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Representative agent meets class structure: imperfect competition and the balanced-budget multiplier

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Recently, New Keynesian economists (NKE) have been concerned with the effect of imperfect competition on the sign and size of the balanced-budget fiscal multiplier. This literature all came up with models based on a profit–income relationship in which imperfect competition increases the tax-financed fiscal multiplier. Accordingly, the higher the exercise of market power by firms, the greater the effectiveness of fiscal policy. In this paper, we argue that the New Keynesian results are very sensitive to a heroic simplification on which they rest: the representative agent. We show that in terms of the budget-balanced multiplier, a Kaleckian approach, where class structure matters, offers a richer set of results. Moreover, we develop a simple short-run rational agent optimisation model of the type used by NKE and introduce class structure into it. We demonstrate, in support of the Kaleckian approach, that even in a general equilibrium optimising framework, the balanced-budget multiplier is strictly decreasing in the degree of monopoly.

Key words: Imperfect competition, Fiscal multiplier, Class structure, Kalecki
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1. Introduction

The last one and a half years have seen a renewed interest in fiscal policy and the value of the multiplier, but of a distinctly 'Keynesian' flavour and responding to a particular challenge. The challenge posed by a number of authors in the 1980s and 1990s has been to provide microfoundations for Keynesian multipliers by assuming that the goods market is characterised by some form of imperfect competition. One noteworthy issue is the attempt to link imperfect competition in the output market to the effectiveness of fiscal policy and the size of the fiscal multiplier. For instance, Dixon (1987), Mankiw (1988), Startz (1989, 1995), Matsuyama (1995) and Heijdra and Van der Ploeg (2002) all show that characterising the product market by standard oligopolistic and monopolistic structure is sufficient to yield a larger tax-financed fiscal multiplier. Indeed, as Dixon and Rankin

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(1994) firmly state in their well-known survey on imperfect competition and macroeconomics: 'imperfect competition by itself is in general enough to cause significant effects of fiscal policy on output' (p. 188). Moreover, in these examples the balanced budget multiplier (BBM) rises monotonically in respect to market power. This literature departs, in one way or another, from the Walrasian tradition and is designed to exhibit New Keynesian features. The intuitive story is as follows. Models with imperfect competition all come up with a profit margin. The profits of the firm are distributed among all identical consumers. Profits are pro-cyclical and, consequently, an increase in government spending increases income and profits. While consumers are satisfied on the margin with their goods–leisure trade-off, the increased income (and profits) causes them to increase their demand for goods so that there is a further increase in output, and a multiplier effect occurs. A positive multiplier occurs because an increase in government expenditure financed by a lump-sum tax will tend to lead to a larger reduction in leisure rather than crowding out consumption. In sum, by using microfoundations for very short-run equilibrium, New Keynesians have developed models that exhibit a positive balanced-budget multiplier.

All these New Keynesian models share at least one common neoclassical premise: All people are the same and have homothetic preferences over consumption and leisure; hence, aggregation is allowed and the models can deal with one representative person. The representative person supplies labour for a unit of time endowment and maximises a utility function over consumption and leisure, and the same person organises production and maximises profits subject to the production function and the demand constraint. Thus, this representative person derives after-tax wages but also after-tax profit income.

One alternative to this conception of agency is heterogeneity across households. Classical economists, for instance, believed that a capitalist economy developed into a class society. The objective class integration of each individual was considered to be the consequence of his or her specific economic function, and each class was defined in relation to the particular form of income that was earned. Kalecki and his followers even predicted that class structure is an inevitable feature of capitalism, and that class distinction between workers and capitalist was essential for economic modelling. Being a prominent but in general ignored predecessor of a refined attempt to provide the microfoundations for short-period equilibrium and dynamic models, Kalecki's best known professional writings unfortunately were seen as presenting an intrinsically embedded theory of income determination in the theory of the trade cycle.[1] Furthermore, Kalecki never formally brought together imperfect competition and his analysis on the budget-balanced effects of taxation on output. However, since the Kaleckian approach is couched in terms of income distribution and the conditions of the ownership (and therefore goes beyond the emphasis on imperfect competition), we may investigate the results that come from performing the analogous exercise that New Keynesians have done, assuming a balanced-budget increase in government spending. Moreover, we modify and extent the prototype New Keynesian fiscal model to the case in which class structure is a significant feature of the economy.

[1] Traditional interpretations of Kalecki's writings during the pre-*General Theory* period usually see the study of investment cycles and not output as the main concern of the analysis. However, as shown by Chapple (1991) and partly by Chilosi (2003), very early in 1933, Kalecki published 'Proba teorii koniunktury' and a work entitled 'O handlu zagranicznymi "ekspocie wewnetrznym"' which contain a theory of the determination of short-period equilibrium. The latter contains no discussion of changes in the capital stock and derives a profit–output relationship that, combined with a 'realisation curve', determines the actual amount of profits and short-period level of output.

