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# Social Conflict and Macroeconomics:
# what determines the effectiveness of aggregate demand policies?

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**Abstract:**

This paper examines the role of social conflict in explaining macroeconomic phenomena and, especially, the effectiveness of aggregate demand policies as a means of raising real output. The social conflict approach to macroeconomic phenomena is compared with a Keynesian view along with Ball, Mankiw and Romer's (1988) and Lucas' (1973) models of the determinants of the effectiveness of aggregate demand policies (or the slope of the Phillips curve). Empirical analysis over the period from the 1950s to the 1990s for 15 OECD countries provides significant evidence that the social conflict view of inflation has much to offer in explaining differences in the effectiveness of aggregate demand policies both across countries and through time.

**JEL classifications: E31 E12 P16**
**Keywords: social conflict, aggregate demand policies, political economy**

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**Social Conflict and Macroeconomics**
**what determines the effectiveness of aggregate demand policies?**

## I. Introduction

In the 1970s and 1980s, there developed in response to the worsening economic conditions of that time what for the sake of convenience we shall term the social conflict approach to macroeconomic phenomena. The contributors to this approach came from various academic disciplines such as political science, sociology and economics (especially economists who were critical of the neoclassical-Keynesian synthesis which was dominant at the time). Not surprisingly, given these diverse backgrounds, there were differences in focus, methodology and terminology, but, as we hope to show, there comes out from this work a remarkably coherent account of why macroeconomic imbalances were unproblematic during the 1950s and 1960s (that is, the period that has come to be known as the 'golden age" of capitalism)[1]; why this ceased to be the case in the 1970s and 1980s; and the prerequisites for the restoration of something like the golden age.

A full account of the golden age and its decline is beyond the scope of this paper. Rather our focus in this paper is on the effectiveness of aggregate demand policies. As we shall see in the next section, according to the social conflict approach, aggregate demand policy that could maintain output at its full employment level was one of the main pillars of the golden age and the increasing inability of such policy to meet this goal signalled the decline of the golden age. We provide in this paper an empirical test for the argument that effective aggregate demand policies are associated with the level of social conflict. Indeed, we show that this association is at least as strong if not stronger than the associations predicted by three standard economic theories, namely traditional Keynesianism, neo-Keynesianism and new classical theory.

The remainder of the paper is organised as follows. In section II, we develop the main themes of the social conflict approach. In particular, we show why this approach suggests that there should be a strong association between the effectiveness of aggregate demand policies and profits – when profits and profitability are healthy, the expectation is that macroeconomic policies can play their role in maintaining full employment output, whereas when profits and profitability are low, expansionary macroeconomic policy is likely to lead to increases in prices rather than output. In section III, we compare this prediction with those of a basic Keynesian model, a new-Keynesian model (Ball, Mankiw and Romer, 1988) and a new classical model (Lucas, 1973). Rather than profits, these theories suggest an association between the effectiveness of demand policies and capacity utilisation, the level of inflation and the variance of inflation, respectively. Section IV outlines our methodology for comparing the relative importance of these four associations predicted by the four approaches. Finally, we offer some conclusions.

## II. The Social Conflict Approach

Two themes permeate the social conflict literature. The first is that the stability of the market economy is considered inherently problematic. This contrasts with both monetarist optimism about the inherent forces for stability within a market economy and the Keynesian relative optimism that such stability can be assured with appropriate government action through control of various macroeconomic aggregates. To take a polar opposite to these approaches, reflecting the tradition of sociology that has tended to emphasise the non-economic supports needed to make the market operate, Goldthorpe (1978, p.194) argues that the market economy itself tends to have a destabilising effect on society and that it is exogenous factors, some of them not part of the economy as such, which can hold it together, if only for a time[2]. Similarly for economists working within the regulation school[3], what needs to be explained is not so much unsuccessful periods of economic performance in terms of exogenous shocks, policy mistakes or irrational behaviour on the part of economic agents but rather the various elements that have come

together at particular historical junctures to produce a favourable environment for the success of the economy.

The second theme is the prevalence of conflict within market economies and the idea that market outcomes are not necessarily generally acceptable. The moral standing of the market has long been a subject of dispute. As Sen (1989) argues, a Pareto optimum competitive equilibrium can be of little moral worth while there is little sense in which the marginal product received by individuals in such equilibria represents in some way their own contribution (that is, what they "deserve"). Thus there is every reason to expect that individuals that are unhappy with market outcomes will seek to change them. Without special institutions to mediate conflict, such as we shall see existed with the Keynesian compromise during the golden age, the conflict between and within groups can lead to inflation and/or stagflation. Moreover, analysts within this social conflict approach do not see behaviour that leads to inflation as necessarily irrational in any sense. It may be better than any alternative strategy[4]. Moreover, if any one group knows that in the end conflictual behaviour may lead to higher inflation and/or higher unemployment, to stand back from this may entail losing out to other groups. That is to say there is a collective action problem associated with 'leapfrogging'[5].

In order to develop the approach further, we present below a stylised account which draws on various disciplines which have social conflict at the core of their analysis[6]. The golden age of capitalism characterised by full-employment, rapid growth and impressive productivity performance was underpinned by the 'Keynesian compromise' where capital gave up opposition to collective bargaining, the welfare state and demand management in exchange for control of investment (Maier and Lindberg, 1985, p.594; Glyn *et al*, 1990). Most of the accounts of this compromise develop Kalecki's (1943) insight that capitalism is incompatible with full employment unless there are major institutional arrangements to incorporate workers into the decision-making system. In more neo-classical terms, institutions, such as the welfare state and centralised bargaining, can been seen as helping to solve various coordination and commitment

problems that can arise in a market economy (Eichengreen, 1996). Such institutions underpinned the investment boom and high growth rates of the post-war period which in turn made macroeconomic policy, and in particular its ability to ensure full-employment, easier and the distributional struggle more manageable[7]. The subsequent stagflation and inflation of the 1970s[8], and beyond, are then tied to the demise of that compromise with implications, now in reverse, for investment and growth, and the ability of macroeconomic policy to continue to ensure full-employment without this leading to inflation. As Maier and Lindberg (1985, p.596) put it 'the inflation problem rightly understood is the counterpart of the investment challenge.' What went wrong according to this account was that the compromise increasingly failed to keep savings and investment at the level needed to support the continuation of the golden age. Of course not all economies experienced the demise of the golden age in the same way. And indeed in the 1970s and 1980s an influential view was that neo-corporatist economies – significantly for our purposes exactly those economies with sophisticated institutions to accommodate social conflict in the labour market – were able for a time to adjust to the new circumstances with fewer consequences for inflation or unemployment[9], or indeed a rise in inequality[10], than the more liberal economies. But eventually even these economies began to feel the strain.

