Yes	Yes	-3.45	-2.315
Y^*	3	Yes	Yes	-3.45	-1.977
w	4	Yes	No	-2.887	-1.886
H	3	Yes	No	-2.887	-1.74
O	4	Yes	No	-2.887	-1.125
C	3	Yes	No	-2.887	-2.157
R	6	Yes	No	-2.887	-2.863

Table 4: Unit Root Tests, Series in Levels.

<i>Variable</i>	<i># lags</i>	<i>diffs.</i>	<i>Const.</i>	<i>Trend</i>	<i>ADF-Test</i>	<i>ADF Series</i>
ΔY	2		Yes	No	-2.887	-4.433
ΔY^*	2		Yes	No	-2.887	-4.139
Δw	3		Yes	No	-2.887	-4.398
ΔH	2		Yes	No	-2.887	-4.683
ΔO	3		Yes	No	-2.887	-3.336
ΔC	2		No	No	-1.943	-2.096
ΔR	5		No	No	-1.943	-3.306

Table 5: Unit Root Tests, Series in Differences.