In the analysis below, I first present a simple Kaleckian fiscal multiplier model in which the description of imperfect competition and class structure is explicit. It is shown that considering slight changes to the Kaleckian model offers a rich set of results. We have chosen to focus on the balanced-budget multiplier in which the only source of finance for government spending is a lump-sum tax on households. There are three reasons for that. First, since the model is static, it must be the case that the government satisfies its budget constraint, otherwise interest and capital cannot be ignored and we need a dynamic analysis. Second, this allows easy comparison with the canonical New Keynesian model. Finally, as far as fiscal policy is concerned, relatively little attention has been paid to this side of the matter by Kalecki's followers.[1]

Section 3 outlines what we call the canonical New Keynesian model and derives the effects of a balanced-budget multiplier expansion. It will be easy to see why New Keynesians' fiscal models suggest that fiscal policy, in the short run, can be an effective tool for enhancing output, employment and welfare.

Section 4 extends the canonical New Keynesian model by investigating the effectiveness of fiscal policy in an economy where class structure and income distribution matter. The analysis is carried out within a framework that postulates optimal choice by consumers. But we have not chosen to focus on consumer's rational behaviour because we believe that consumers solve optimisation programmes. Far from it. Rather, we want to show that, even within an optimising framework, in opposition to the New Keynesian claim, a higher degree of imperfection in the goods market will decrease the power of fiscal policy on output.

2. The Kaleckian balanced-budget multiplier

The model that is worked out here cannot be taken as an exact representation of the views of Kalecki. It is a composite based on the ideas of various Post-Keynesian authors and Kaleckian followers. It bears a resemblance to the model of Harcourt (1965), Harris (1974), Asimakopulos (1975), Yellen (1980), Langer (1985), Mott (1989) and Mott and Slattery (1994). In equilibrium, aggregate demand equals national income and the analysis and the presentation confines itself to the short-period equilibrium. Thus, we present a simple Kaleckian model in Keynesian garb. In regard to the determination of prices, firms are assumed to operate at standard capacity (below full employment) and pursue a policy of setting prices at a level given by a mark-up on variable costs. Variable unit costs are assumed to be constant over the relevant ranges of production. Dealing with the short run, we merely assume that investment is exogenously determined, which can be justified on the grounds that investment expenditure in the current period is the outcome of investment decisions made in previous periods.[2] The model typically assumes different savings behaviour on the part of workers and capitalists, so that class structure is allowed to play its

[1] Following Kalecki (1971), most of the Post-Keynesian literature has emphasised the incidence and macroeconomic effects of taxation. Asimakopulos and Burbidge (1974) formalised and extended Kalecki's theory of taxation, and Laramie (1991), Damania and Mair (1992), Mott and Slattery (1994) and Mair and Laramie (1996) have further contributed to this line of research. Noteworthy, Kalecki's pioneer paper on taxation is not only a short-period analysis but assumes that the government budget is in balance, that taxes are lump sum, that workers' saving equals zero, and that the economy is closed and operating with excess capacity.

[2] Of course, the investment function may require deeper analysis. Post-Keynesians, for instance, offer several justifications for the influence of profits on investment. In the event that this relationship does exist, an additional cumulative feedback effect will amplify the impact of an autonomous change in aggregate demand. I am grateful to Robert Blecker and an anonymous referee for pointing this out to me.

role. The model abstracts from monetary policy by assuming a perfect elastic money supply, but the system equations will include a balance budget government sector whose spending is assumed to be financed entirely via lump-sum taxation. This is at best a starting point for a truly comparative analysis with the canonical New Keynesian model.

The remaining features of the model can be quickly sketched. National income in money terms is

$$pY = \Pi + wL \tag{1}$$

where Y is aggregate output, p is the general price index, Π is the level of money profits, w stands for the money-wage rate (taken as given in the short run), and L is the total employment of labour.

Output per unit of labour, $1/b$, is constant for all ranges of output up to full capacity. Thus

$$Y = \frac{L}{b} \tag{2}$$

Prices are set by a mark-up, τ, over unit variable costs. Here, we may or may not introduce profit maximisation into the analysis (as New Keynesians would do) and demonstrate that the pricing rule is perfectly consistent with Kalecki's view that short-run price changes are essentially due to cost factors (see Appendix 1)

$$p = \tau wb, \quad \tau > 1 \tag{3}$$

As we can see from (3), aggregate unit costs, if production is fully integrated, are given by w times b, or labour per unit of output.