This reflects the fact that for the social conflict approach any settlement within a market economy is likely to be a rather fragile affair, needing from time to time renegotiation and institutional development. Goldthorpe's (1978, p.196) account of the demise of the compromise, and the rise of stagflation, stresses the importance of changes in the form of social stratification of advanced capitalist economies, that is in the structures of social advantage and power and relates this to three developments in the post-war period: the decay of the status order, the realization of social citizenship and the emergence of a mature working class. An important part of his argument is that these factors are endogenous to a market economy. It is not that the market economy is a basically stable entity which is derailed from time to time by exogenous forces, such as trade union militancy say, but that the market itself may rely on non-market institutions for support. Goldthorpe's first example is the role of social status underpinning

market inequalities and the way in which the ideology of status was increasingly undermined by the market itself[11].

This sociological approach was similar to the account common in political science at the time:

> [w]ith the politicization of economic life, the ability to escape the authority and discipline of the market, to gain control of price and income and of one's economic destiny, has been generalized. Society thus must develop new arrangements for distributing income losses and adjusting the expectations of all groups. (Lindberg, 1985, p.45)[12].

For Maier and Lindberg (1985, p.597) the problems of the 1970s were both economic and political:

> [i]nflation and stagnation emerged from, and then helped intensify, a major questioning of the division of labour within the industrial nations and between these nations and the newer developing regions of the world[13]. Class and political compromises that had allowed a generation of post-war growth could no longer command the consensus they earlier had.

In these accounts of the need to rework the post-war settlement, two solutions, going in radically different directions, were discussed. One entailed a market strategy to reduce the effects of politics on economic decision-making The other was a renewed attempt at democratization and inclusion, that is a reworking of the old Keynesian compromise. For most analysts within the social conflict approach, either strategy implied a political economy project with clear winners and losers[14]. This fact is often missed in much economic analysis because the acceptability of market outcomes is taken as given, whereas in the social conflict approach, market outcomes are themselves a source of conflict with the losers seeking in some sense to work 'against the market'. In this light, 'Renunciation of political weaponry is an unattractive option, above all for groups that look to political weapons to alter the economic and political *status quo* in their favour. (In the words of an old Labour Party slogan: 'The rich man has his money, the poor man has his politics')' (Hirsch, 1978, p.269)[15]. Within this framework, '[e]fforts to depoliticise the market tend to be spurious. They usually entail a one-sided buttressing of profits and managerial prerogatives' (Maier and Lindberg, p.597-8)[16]. This clearly

has very different implications from a strategy of inclusion and rebuilding the Keynesian compromise.

From the standpoint of the present it is clear that the more liberal strategy has been more prevalent in the period since the mid-1980s. But the analysis which emphasizes social conflict has lost little of its bite. It is true that for many analysts working in this tradition there was a belief in the superiority of the 'democratic' and 'inclusive' solution and a skepticism that a neo-liberal approach could command long-term support[17]. But this should be distinguished from the methodological and analytic advances of the approach that are still crucial to the understanding of how the conflict was resolved in the more recent period. As Glyn *et al* (1990, p.117) predict

> as long as high unemployment rates in the advanced countries are politically acceptable, the balance of advantage (from the standpoint of conservative governments in the leading countries) lies in continuing with the current macroeconomic pattern of low growth and low inflation. For if expansionary policies were followed and world economic growth rose on a sustained basis to anywhere near its golden age level, it will indeed lead to an increase in the power of unions as well as a sharp rise in commodity prices, including oil. This in turn will rekindle a conflict over income distribution threatening to push up inflation.

Moreover where the market strategy has been more successful it has been associated with a rise in profitability and inequality. The problems of unemployment have been fewer in those economies where market ideology has been strongest and where politicians, including those of the Left, have been more willing to adopt pro-market ideology – that is to say where market outcomes have come to be more widely accepted[18]. Where such outcomes are less acceptable, continental Europe being the prime example, the problem of inflation has been solved at the cost of persistently high levels of unemployment. This Hobson's choice of low inflation either with increased inequality (and/or poverty) or with high unemployment hardly suggests that Kalecki's dilemma has been solved by advanced capitalist economies. On the contrary it suggests the continuing relevance of the social conflict view of inflation and stagflation that came to the fore in the 1970s.

The main message of the above for our purposes is that, although this literature covers a wide range of issues associated with economic performance in the post-war period, it originated from the observation that macroeconomic policies became less effective as a means to stabilise the economy. Part of the success of the Keynesian compromise was the ability to use macroeconomic policy to ensure sufficient demand. This was less possible in the 1970s and 1980s. Increases in aggregate demand were now as likely to lead to price increases as to an output response. For economists working in the mainstream tradition, this observation was explained in terms of a shifting Phillips curve because of increased inflationary expectations. Alternatively, they saw it as a steepening of the Phillips curve as agents became less likely to mistake general price increases for relative price increases or as the costs of changing prices were more than outweighed by the benefits. This contrasts strongly with the approach outlined here which associated this worsening of the overall context for economic policy-making with declining profits and profitability, a trend which started in the mid to late 1960s[19]. Thus profitability can be seen in this context as the initial indicator that the conditions that underpinned the golden age were coming under pressure. For authors working within this approach, the decline in profits not only had consequences for the efficacy of stabilisation policy over the short run, but also for investment and longer-term issues, such as productivity and growth. This observation leads to wider implications about the rise and decline of the golden age which are beyond our scope here. The focus here is on the potential effect that conflict and declining profitability can have on the efficacy of macroeconomic policies.

## III. Testing for the validity of social conflict

This paper seeks to test the social conflict approach against three prominent views within economics of the slope of the Phillips curve (a measure of aggregate demand policy effectiveness), a Keynesian interpretation along with those of the new classicals (Lucas, 1973) and the New Keynesians (Ball, Mankiw and Romer, 1988). The Phillips curve shows the inverse relationship between inflation and unemployment. The ability of aggregate demand

policies to increase output (and hence reduce unemployment) is greater the flatter the Phillips curve; a steep Phillips curve implies that increases in aggregate demand are reflected only in price rises. In this section we outline the four theories and the hypotheses they generate.

A basic Keynesian analysis of the effectiveness of aggregate demand policies focuses on the degree of capacity utilisation[20]. This will determine the extent to which firms are able to respond to increases in aggregate demand by raising output rather than prices. As the economy approaches full employment, so increases in aggregate demand will be less effective at raising output; rather prices will be increased and the Phillips curve is rather steep. Thus the prediction of this model is that capacity utilisation or some measure of output relative to potential output will be positively related to the effectiveness of aggregate demand policies.

Lucas (1973), in the new classical tradition, hypothesises that the trade-off between changes in output (or alternatively unemployment) and inflation arises when agents observe changes in prices which they mistakenly perceive as changes in the price of one good relative to another and not changes in the absolute price level where the prices of all goods change proportionately. Lucas' model creates the empirical prediction that the effectiveness of aggregate demand policies (or the slope of the Phillips curve) is related to the variance of inflation. If the variance of inflation increases, then this increases the uncertainty which agents face and they are more likely to attribute price movements to nominal shocks (requiring a change in the absolute price level) rather than real shocks (leading to changes in relative prices) and hence they will tend to respond by changing prices and not output. Under these circumstances, aggregate demand policies will be less effective.

Ball, Mankiw and Romer (1988) provide a new-Keynesian account of the inflation-output trade-off. Their model assumes an imperfectly competitive economy where price rigidities arise because individual price setters in general face only a small incentive to change their prices in the face of a shock. When however average inflation is high, shocks to aggregate demand will

be more likely reflected in changes in prices rather than output. This arises from the fact that when inflation is high, the benefits to the firm (in terms of remaining at its profit-maximising equilibrium) of changing prices more than outweigh the costs of changing prices (the so-called small menu costs which include the costs of reprinting catalogues, replacing price tags, etc). Thus their model predicts that the slope of the Phillips curve will be steeper and the trade-off less favourable when average inflation is higher.

The latter two theories also hypothesise that the variance of nominal aggregate demand will influence the slope of the Phillips curve. For Lucas, a larger variance of nominal aggregate demand implies agents will view aggregate demand shocks as more likely to be nominal than real shocks and hence will respond by not changing output. Similarly Ball, Mankiw and Romer (1988) predict a positive relationship between the variance of nominal aggregate demand and the slope of the Phillips curve. However, their reasoning is rather different. The larger the variance of nominal demand shocks, the more costly it is for the firm to keep prices fixed since it is likely to move quite far away from its profit-maximising equilibrium. Thus, testing the relationship between the slope of the Phillips curve and the variance of aggregate demand does not allow us to distinguish between these two theories.

We can compare the above theories with that of a social conflict view of the output-inflation trade-off. We rely mainly on a model of inflation developed by Rowthorn (1977) which provides a more specific foundation for many of the ideas discussed in the previous section. Rowthorn (1977) argues that inflation arises from conflict between capitalists and workers over the sharing out of total income generated by the economy. Both groups are essentially interested in maximising their share, but both face constraints in terms of the amount of power which they can exercise.

The model assumes that workers bargain over money wages with their employers, taking into account that prices will rise by a given expected amount. This generates a wage share for

workers and hence, as a residual, the profit share. Capitalists, however, have a target profit share and once wages are determined through the bargaining process, they set their prices in order to generate a profit share as close to their target as possible[21]. If the profit share which emerges from the bargaining process with workers (the "negotiated" profit share) is equal to the target profit share, then capitalists will raise prices by the amount anticipated in the wage bargaining process and there is no conflict. Conflict arises between workers and capitalists if the negotiated profit share is less than the target. In this case, capitalists will seek to use what power they have to raise prices by more than workers' anticipated increase and hence raise the profit share at the expense of the wage share. That is, they engineer a redistribution of income from wages to profits through generating higher than anticipated inflation.

What determines the power of each party in the model? Essentially, it depends on the level of demand: in the case of workers, it is the demand for labour; in the case of capitalists, the demand for their product(s). If workers are strong because there is a scarcity of the particular type of labour they are offering, then they can demand large wage increases and through that exert considerable downward pressure on the negotiated profit share. However, if capitalists are strong because the demand for their product(s) is high, then they can simply raise prices in order to try to restore their target profit share. Thus in both cases, power and therefore conflict and inflation is an increasing function of demand. This model generates a Phillips curve (an inverse relationship between inflation and unemployment) if we assume that the level of demand in both labour and product markets is inversely related to unemployment[22].

Rowthorn's model gives us two critical ingredients. First, the idea that capitalists have some kind of target for profits rather than being profit maximisers as assumed by both new classical and New Keynesian models. Second, if negotiated profits are lower than the target, then capitalists will use the power they have in product markets to raise their prices and ensure that the gap between negotiated and target profits is closed (at least to some extent). The extent to which prices will rise will depend on market power and demand conditions.

Our interest lies in the impact of an increase in aggregate demand on inflation and output in this kind of model. For Rowthorn, increases in aggregate demand will increase the power of capitalists to raise their prices if their negotiated profits are below the target. This generates the prediction that when profits are low, an expansionary aggregate demand policy is likely to be less effective – it will lead to inflation rather than a rise in output as capitalists seek to restore profits by raising prices. On the other hand, when negotiated profits are close to the target, an increase in aggregate demand will be more likely to lead capitalists to sell more output at current prices (since they are happy with the profits that emerge from their negotiations with workers). Thus Rowthorn's model generates an inverse relationship between profits and the effectiveness of demand policies.

It is interesting to ask what the implications of Rowthorn's model are for the relationship between inflation and aggregate demand policies since this will allow some comparison with the model of Ball, Mankiw and Romer. Recall, that the latter model generates the result that the Phillips curve will be steep (aggregate demand policies less effective) when inflation is high and vice versa. Rowthorn's model generates the same result. When profits are low, aggregate demand policies are ineffective and inflation will be high since conflict is high (the negotiated profit share is below the target share) and capitalists will raise prices as much as possible in order to redistribute income towards profits. By contrast, when profits are high, aggregate demand policies will be effective and inflation is low since conflict is low (negotiated profits are close to their target) and capitalists will not be raising prices to redistribute income to profits.

However, the two models do not predict the same relationship between profits and the slope of the Phillips curve. Ball, Mankiw and Romer's (1988) model suggests, if anything, a negative relationship between profitability and the effectiveness of aggregate demand policies. If firms do not change their prices in response to a shock to aggregate demand, then, relative to when they do change prices, profits will be lower as firms move away from the profit maximising

position. In this case, aggregate demand policies will be more effective. By contrast, when firms change their prices in response to shocks, profits will be relatively higher (since they will be at the profit-maximising position) and aggregate demand policies will have no real effects. This negative relationship predicted by Ball, Mankiw and Romer between profits and the effectiveness of aggregate demand policies is the opposite of what the social conflict approach predicts.

So the finding that the slope of the Phillips curve is inversely related to the level of inflation does not allow us to distinguish between the two models. What distinguishes the models is the prediction about profitability: the social conflict approach is consistent with a positive relationship between the slope of the Phillips curve and profitability; the new-Keynesian theory predicts a negative relationship.

## IV. Methodology and empirical analysis

Lucas (1973) and Ball, Mankiw and Romer (1988) take the following equation[23]:

$$lny_t = \alpha + \beta lny_{t-1} + \gamma trend + \tau \Delta x_t \qquad (1)$$

where $lny_t$ = real income in period t

$\Delta x_t$ = change in nominal income from period t-1 to t.

$\tau$ measures the extent to which changes in nominal income (proxying aggregate demand policies) affect real income and hence gives us some measure of the slope of the Phillips curve[24]. If $\tau = 0$, then aggregate demand policies have no impact on real income and the Phillips curve is vertical. If $\tau = 1$, then aggregate demand policies affect only real income (and not prices or inflation) and hence the Phillips curve will be horizontal. For $0 < \tau < 1$, aggregate demand policies influence both output and prices and the Phillips curve will be negatively sloped.