In the popular income–expenditure version of Keynes, equilibrium national income is equal to aggregate demand for consumption goods C, demand for investment goods I, and government expenditure G, and is expressed in the familiar

$$Y = C + I + G \tag{4}$$

Assuming that consumption out of wages is different from consumption out of profits, the aggregate consumption function is

$$pC = (1 - s_w)(wL - T_w) + (1 - s_p)(\Pi - T_P), \quad 0 \le s_w \le 1, 0 \le s_p \le 1, \quad \textit{and} \quad s_w < s_p \tag{5}$$

where s_{w} and s_{p} are the propensities to save out of wage and profit income, respectively, and the aggregate nominal lump-sum tax $T = T_{\mathrm{w}} + T_{\mathrm{p}}$ is made up of two amounts, an aggregate lump-sum tax on workers and an aggregate lump-sum tax on capitalists. Simple as it is, this aggregate consumption function differs from the one that will emerge in the next section in one fundamental way: it depends explicitly on the distribution of income in the economy.

The investment demand in the short run is

$$I = \bar{I} \tag{6}$$

and government expenditure is assumed to be exogenous

$$G = \bar{G} \tag{7}$$

The government budget constraint requires that government spending (in nominal terms) equals revenue. That is,

$$pG = T \tag{8}$$

We may use now (1) and (3) and obtain aggregate profits expressed in terms of income and the mark-up.

$$\begin{aligned}\Pi &= \tau wbY - wbY \\ &= (\tau - 1)wbY \end{aligned} \tag{9}$$

Profits increase with output (they are pro-cyclical) in the aggregate, even with a constant labour–output ratio because prices exceeds the unit cost.

Now we can use expression (4) for equilibrium national income and substitute (2), (3), (5), (6), (7) and (9) into it. This yields

$$Y = (1 - s_w)\frac{1}{\tau}Y + (1 - s_p)(\tau - 1)\frac{1}{\tau}Y - (1 - s_w)\frac{T_w}{p} - (1 - s_p)\frac{T_p}{p} + \bar{I} + \bar{G}$$

When solved for Y, this equation gives

$$Y^\star = \frac{-(1 - s_w)T_w p^{-1} - (1 - s_p)T_p p^{-1} + \bar{I} + \bar{G}}{s_p - \frac{(s_p - s_w)}{\tau}} \tag{10}$$

For equilibrium national income to be positive, we need $s_p - (s_p - s_w)\tau^{-1} > 0$ in (10). The interesting policy problem analysed here is to determine the effect upon Y of a change in pG financed by and equal to a change in $T_w + T_p$. That will be the balanced budget multiplier within a Kaleckian framework. We shall set the share of wage income taxation on government spending as

$$T_w = \lambda pG \tag{11}$$

and share of profit income taxation on government spending as

$$T_p = (1 - \lambda)pG, \tag{12}$$

where λ is a fraction ($0 < \lambda < 1$).[1] Using (10), (11) and (12), we may then calculate the net effect of dG. This gives

$$\frac{dY^\star}{d\bar{G}} = \frac{\lambda s_w + (1 - \lambda)s_p}{s_p - \frac{(s_p - s_w)}{\tau}} > 0 \tag{13}$$

Thus, since, $s_p - (s_p - s_w)\tau^{-1} > 0$, an increase in government expenditure produces a rise in output. The intuition behind this is that, since part of both profit-income and wage-income is saved, an increase in taxes taken from either or both groups and wholly spent by government should raise national income. The size of the multiplier will depend on the magnitude of the propensities to save, on the magnitude of the share of wage income taxation on government spending and on the size of the mark-up.

An issue of interest is the relationship between the value of the multiplier and market power. Noting that this relationship derives from the sign of the multiplier in (13), we differentiate (13) with respect to τ, which yields

$$\frac{\left(\frac{dY^\star}{d\bar{G}}\right)}{d\tau} = \frac{-\frac{(s_p - s_w)}{\tau^2}[(\lambda s_w + (1 - \lambda)s_p]}{[s_p - (s_p - s_w)/\tau]^2} < 0 \tag{14}$$

[1] I am indebted to Tracy Mott for bringing the importance of this parameter to my notice.

The impact of a change in the mark-up turns out to be negative. Not surprisingly, when $s_p > s_w$ the results here turn out to be rather similar to those obtained by other authors in the framework of the Kaleckian investment multiplier (see, for instance, Harris, 1974; Langer, 1985; Reynolds, 1987, p. 95). That is, an increase in the mark-up that helps profit-earners and hurts wage-earners reduces effective demand and will decrease the size of the fiscal multiplier. Only in an extreme and rare case where s_w is large enough and s_p small enough, could the expression conceivably become positive.