Lucas (1973) estimates $\tau$ for each of his 18 countries using data over the period 1952-67. He then relates the measures of $\tau$ to the variance of inflation. Argentina, the country with the lowest

value of $\tau$, experienced the highest variance of inflation. By contrast, the US, with the highest $\tau$ had the lowest variance of inflation. Indeed, on the basis of Lucas' results in his Table 2, the correlation coefficient between $\tau$ and the variance of inflation is high and negative (-0.71), consistent with his theory.

Ball, Mankiw and Romer (1988) have information on 43 countries over the period 1948-86. In line with their theory, they examine whether a relationship exists between $\tau$ (estimated for each country individually, as in Lucas (1973)) and the level of inflation using scatter plots and simple correlations. The results indeed suggest a strong relationship which they take as evidence in favour of their 'small menu costs' theory and against that of Lucas'. They also provide cross-sectional regression evidence of a negative relationship.

Our sample of countries is limited to those for which profits data is available: Australia (AUS), Belgium (BE), Canada (CA), Denmark (DK) Finland (FN), France (FR), Germany (GE), Italy (IT), Japan (JA), the Netherlands (NL), New Zealand (NZ), Norway (NW), Sweden (SW), the United Kingdom (UK) and the United States (US). Data on price deflators and either real GDP or GDP volume is taken from the IMF's *International Financial Statistics*. We have both profit rates and shares for manufacturing and business where available and these were taken from Armstrong *et al* (1987) or Glyn (1997) for the earlier period and from OECD *National Accounts* from 1970 onwards. The data period varies by country, but in general we have attempted to cover the period from 1950 to the mid-1990s. This gives us a much greater span of data than used by either Lucas (1973) or Ball, Mankiw and Romer (1988). Exact details of data availability and the method used to calculate profit rates and shares are given in Appendix I.

We proceed in our investigation of the four theories in the following manner. First, since we employ a different data period to Lucas (1973) and Ball, Mankiw and Romer (1988), we begin by examining whether their results using cross-sectional data continue to hold up to the mid-to-late 1990s[25]. Second we examine the relationship between $\tau$ and capacity utilisation, the

variability of inflation, the level of inflation and profits individually using a cross-sectional time series approach. Finally, we consider all four theories simultaneously and try to provide an assessment of the relative strength of the association predicted by each theory.

**Updating the results of previous theories:** In order to update the results of previous work, we estimate $\tau$ for the longest period possible for each country and then calculate both the variance of inflation and average inflation over that period. In order to avoid spurious regressions, we rewrite equation (1) as follows (by subtracting $y_{t-1}$ from both sides of equation (1))[26]:

$$\Delta lny_t = \alpha + \delta lny_{t-1} + \gamma trend + \tau \Delta x_t \qquad (1a)$$

where $\delta = (\beta - 1)$. The results are reported in Table 1 and the relationship between $\tau$ and the variance of inflation (Lucas' prediction) is shown in the scatter plot in Figure 1. It appears that the negative relationship continues to hold and the correlation coefficient is –0.63.

In Figure 2, we plot average inflation against $\tau$ to examine the prediction arising from Ball, Mankiw and Romer's theory. Once again the negative relationship is clear and the correlation coefficient is –0.73 suggesting that the relationship has not broken down in the 1990s.

**The importance of conflict and profitability:** In part because we have fewer countries than Ball, Mankiw and Romer, we adopt the following strategy which allows us to go beyond simple correlations and scatter plots and examine the above hypotheses by using regression analysis. We estimate equation (1a) recursively and we keep the series of $\tau$ generated by this process[27].

This strategy implies we have more than one observation for $\tau$ for each country which has two distinct advantages. First, it allows us to examine the stability of $\tau$ over time for different countries. Ball, Mankiw and Romer (1988) provide some evidence of instability by estimating equation (1) for the period pre-1973 and post-1972 noting that for 63% of countries the $\tau$ is significantly different between these two periods. Although this suggests that the effectiveness

of aggregate demand policies does not just vary across countries, but also through time, they do not investigate this further. For taking an 'average' $\tau$, that is one estimated over the whole sample period, effectively ignores this instability and reduces the question of the effectiveness of aggregate demand policies to a cross-sectional one whereas in fact it could also have a time dimension. That is, aggregate demand policies might not only be more effective in some countries than in others, but might have been more effective in some periods in a given country than in other periods.

The second advantage of our methodology is that just as $\tau$ might differ over time for any country, so might the variance of inflation, the level of inflation, capacity utilisation or our various measures of profits. Thus it may be incorrect to classify a country as high inflation variability, high inflation or high profits for the whole period in question. To take the case of profits, a simply graph of profit rates (or share) show structural breaks in different countries, and hence talking about some average profit rate over the whole period is not really appropriate. Similar arguments can be made about capacity utilisation, inflation and the variance of inflation.

The recursive estimates of $\tau$ can be seen in Figures 3-6. It is clear that there are sharp changes in the value of $\tau$ around the first oil price shock, although the extent to which $\tau$ changes varies from country to country[28]. In some countries (AUS, BE, DK, FR, JA, NL, UK, US), it appears that aggregate demand policies have become less effective in later years. In other countries the opposite is true. We test for structural breaks in equation (1) and the results are given in Table 2 where we report the Chow test for a structural break in any given year[29]. They show that there are structural breaks in all countries except the Netherlands and Norway (but that is not because $\tau$ is stable, but just that it changes smoothly) - indeed in some countries there are two as policy effectiveness changed quite a bit. So there is indeed something to explain not just cross-sectionally between countries, but also through time for any one country.

Having derived a measure of $\tau$, we then examine the relationship between the values of $\tau$ and various measures of profits[30], capacity utilisation, inflation and the variability of inflation. To begin with, some descriptive correlation coefficients are given in Table 3 on a country-by-country basis. The correlations in the last column of Table 3 show that the relationship between the cyclical component of income and the value of $\tau$ is mixed. We measure cyclical income as deviations of real GDP from its trend[31]. In only 9 out of 15 countries is the sign of the correlation coefficient as predicted by the theory (that is, negative) and in a number of cases it is very small. If we pool all the countries and run a fixed effects regression[32], the results suggest that capacity utilisation is positively related to aggregate demand policy effectiveness:

$$\tau_{it,} = \underset{(0.01)}{0.41} + \underset{(0.17)}{0.33}yc_{it} \qquad (2)$$

where the number of observations is 545 and $yc_{it}$ is cyclical income in country i at time t. Note that standard errors are given in brackets below the appropriate coefficient. These results are contrary to what Keynesian theory would predict.

A mixed picture also emerges for the relationship between the variability of inflation and the value of $\tau$. Lucas (1973) simply uses the standard deviation of inflation across time in each country to represent inflation variability. However, this does not capture any differences in the variability of inflation which might occur through time in individual countries – the resulting standard deviation may be an average of periods of high and low variability. To overcome this, we measure the variability of inflation using two methods: first, a centered moving standard deviation over 3 periods (Klein, 1977); second, a GARCH model[33] (Engle, 1982, 1983; Bollerslev, 1986). The latter has the advantage of being a conditional variance that can alter over time. It is conditional in the sense that all previously available information, including shocks to mean inflation, is included, something which fits nicely with new classical theory and its assumption of rational expectations. The results in Table 3 are for the GARCH measures of inflation variability and the results do not differ qualitatively from those generated using the moving standard deviation. For some countries there is little relationship (AUS, GE, SW, US);

for four countries there is a strong positive relationship (DK, FR, JA, NL); only in BE, CA, FN, IT, NW, NZ and UK (that is, less than half of the countries) is the relationship predicted by theory (that is, negative) and sometimes it is rather weak.

A fixed effects regression across all countries generates a no more encouraging picture for Lucas' prediction. In particular:

$$\tau = \underset{(0.01)}{0.41} - \underset{(0.62)}{0.02\,\pi_{sd}} \qquad (3)$$

where the number of observations is 545 and $\pi_{sd}$ is the GARCH measure of inflation variability. The variability of inflation across countries and across time is not significantly related to $\tau$

Table 3 also shows the correlation coefficient between $\tau$ and the level of inflation. Ball, Mankiw and Romer predict a negative relationship and, indeed, in 11 of our 15 countries this proves to be the case. Equations (4) and (5) below report regressions where $\tau$ is regressed on inflation for the pre-1986 period (in an attempt to mimic as far as we can the data period used by Ball, Mankiw and Romer) and the whole period. Again we run a fixed effects regression. The negative relationship shows up clearly, although it is much weaker for the period as a whole (the coefficient falls by almost two-thirds)[34].

pre-1986 $$\tau = \underset{(0.02)}{0.53} - \underset{(0.23)}{1.41\pi} \qquad (4)$$

whole period: $$\tau = \underset{(0.01)}{0.44} - \underset{(0.16)}{0.52\pi} \qquad (5)$$

The social conflict approach, while also being consistent with the results in (4) and (5), predicts that there should be a positive relationship between profits and the effectiveness of aggregate demand policies. Thus we now turn to examine how $\tau$ varies with profitability. Correlation coefficients between $\tau$ and various measures of profits are reported in Table 3. We use both

profit shares and profit rates in manufacturing and business since not all series are available for every country.

The results show that by and large, the relationship between $\tau$ and profitability is positive as expected. There are some exceptions, notably Germany, Denmark and New Zealand, where the relationship is always negative. The positive relationship is confirmed by a fixed effects regression, the results of which are shown in Table 4 for the whole period[35]. We quote results for each of our four profits measures. In each case, they show a strong positive relationship between profits and $\tau$, with the exception of the net profit share in the business sector. The fixed effects are strongly significant, indicating that there are country specific effects which are not captured by the differences in profitability[36].

**The four hypotheses compared:** Up till now we have examined the predictions of each theory individually. What is also of interest is to compare the theories to determine which prediction has the strongest relationship with the effectiveness of aggregate demand policies. To this end, we use our panel of data to estimate a fixed effects regression where we include the predictions of all the theories[37].

$$\tau_{it} = \alpha_i + \beta\pi_{sd,it} + \gamma\pi_{it} + \delta profit_{it} + \mu yc_{it} \qquad (6)$$

where i represents the country; t is time; $\pi$ is inflation; $\pi_{sd}$ is the GARCH measure of inflation variability, profit is profitability and $yc_{it}$ is cyclical income. The results of this are shown in Table 5 for each measure of profitability.

The results are encouraging for the social conflict approach. First, the profit rate (either in manufacturing or business) is always significant. The profit share performs less well. The level of inflation is also significant and negative, consistent with both the social conflict approach and that of Ball, Mankiw and Romer. However, the variability of inflation and the cyclical position of the economy are less strongly associated with the effectiveness of aggregate demand.

Second, although both profits and the level of inflation are significant, the effect of profits is almost double that of inflation. This is shown by calculating the effect of a given percentage change in profits, inflation, etc on the effectiveness of aggregate demand policies, the so-called elasticities. In Table 6 we present the elasticities which we calculate at the means of the variables concerned[38]. Thus, for the net profit rate in business, a 10% increase in the profit rate (say from 10% to 11%) is associated with a 2.8% increase in the effectiveness of aggregate demand policies. By contrast, a 10% increase in inflation is associated only with a 1.4% increase. In other words, the relationship between profits and the effectiveness of aggregate demand policies is stronger than that of the level of inflation and $\tau$. Elasticities do not take into account the standard deviation of a variable and hence likely changes in the variables concerned. Thus, whilst a 10% increase in inflation may be very common, a 10% increase in profitability may be rarer. In order to confirm that our results are not sensitive to this criticism, we also calculate the impact of a 1 standard deviation increase in variable concerned on effectiveness of aggregate demand policies. The results confirm our conclusion that the profit association appears stronger.

Ball, Mankiw and Romer (1988) provide two further extensions to their results which are worth exploring here to determine whether our conclusions about the importance of profits are unaffected. First, they allow for nonlinearities by including mean inflation squared for each country in their cross-sectional regressions. Second, they include aggregate demand growth variability (the standard deviation of nominal GDP growth). As we argued above, their theory predicts a negative relationship between the variability of aggregate demand and the effectiveness of demand management[39].

Including both nominal aggregate demand variability and allowing for nonlinearities in our fixed-effects regression produces the results given in Tables 7 and 8. We restrict ourselves to results for the profit rates (in manufacturing and business) and we use the centred moving standard deviation of nominal GDP growth as a measure of the variability of aggregate demand.

The results are similar in that profits are significant, although the effect of inflation on the effectiveness of aggregate demand policies is weaker (since only the squared value of inflation is significant in each of the equations).

The total impact of inflation and aggregate demand variability on $\tau$ is given by the coefficients on both the level and the squared terms for each variable. The results suggest that in both cases the relationship is bell-shaped (the coefficient on the squared term is negative). That is, initially inflation is positively related to $\tau$ and then becomes negatively related (and similarly for the variability of aggregate demand). Comparing the maximum point of the bell-shaped relationship with the data range of each of the two variables in our sample, we can conclude the following. First, for inflation, our data suggests a negative relationship between $\tau$ and inflation (that is, we are always on the downward sloping part of the bell shape), although as we noted above the effect is less significant. Second, the relationship between $\tau$ and aggregate demand variability is negative at low levels of aggregate demand variability and positive at higher levels; the range of our data includes both the upward and downward sloping parts of the bell-shaped relationship. Thus overall, the effect relationship between $\tau$ and aggregate demand variability is not unambiguously negative as predicted by the theories of Ball, Mankiw and Romer (1988) and Lucas (1973)[40].