Consider for instance the case where saving out of wages is zero, which is the extreme Ricardian–Kaleckian assumption or Keynes's 'widow's' cruise theory of profits. This case is important because it will allow us to evaluate the New Keynesian approach below, in a way that is vitally relevant to our main concern. Expression (13) reduces to

$$\frac{dY^\star}{d\bar{G}} = \frac{(1-\lambda)s_p}{s_p - \frac{s_p}{\tau}} > 0 \qquad (15)$$

Thus, in this imperfectly competitive economy, in which the lump-sum tax is levied on all wage income and only a portion $(1 - s_p)$ on profit income, the balanced-budget multiplier is still positive.

As the mark-up changes, the impact of the balanced budget multiplier will be

$$\frac{\left(\frac{dY^\star}{d\bar{G}}\right)}{d\tau} = \frac{-\left(\frac{s_p}{\tau}\right)^2(1-\lambda)}{\left[s_p - (s_p/\tau)\right]^2} < 0 \qquad (16)$$

Again, a rise in the mark-up generates a reduction in the size of the fiscal multiplier. But the reduction is larger than the one we found in (14).

The Kaleckian research framework has tended to be classed based, but what would happen in this model if class structure and imperfect competition were assumed to be utterly irrelevant? Indeed, the basic structure of the model is simplified in ways that give interesting results.

To begin with, the endogenous nature of profits disappears. Thus, knowing that $T_w + T_p = T$ and using expression (1), the aggregate consumption function reduces to

$$pC = (1-s)(Y-T), \quad 0 \leq s \leq 1 \qquad (17)$$

Equilibrium national income and the balanced budget multiplier may now be expressed as

$$Y^\star = \frac{\bar{I} + s\bar{G}}{s} \qquad (18)$$

$$\frac{dY^\star}{d\bar{G}} = 1 \qquad (19)$$

It follows from (19) that the multiplier for a balanced-budget change in pG and T is equal to 1. The result confines itself, in the main, to the celebrated 'balanced budget multiplier theorem' of Haavelmo (1945).

Let us now turn our attention to the case where the balanced budget constraint still applies, but lump-sum taxes are only levied on profit income.[1] This is the case in which $\lambda = 0$. Equilibrium national is given by

$$Y^\star = \frac{-(1-s_p)T_p p^{-1} + \bar{I} + \bar{G}}{s_p - \frac{(s_p - s_w)}{\tau}} \qquad (20)$$

[1] The case of taxing wage income would not be very interesting.

The balanced fiscal multiplier is now

$$\frac{dY^\star}{d\bar{G}} = \frac{s_p}{s_p - \frac{(s_p - s_w)}{\tau}} > 1 \tag{21}$$

The analysis then shows that favouring workers' income and implementing a progressive tax regime where taxes rely on profits will still allow a likely stimulating effect for fiscal policy in the economy.

When we turn to the effect of an increase in the mark-up on the balanced fiscal multiplier, we get

$$\frac{\left(\frac{dY^\star}{d\bar{G}}\right)}{d\tau} = \frac{-\frac{(s_p - s_w)}{\tau^2} s_p}{\left[s_p - (s_p - s_w)/\tau\right]^2} < 0 \tag{22}$$

which is clearly negative. Again, an increase in the degree of imperfect competition reduces the size of the fiscal multiplier.

3. The canonical New Keynesian model and the balanced budget multiplier

The models constructed in much of the recent literature on imperfect competition and the role of fiscal policy share some common features. Here we consider a slightly changed version of Dixon (1987), Mankiw (1988), Starz (1989, 1995), Dixon and Rankin (1994) and Heijdra and Van der Ploeg (2002). Central to all these New Keynesian models is a static general equilibrium framework where a representative consumer is endowed with time, Ω, and labour per unit of time, L, and also owns a share of each firm and thus a share in economic-wide profits, if there are any. The representative consumer maximises a utility function over consumption and leisure. The representative firm maximises profits knowing its ability to control p, and assumptions about economic structure such as constant marginal cost, constant mark-up pricing and lump-sum taxes are common.

Here, the representative consumer maximises a Cobb–Douglas utility function, which depends on the amount C consumed of a single produced commodity and of the amount $(1 - L)$ of leisure consumed. That is $U = C^\alpha(1 - L)^{(1-\alpha)}$ and $0 < \alpha < 1$. In log form, the utility function is

$$\log U = \alpha \log C + (1-\alpha)\log(1-L) \tag{23}$$

The representative agent sells part of her/his labour endowment at a nominal wage w, receives profits Π, and pays taxes T. Thus the consumer's budget constraint is

$$pC = wL + \Pi - T \quad \text{or} \quad pC = w(\Omega - (1-L)) + \Pi - T \tag{24}$$

and, as before, the government budget constraint is $pG = T$.

The demand functions associated with maximising (23) subject to (24) are

$$(1-L) = \frac{(1-\alpha)}{\alpha}\frac{pC}{w} \tag{25}$$

$$pC = \alpha(w\Omega + \Pi - T) \tag{26}$$

Equation (26) is a consumption function, and α is the marginal propensity to consume ($\alpha = 1 - s$, if we prefer).

Using equation (26) to substitute into the total expenditure on the produced goods, we find

$$Y = \frac{(1-s)(w\Omega + \Pi - T)}{p} + I + G \tag{27}$$

Expenditure therefore depends positively on profits, and profits under imperfect competition are endogenously determined as in the Kaleckian framework.

New Keynesians will now take industry's profits, the pricing rule derived above and given by (3), and the industry demand function ($Q = y/p$), to obtain an expression for total profits. Industry's profits are

$$\Pi = pQ - wbQ = p\frac{y}{p} - wb\frac{y}{p} \tag{28}$$

But we know that the summation of industry real output is equal to total real output of the economy ($\sum_{j=1}^{m}(y/p)_j = Y$). Then, using (3) we may simplify (28) and get

$$\Pi = \tau wbY - wbY = (\tau - 1)Y \tag{29}$$

Hence, higher aggregate expenditure implies higher aggregate profits. Equations (27) and (29) summarise the New Keynesian theory of income determination under imperfect competition and the potential for the multiplier: 'An expansionary change in fiscal policy increases aggregate expenditure, which increases profits, which in turn increases expenditure, and so on' (Mankiw, 1988, p. 377).

To address the impact of fiscal policy, again we may consider an equal increase in government purchases pG and taxes T. Combining (29) with the aggregate demand equation gives

$$Y^{\star} = \frac{(1-s)w\Omega p^{-1} + s\bar{G} + \bar{I}}{1 - \frac{(1-s)}{wb}\left(1 - \frac{1}{\tau}\right)} \tag{30}$$

By inspection, the New Keynesian balanced-budget multiplier is

$$\frac{dY^{\star}}{d\bar{G}} = \frac{s}{1 - \frac{(1-s)}{wb}\left(1 - \frac{1}{\tau}\right)} > 0 \tag{31}$$

This mechanism, however, should not be confused with the one exhibited by the Kaleckian multiplier which rests on pure aggregate demand effects. Here, aggregate demand and aggregate supply react to a fiscal shock in such a way that the economy has a Keynesian multiplier.[1] In the limiting case in which the mark-up is equal to 1 (perfect competition), the multiplier is s (less than one). That is, the process ends after the initial increase in expenditure. Moreover, as the marginal propensity to save tends to 1, the multiplier tends to 1 as well.

One noteworthy issue found in Mankiw (1988), Startz (1989), Dixon (1987), Dixon and Rankin (1994) and Matsuyama (1995) is the attempt to link market power and the size of the multiplier. All remark that the multiplier rises monotonically with respect to the mark-up. Mankiw (1988), for instance argues that '[a]s competition in the goods market becomes less perfect, the fiscal-policy multiplier approach the values implied by the

[1] Aggregate supply reaction occurs as a consequence of a fall in leisure consumption (which is supposed to be a normal good). As taxes increase to finance the higher level of government spending, disposable income falls and labour supply increases to match increases in labour demand.

Keynesian cross' (p. 384). Indeed, that is the case here since the impact of the mark-up on the multiplier takes the form

$$\frac{\left(\frac{dY^*}{d\bar{G}}\right)}{d\tau} = \frac{\frac{s(1-s)}{wb\tau^2}}{\left[1 - \frac{(1-s)}{wb}\left(1 - \frac{1}{\tau}\right)\right]^2} > 0 \tag{32}$$

Clearly, at least in the short run, and assuming that the government constraint applies, a greater exercise of market power by firms leads to a greater effectiveness of fiscal policy.[1]

4. Representative agent meets class structure

The rationalisation of the representative consumer permeates modern New Keynesian economics and has taken over macroeconomic analysis so that economists model the entire economy as if there is only one person in it. Yet far from being valid, in fact it can become a misleading device if simple generalisations are derived from it. Moreover, empirical evidence supporting the representative agent approach based on the estimation of stochastic Euler equations is frequently rejected by the data (Kirman, 1992). The Kaleckian approach such as that followed by Post-Keynesian economists would not accept that the representative agent has been shown to be a valid abstraction. The Kaleckian approach focuses on heterogeneous agents with different roles and preferences. On the one hand, workers are required to sell their ability to work as a commodity on the market. On the other hand, capitalist, owners of the means of production, make profits by retaining a portion of the value produced by employees. Segmentation is required here, and this segmentation implies that a better analytical approximation is one that conceives the economy as composed of two different representative groups.