More importantly, for our purposes, the elasticities and the effect of a 1 standard deviation increase in the variable concerned (reported in Table 8) indicate that the relationship between inflation and aggregate demand effectiveness is weaker than that between profits and $\tau$. The elasticity of aggregate demand variability is small and, at the mean, it is positive (not the sign expected by the theory). Finally, the elasticity of cyclical income is now negative as predicted by theory, but is a long way from being significant.

## V. Conclusions

This paper has shown that profits are positively related to the effectiveness of aggregate demand policies or, equivalently, negatively related to the slope of the Phillips curve. This result holds both across countries and through time. Moreover, the relationship between profits and the effectiveness of aggregate demand policies is stronger than the relationships predicted by the three other competing accounts: a traditional Keynesian view; the New Classical school; and the New Keynesian school.

Our interpretation of these results is that the importance of profits reflects the importance of social conflict in explaining the effectiveness of aggregate demand policies. Both across time and countries, the argument of this paper is that it is difficult to understand macroeconomic developments and policies without at least some reference to how economies accommodate the existence of social conflict. The corollary of the above is that, to the extent that one of the pillars of he golden age was effective aggregate demand policies, our results suggest that a necessary, if not sufficient, condition for restoring such effectiveness is an institutional framework that addresses the problem of social conflict.

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**Endnotes**

[1] On the rise and fall of the golden age, see Marglin and Schor (1990).
[2] For more on the relationship between different views about the stability of the market economy and how this relates to attitudes about inflation see Hirsch (1978).
[3] See, for instance, Aglietta (1976) and Glyn *et al* (1990).
[4] On the role of inflation in 'reflecting and also mediating political struggles' see Hirsch (1978, pp.269-270) and Crouch (1978). For Hirsch (1978, pp.276-278) inflation is often the result of groups in society opposing other solutions in the face of rising social conflict. For instance, the latter may entail further interference with the market economy along neo-corporatist grounds and as such be seen 'as threats to the economic and perhaps also political *status quo*' (Hirsch, 1978, p.279; see also Goldthorpe, 1987). Moreover eventually the disruptive effects of inflation help to build a coalition which can impose stabilisation even if this is associated with important losses for certain sectors of society. Political scientists have done much to elucidate pro and anti-inflation coalitions (see Maier, 1978).
[5] For a classical analysis along these lines explaining Latin American inflation, see Hirschman (1985). On the phenomenon of leapfrogging, see Hirsch (1978, p.211) and Soskice (2000).

[6] This is drawn partly from two volumes on the issue, Goldthorpe and Hirsch (1978) and Lindberg and Maier (1985). A similar story, with rather different terminology, can be found in Armstrong *et al* (1987), Glyn *et al* (1990).
[7] The Regulation school has emphasised how macroeconomic policy to ensure enough demand, and labour relations that allowed real wage growth but not enough to eat into profits was tied to the prevailing mode of 'Fordist' production. See Aglietta (1976) and Glyn *et al* (1990).
[8] Although the deterioration of key macroeconomic variables was in evidence before 1974, that is before the first oil shock (see for instance Glyn *et al*, p.72).
[9] For this debate on corporatism see Crouch (1985), Goldthorpe (1984), Pekkarinen *et al* (1992) and Henley and Tsakalotos (1993).
[10] See Green *et al* (1992).
[11] This can also be captured in the language of the economist since marketisation is associated with increased individualism and thus with a decreased provision of public goods (Hirsch, 1978, p.274).
[12] As the above makes clear, the question of social conflict was not just about wages. The Regulation school has been most prominent in stressing that from the 1960s onwards there were increasing 'micro-conflicts' within the production process itself putting into question work routines, the separation between those organise work process and those who actually carry them out and so on. See, for instance, Lipietz (1992, p.15) and Armstrong *et al* (1987).
[13] While in this paper we emphasise conflict within the national context, most of the analysts from the traditions being discussed, are acutely aware of the importance of conflict between nations, most notably, but far from exclusively, associated with the two major oil shocks and the commodity price boom in general.
[14] See Hirsch (1978), Goldthorpe (1978; 1987) and Lindberg (1985, p.31).
[15] Again as Hirsch argues (1978, pp.280-281) one does not have to appeal to any irrationality on the part of organised labour with respect to its attempts to organise collectively in some sense against the market. This is the case even if empirically it could be shown that such action has not led to an increase of the real wage. For the benefits of such actions need to be also seen in terms of the power of labour in the political and production arenas, as well as in the distribution of income affecting certain sectors of labour.
[16] See also Armstrong *et al* (1987 ch. 17 and p.322).
[17] For many the expectation was that the market solution would lead to difficulties since, at least in the short run, it entailed a disproportionate burden (through unemployment, lower incomes and so on) on the weakest groups in the economy and thus was incompatible with both the 'democratic ethic', 'sense of fairness' and the rise of 'social citizenship' which had become prevalent in the post-war period in many economies (see Lindberg, 1985, pp.40 & 45; Goldthorpe, 1978).
[18] The predictive power of the model of social conflict we are discussing is evident from Hirsch's (1978, p.276) argument made in the 1970s that 'the containment of the latent distributional struggle without financial instability requires either sufficient authority, or sufficient consensus, on the values or principles underlying the distribution of income and other aspects of welfare'. See also Maier and Lindberg (1985, p.578).
[19] Although Maier and Lindberg do not put it in such terms the centrality of profits is clearly implicit in their analysis throughout. And of course this is explicitly so when, as we have seen they link the market solution to the 'buttressing' of profits. It is also quite explicit when they discuss developments in neo-corporatism at the time in Sweden on the lines of the unions' support for wage-earner funds (Maier and Lindberg, 1985, p.597). For such schemes imply exactly the socialisation of investment and cutting the umbilical cord between investment and private profitability. For an analysis of wage-earner funds in this context see Pontusson (1992)
[20] This line of argument can be found in any basic intermediate macroeconomics textbook and is usually represented by a flat or upward sloping aggregate supply curve which becomes vertical at full employment.

[21] We are working here with an imperfectly competitive model which allows firms to act as price setters rather than price takers in their particular markets. Note also that firms in this model are not profit maximisers.

[22] Scitovsky (1978) provides a similar explanation for inflation. In his model inflation results from an imbalance of power between labour and product markets which generates conflict over income distribution. If both labour and product markets were competitive, then the question of power would not arise and wages and prices would be determined by supply and demand conditions alone. If, however, we have imperfect competition and if power is imbalanced (for example, workers have some power in the labour market and producers have power in the product market), then such imbalances can, according to Scitovsky, lead to inflation. The extent of producer power in Scitovsky's model depends on market structure (or the degree of concentration) and the price elasticity of demand for different products.