Within the New Keynesian framework we can rationalise the use of two representative groups. The purpose is to highlight formally, in a simple (tractable) way, some essential implications for the economy's aggregate behaviour in the short period and for fiscal policy that follow from the fact that agents or groups performs different roles in society. We start by separating the utility function and the budget constraint of each group.

The workers' role in this economy is to supply labour services as a variable input in production, and to be consumers of final commodities. In a Kaleckian manner, they consume all their labour income wL (they do not save). Workers have a utility function defined over one good C_w, and leisure $(1 - L)$. The maximisation problem that these individuals solve is thus a simple static one

$$Max_{Cw,(1-L)}\, U = U[C_w, (1-L)] \tag{33}$$

subject to

$$pC_w = wL - T_w \quad \text{or} \quad pC_w = w(\Omega - (1-L)) - T_w \tag{34}$$

If, as before, Ω is the endowment of time, then $w[\Omega - (1 - L)]$ is the labour income. The first-order conditions for this optimisation problem, which provide the decision rules for the consumption demand and labour supply of workers, state that the contemporaneous

[1] New Keynesians would argue, however, that higher profits will induce entry. In the long-run, as the number of firms increase, the economy becomes more competitive and the size of the multiplier may decrease.

marginal rate of substitution between consumption and leisure must equal the real wage rate

$$mrs_{Cw,(1-L)} = \frac{U'(1-L)}{U'(C_w)} = \frac{w}{p} \tag{35}$$

Workers' optimal choice allows us to express their consumption function as

$$C_w = \frac{wL}{p} - \frac{T_w}{p} \tag{36}$$

and the labour supply function that emerges is

$$L^s = L^s(w/p), \quad dL^s/d(w/p) > 0 \tag{37}$$

Capitalists, as consumers, purchase final commodities in an amount C_p; and, as asset holders, derive utility from real money balances (M/p) as well. We should note here that incorporating real money balances into the utility function serves as a shortcut for the saving decision of capitalists. They maximise the utility function

$$Max_{Cp,(M/p)} \log U = \delta \log C_p + (1-\delta)\log(M/p) \tag{38}$$

subject to the budget constraint

$$pC_p + M + T_p = \Pi + M' \tag{39}$$

where M' and M are the initial endowment of money and the nominal money balance at the end of the period, respectively. Capitalist's budget comes from profits Π and the initial endowments of money M'.

The solution to the this type of household problem yields standard Marshallian consumption demand functions

$$\frac{M}{p} = \frac{(1-\delta)}{\delta} C_p \tag{40}$$

$$C_p = (1-s_p)\left(\frac{\Pi}{p} + \frac{M'}{p} - \frac{T_p}{p}\right) \tag{41}$$

where δ is capitalist's propensity to consume [$\delta = (1 - s_p)$]. To obtain the aggregate consumption function, we have to aggregate the consumption functions of both representative groups in the economy. Thus, we must add the consumption function of workers to that of house owners or capitalists.

Aggregation yields

$$C = \frac{wL}{p} - \frac{T_w}{p} + (1-s_p)\left(\frac{\Pi}{p} + \frac{M'}{p} - \frac{T_p}{p}\right) \tag{42}$$

In the analysis that follows, as before, the only source of finance for government spending is the lump-sum tax (on both groups), and the government has to satisfy a budget constraint: $pG = T_w + T_p$, where $T_w = \lambda pG$ and $T_p = (1-\lambda)pG$. Similarly, the representative firm maximises profits knowing its ability to control p, and assumptions about economic structure such as constant labour productivity ($Y/L = 1/b$), constant marginal costs and a constant mark-up still apply. Thus, the profit maximising price is given by $p = \tau wb$.

From (42) and (3) and given investment demand and government expenditure, it is straightforward to show equilibrium national income and aggregate profits as

$$Y = \frac{wL}{p} - \frac{T_w}{p} + (1 - s_p)\left(\frac{\Pi}{p} + \frac{M'}{p} - \frac{T_p}{p}\right) + \bar{I} + \bar{G} \tag{43}$$

$$\Pi = (\tau - 1)wbY \tag{44}$$

and therefore the balanced-budget multiplier and the impact of market power on the multiplier are (see the mathematical workings in Appendix 2)

$$\frac{dY^{\star}}{d\bar{G}} = \frac{(1 - \lambda)s_p}{s_p - \frac{s_p}{\tau}} > 0$$

and

$$\frac{\left(\frac{dY^{\star}}{d\bar{G}}\right)}{d\tau} = \frac{-\left(\frac{s_p}{\tau}\right)^2 (1 - \lambda)}{\left(s_p - s_p\tau^{-1}\right)^2} < 0$$

It should be noted that these results are identical to those predicted by the Kaleckian balanced-budget multiplier in the case where $s_w = 0$. An increase in government expenditure results in an increase in output but a higher mark-up (meaning deteriorating competitive conditions) reduces the positive effect of fiscal policy. So, by abandoning the methodology of the representative agent as the basis for making inferences about the impact of expansionary fiscal policy on output, and favouring the inclusion of class structure into rational optimisation models, we discover that the claims made by New Keynesians about the relationship between market power and fiscal policy no longer possess any pure sense of truth and stability. The relationship between the magnitude of the balanced-budget multiplier and firm's market power is found to be non-monotonic.

5. Conclusions

The main aim of this paper was to see whether the widely held claim made by New Keynesian economists, that imperfect competition increases the effectiveness of fiscal policy and the size of the balanced-budget multiplier, makes sense when formulated in terms of the Kalecki's system. When pondering, within the Kaleckian system, the impact of changes in government expenditure on output, it appears that the results are richer than usually thought. In conditions where the fiscal constraint is binding and taxes are lump sum, an increase in government expenditure, for instance, produces a rise in output. Though this is in agreement with the New Keynesian case, the proposition that the balanced budget multiplier raises monotonically in respect to market power no longer holds.

The Kaleckian approach takes its departure from the idea of imperfect competition plus the conditions of the ownership and distribution of income and wealth, rather than starting from the neoclassical vision of individual maximising behaviour. However, it has been shown that it is perfectly possible to accommodate the idea of class structure within the New Keynesian approach. Once we do that, the results differ from early predictions based on the canonical New Keynesian model and are identical to those predicted by the Kaleckian balanced-budget multiplier when workers' propensity to save equals zero. Therefore, this type of rational optimisation model with differential savings and imperfect competition in the goods market seems to be a special case of a wider set of Kaleckian models. For New Keynesians, it is maybe important to have some tightly structured framework to serve as a benchmark in order to reduce the arbitrariness of the earlier Keynesian models. But for this purpose, the extent to which the representative agent succeeds in eliminating this arbitrariness should be kept in perspective, to say the least.

Bibliography

Asimakopulos, A. 1975. A Kaleckian theory of income distribution, *Canadian Journal of Economics* vol. 8, 313–33

Asimakopulos, A. and Burbidge, J. 1974. The short-period incidence of taxation, *Economic Journal*, vol. 84, 267–88

Chapple, S. 1991. Did Kalecki get there first? The race for the General Theory, *History of Political Economy*, vol. 23, 243–61

Chilosi, A. 2003. Kalecki's theory of income determination: a reconstruction and assessment, in Sadowski, Z. and A. Szeworski (eds), *Kalecki's Economics Today*, London and New York, Routledge

Damania, D. and Mair, D. 1992. The short-period incidence of taxation revisited, *Cambridge Journal of Economics*, vol. 16, 195–206

Dixon, H. 1987. A simple model of imperfect competition with Walrasian Features, *Oxford Economic Papers*, vol. 39, 134–60

Dixon, H. and Rankin, N. 1994. Imperfect competition and macroeconomics: a survey, *Oxford Economic Papers*, vol. 46, 171–99

Haavelmo, T. 1945. Multiplier effects of a balanced budget, *Econometrica*, vol. 13, 311–18

Harcourt, G. 1965. A two sector model of the distribution of income and the level of employment in the short-run, *Economic Record*, vol. 41, 103–17

Harris, D. 1974. The price policy of firms, the level of employment and the distribution of income, *Australian Economic Papers*, vol. 13, 144–51

Heijdra, B. and Van der Ploeg, R. 2002. *Foundations of Modern Macroeconomics*. Oxford, Oxford University Press

Kalecki, M. 1971. *Selected Essays on the Dynamics of the Capitalist Economy*, 1933–1970, Cambridge, Cambridge University Press

Kirman, A. 1992. Whom or what does the representative individual represent?, *Journal of Economic Perspectives*, vol. 6, 117–36

Langer, G. 1985. Kalecki and the Keynesians, *The Economic Forum*, winter

Laramie, A. 1991. Taxation and Kalecki's distribution factors, *Journal of Post Keynesian Economics*, vol. 13, 583–94

Mair, D. and Laramie, A. 1996. Taxation and Kalecki's theory of the business cycle, *Cambridge Journal of Economics*, vol. 20, 451–64

Mankiw, G. 1988. Imperfect competition and the Keynesian cross, *Economic Letters*, vol. 26, 7–13

Matsuyama, K. 1995. Complementarities and cumulative processes in models of monopolistic competition, *Journal of Economic Literature*, vol. 33, 701–29