[23] In fact, Lucas estimates something a little different from equation (1) in that he takes deviations of output from trend.

[24] Estimation of equation (1) has been criticised as including demand shocks (represented by the change in nominal output, $\Delta x$) but not supply shocks. Movements in real output is any economy is dependent on both types of shocks and if they are correlated then the omission of the former could bias the coefficient on the latter. As Ball, Mankiw and Romer (1988) argue, if policy makers offset the impact of supply shocks on nominal GDP by fiscal and/or monetary policy changes, then the correlation of demand and supply shocks will not influence the estimation of $\tau$. Moreover, equation (1) will not generate biased estimates of $\tau$ if the aggregate demand schedule is unit elastic. In this case any supply shock will result in an equiproportional movement in prices and output in opposite directions, leaving nominal GDP unchanged with the result that changes in nominal GDP reflect only demand shocks and not supply shocks. In order to determine the sensitivity of their results to different elasticities, Ball, Mankiw and Romer estimate a variant of equation (1) which we discuss below.

[25] In order to check that our data produces similar results for the periods used by Lucas (1973) and Ball, Mankiw and Romer (1988), we replicated their estimates of $\tau$ for as close to their periods as our data would allow. The results are very similar and hence we confident that the conclusions we draw below are not based on differences in data.

[26] This has the advantage that the dependent variable is integrated of order zero (I((0)) and, as Appendix II shows, $\Delta \ln x_t$ is usually I(0) as well. This prevents us from drawing spurious conclusions simply because y and x are trended. Equation 1a can be interpreted as containing a long run where real output is trended.

[27] We start with an estimated $\tau$ which comes from an equation with 10 observations. In other words, our first estimate of $\tau$ comes from an equation with more observations than are actually needed to estimate $\tau$, in order to eliminate any instability in the $\tau$ estimate arising from rather few observations. We then successively add years to generate a series of $\tau$ for each country.

[28] The inclusion in equation 1a of a dummy variable for the oil shocks of 1973-74, 1979-80, 1986 (oil price fall) and 1990-91, representing the most important supply shocks over the period does not alter the measure of $\tau$ significantly. In all cases except the US, the dummy is insignificantly different from zero.

[29] We test for structural breaks in a variety of years around potential breaks. Here we quote the F test with the highest value around the date of a structural break.

[30] As Glyn (1997) notes, neoclassical theory tends to downplay the variability of profitability and profit shares and hence its ability to play a significant macroeconomic role. The data on profitability and profit shares used here shows that there have been significant variations over the period considered.

[31] Cyclical income measures departures of output from some measure of potential output. Capacity utilisation refers to the degree to which the capital stock is used. For some EU countries data on capacity utilisation is available from 1984 or later (*European Economy Supplement B*). Correlations between these series and our measure of deviations of output from trend are high (with the exception of Germany), suggesting that our measure of cyclical income

is a good proxy for capacity utilisation. We measure trend output here using the Hodrick-Prescott filter.

[32] A fixed effects regression has the advantage that we control for factors which are country specific and do not change over time (or change only slowly). Such factors may influence the effectiveness of aggregate demand policies. An obvious example is a country's openness to foreign trade. Some have argued that more open economies tend to have lower inflation since in such economies there is a smaller trade-off between unemployment and inflation (the Phillips curve is steeper) and hence aggregate demand policies are less effective at changing output – they simply affect prices and inflation. Evidence supporting this is given by Romer (1993) and Lane (1997) who examine the relationship between average levels of openness and inflation in a number of countries, both developing and industrialised. Openness in these models is not something that explains cycles in inflation, but rather differences in long-run inflation rates across countries, the fixed effects in our equation will capture any possible influence of openness of aggregate demand policy effectiveness. Another factor which might affect policy effectiveness is labour market institutions which again tend to be fairly fixed over time but differ significantly between the countries in our sample. Thus the fixed effects regression has a distinct advantage that such factors are accounted for implicitly in our estimation.

[33] ARCH (Autoregressive Conditional Heteroskedasticity) and GARCH (Generalised Autoregressive Conditional Heteroskedasticity) models focus on estimation of the variance of a data series, modelling it as a function of past values of the variance and any exogenous variables which might be relevant to its determination. We compute the order of ARCH and GARCH terms in the variance equation based on tests for restricting higher order terms to have a coefficient of zero as well as on the basis of the value of the log likelihood ratio.

[34] The coefficient of 1.41 is very close to that of Ball, Mankiw and Romer whose cross-section regression yields a coefficient of 1.35 (see their equation 5.1 in Table 5 of their paper).

[35] For the purposes of comparison with Ball, Mankiw and Romer, we also ran the regression up to 1986. The results qualitatively similar with the coefficient on profits being slightly higher over the shorter period. Results are available from the author on request.

[36] This is also true for the results in equations (2) to (4) above.

[37] The results presented here and later are unaffected by our use of the GARCH measure of inflation variability. Results with the moving standard deviation of inflation are available from the author on request.

[38] Given an equation $y = \alpha + \beta x$, the elasticity of y with respect to x is given by $(dy/dx)(x_{mean}/y_{mean})$ where dy/dx is equal to $\beta$.

[39] A further extension relates to the possible bias from the omission of supply shocks from equations (1) and (1a). This might be important if the aggregate demand schedule is not unit elastic as we noted above. Investigation of this along the lines outlined in Ball, Mankiw and Romer (1988, pp.46-7) does not alter the results except in the case that the elasticity of the aggregate demand schedule is very small which as Ball, Mankiw and Romer point out is unlikely.

[40] Ball, Mankiw and Romer (1988) in fact do not find a significant relationship between $\tau$ and aggregate demand variability. They investigate only a linear relationship in their equation and hence perhaps our finding of a nonlinear relationship can go some way to explain this result.

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| **Table 1: Updating Lucas' and Ball, Mankiw and Romer's results** | | | | |
|---|---|---|---|---|
| country | data period | $\tau$ | mean inflation | variance of inflation |
| AUS | 1961-2000 | 0.382 | 0.056 | 0.039 |
| BE | 1954-2000 | 0.658 | 0.037 | 0.028 |
| CA | 1951-2000 | 0.495 | 0.041 | 0.032 |
| DK | 1967-1999 | 0.519 | 0.059 | 0.035 |
| FN | 1961-1999 | 0.488 | 0.060 | 0.041 |
| FR | 1951-2000 | 0.017 | 0.053 | 0.043 |
| GE | 1961-1999 | 0.701 | 0.031 | 0.018 |
| IT | 1961-1999 | 0.073 | 0.075 | 0.052 |
| JA | 1957-1998 | 0.569 | 0.043 | 0.039 |
| NL | 1957-1999 | 0.912 | 0.039 | 0.026 |
| NW | 1967-2000 | 0.017 | 0.058 | 0.032 |
| SW | 1951-1999 | 0.138 | 0.055 | 0.035 |
| UK | 1951-2000 | 0.039 | 0.059 | 0.045 |
| US | 1951-2000 | 0.578 | 0.039 | 0.029 |
| Remaining country in our sample (for interest) | | | | |
| NZ | 1955-1999 | 0.252 | 0.064 | 0.049 |