Mott, T. 1989. 'The Structure of Class Conflict in a Kaleckian–Keynesian Model', Working Paper No. 21, The Jerome Levy Economics Institute, Bard College

Mott, T. and Slattery, E. 1994. Tax incidence and macroeconomic effects in a Kaleckian model when profits finance affect investment and prices may respond to taxes, *Journal of Post Keynesian Economics*, vol. 16, 391–409

Reynolds, P. 1987. *Political Economy: A Synthesis of Kaleckian and Post Keynesian Economics*, New York, St. Martin's Press

Startz, R. 1989. Monopolistic competition as a foundation for Keynesian macroeconomic models, *Quarterly Journal of Economics*, vol. 104, 737–52

Startz, R. 1995 Notes on imperfect competition and New Keynesian economics, in Dixon, H. and Rankin, N. (eds), *The New Macroeconomics; Imperfect Competition and Policy Effectiveness*, Cambridge, Cambridge University Press

Yellen, J. 1980. On Keynesian economics and the economics of Post-Keynesians, *American Economic Review*, vol. 70, 15–19

Appendix 1

There are n firms in an industry acting as a Cournot competitor and producing an aggregate amount of output $Q = nq$ of a single commodity. The industry takes total income and expenditure as given and faces a unit elastic demand function $Q = y/p$. Hence each firm faces

$$p(q_i) = \frac{y}{Q} = \frac{y}{(n-1)\bar{q} + q_i}$$

where $(n-1)\bar{q}$ represents the fringe or the $n-1$ competitors. The cost function for the firm is given by

$$C(q_i) = wbq_i$$

Capitalists know they influence p, and they maximise profit accordingly

$$\begin{aligned}\max \pi_i &= p(q_i)q_i - wbq_i \\ &= \frac{yq_i}{(n-1)\bar{q} + q_i)} - wbq_i\end{aligned}$$

The first-order condition yields

$$\frac{\partial \pi_i}{\partial q_i} = 0 \Rightarrow y\frac{(n-1)\bar{q} + q_i - q_i}{[(n-1)\bar{q} + q_i]^2} - wb$$

Symmetric equilibrium would imply that $q_i = \bar{q} = q$. Hence,

$$y\frac{(n-1)q}{Q^2} = wb$$

or

$$p\frac{(n-1)q}{nq} = wb$$

Rearranging, we get the optimal price as

$$p = \left(\frac{n}{n-1}\right)wb$$

The n firms play some oligopoly game, the details of which we do not need to specify here. Setting $n/(n-1) = \tau$, we get expression (3) as

$$p = \tau\, wb, \quad \tau > 1$$

Appendix 2

Using expressions (2) and (44), we may rewrite (43) as

$$Y = \frac{wbY}{p} - \frac{T_w}{p} + (1 - s_p)\left(\frac{(\tau - 1)wbY}{p} + \frac{M'}{p} - \frac{T_p}{p}\right) + \bar{I} + \bar{G}$$

Since $T_{\mathrm{w}} = \lambda pG$, $T_{\mathrm{p}} = (1 - \lambda)pG$ and $G = \bar{G}$, the expression above becomes

$$Y = \frac{wbY}{p} - \lambda\bar{G} + (1 - s_p)\left(\frac{(\tau - 1)wbY}{p} + \frac{M'}{p} - (1 - \lambda)\bar{G}\right) + \bar{I} + \bar{G}$$

Regrouping terms equilibrium national income yields

$$Y^\star = \frac{(1 - s_p)\left(\frac{M'}{p} - (1 - \lambda)\bar{G}\right) + \bar{I} + \bar{G} - \lambda\bar{G}}{\left[1 - \frac{wb}{p} - \frac{(1-s_p)(\tau-1)wb}{p}\right]}$$

Substituting $p = \tau wb$ in the above expression, we obtain after simplifications

$$Y^{\star} = \frac{(1 - s_p)\left(\frac{M'}{p}\right) + \bar{I} + [1 - \lambda - (1 - s_p)(1 - \lambda)]\bar{G}}{\left(\frac{s_p\tau - s_p}{\tau}\right)}$$

Differentiating with respect to G, we get

$$\frac{dY^{\star}}{d\bar{G}} = \frac{(1 - \lambda)s_p}{s_p - \frac{s_p}{\tau}} > 0$$

And differentiating this expression with respect to τ, we obtain

$$\frac{\left(\frac{dY^{\star}}{d\bar{G}}\right)}{d\tau} = \frac{-\left(\frac{s_p}{\tau}\right)^2(1 - \lambda)}{\left(s_p - s_p\tau^{-1}\right)^2} < 0$$