| **Table 2: Structural Break in equation (1)** | | | |
|---|---|---|---|
| | date of test | F-test | probability |
| Australia | 1974 | 10.42 | 0.00 |
| Belgium [1] | 1974 | 2.06 | 0.06 |
| Canada | 1974 | 2.79 | 0.04 |
| | 1982 | 2.58 | 0.05 |
| Denmark | 1984 | 4.33 | 0.01 |
| Finland | 1976 | 4.59 | 0.00 |
| | 1991 | 5.46 | 0.00 |
| France | 1974 | 12.30 | 0.00 |
| Germany | 1974 | 3.90 | 0.04 |
| Italy | 1970 | 4.70 | 0.00 |
| Japan | 1973 | 2.58 | 0.05 |
| New Zealand | 1976 | 5.81 | 0.00 |
| Sweden | 1975 | 11.75 | 0.00 |
| | 1991 | 3.82 | 0.01 |
| UK | 1974 | 6.43 | 0.00 |
| US | 1970 | 4.34 | 0.00 |
| | 1979 | 2.70 | 0.04 |

Note: the Chow Breakpoint test is conducted on the whole sample, that is 1950-2000 or whatever period of data is available for each country.

[1] We also checked for a break in 1985, but it is not significant.

| Table 3: Correlations between τ and profits, inflation and inflation variability | | | | | | | |
|---|---|---|---|---|---|---|---|
| Country | correlation of τ with[2]: | | | | | | |
| | nprm[1] | mprb[1] | npsm[1] | npsb[1] | inflation | variability of inflation | cyclical income |
| AUS | 0.54 | 0.68 | 0.68 | 0.84 | -0.44 | 0.06 | 0.16 |
| BE | -0.76 | -0.16 | -0.70 | -0.19 | 0.16 | -0.23 | -0.01 |
| CA | 0.09 | -0.05 | 0.13 | -0.11 | -0.84 | -0.35 | -0.69 |
| DK | 0.25 | n.a. | -0.72 | -0.78 | 0.82 | 0.94 | 0.31 |
| FN | -0.02 | 0.04 | 0.10 | 0.13 | -0.69 | -0.40 | -0.40 |
| FR | 0.43 | 0.85 | 0.08 | 0.77 | -0.10 | 0.77 | 0.36 |
| GE | -0.62 | -0.68 | -0.70 | -0.63 | -0.54 | -0.12 | -0.55 |
| IT | 0.42 | -0.11 | 0.47 | 0.49 | -0.41 | -0.32 | -0.85 |
| JA | 0.80 | 0.85 | 0.75 | 0.78 | 0.09 | 0.24 | 0.28 |
| NL | n.a. | n.a. | -0.43 | 0.06 | 0.02 | 0.34 | 0.47 |
| NZ | n.a. | n.a. | -0.29 | -0.26 | -0.23 | -0.22 | -0.01 |
| NW | 0.33 | 0.35 | 0.54 | 0.45 | -0.78 | -0.84 | -0.59 |
| SW | 0.30 | n.a. | 0.26 | n.a. | -0.63 | -0.05 | -0.04 |
| UK | 0.73 | 0.56 | 0.80 | 0.15 | -0.35 | -0.38 | 0.25 |
| US | 0.55 | 0.43 | 0.10 | 0.56 | -0.01 | 0.01 | -0.07 |
| | | | | | | | |

[1] nprm is the net profit rate in manufacturing; nprb is the net profit rate in the business sector; npsm is the net profit share in manufacturing; npsb is the net profit share in business.
[2] the sample period varies according to the availability of data.

| Table 4: The effect of profits on τ: whole sample period | | | | |
|---|---|---|---|---|
| | **coefficient** | **standard error** | **t-statistic** | **probability** |
| (a) net profit rate in manufacturing (n=348) | | | | |
| constant | 0.286 | 0.020 | 14.113 | 0.000 |
| Nprm | 0.006 | 0.001 | 4.257 | 0.000 |
| fixed effects | F(12,334) = 113.43 [prob=0.00] | | | |
| | | | | |
| (b) net profit rate in the business sector (n=320) | | | | |
| constant | 0.253 | 0.022 | 11.433 | 0.000 |
| nprb | 0.010 | 0.002 | 5.935 | 0.000 |
| fixed effects | F(10, 308) = 189.53 [prob=0.00] | | | |
| | | | | |
| (c) net profit share in manufacturing (n=411) | | | | |
| constant | 0.316 | 0.032 | 9.789 | 0.000 |
| npsm | 0.004 | 0.001 | 2.651 | 0.008 |
| fixed effects | F(14, 395) = 147.16 [prob=0.00] | | | |
| | | | | |
| (d) net profit share in the business sector (n=382) | | | | |
| constant | 0.403 | 0.034 | 11.811 | 0.000 |
| npsb | 0.001 | 0.001 | 0.856 | 0.856 |
| fixed effects | F(13, 367) = 187.36 [prop=0.00] | | | |
| | | | | |

| **Table 5: The determinants of tau – multivariate regression** | | | | |
|---|---|---|---|---|
| | coefficient | standard error | t-statistic | probability |
| (a) net profit rate in manufacturing (n = 348) | | | | |
| inflation variability | 0.427 | 0.696 | 0.61 | 0.540 |
| Inflation | -0.855 | 0.225 | -3.80 | 0.000 |
| profitability | 0.005 | 0.002 | 3.01 | 0.003 |
| cyclical income | -0.028 | 0.227 | -0.12 | 0.903 |
| Constant | 0.350 | 0.029 | 12.06 | 0.000 |
| Fixed effects | F(12,331) = 113.1 [prob=0.00] | | | |
| | | | | |
| | | | | |
| (b) net profit rate in business (n = 320) | | | | |
| inflation variability | -0.548 | 0.647 | -0.85 | 0.398 |
| Inflation | -0.629 | 0.217 | -2.90 | 0.004 |
| profitability | 0.008 | 0.002 | 4.40 | 0.000 |
| cyclical income | 0.020 | 0.205 | 0.10 | 0.922 |
| Constant | 0.324 | 0.029 | 11.18 | 0.000 |
| Fixed effects | F(10,305) = 156.5[prob=0.00] | | | |
| | | | | |
| | | | | |
| (c) net profit share in manufacturing (n = 411) | | | | |
| inflation variability | 0.992 | 0.694 | 1.43 | 0.153 |
| Inflation | -0.526 | 0.228 | -2.31 | 0.021 |
| profitability | 0.002 | 0.001 | 1.52 | 0.128 |
| cyclical income | 0.094 | 0.208 | 0.45 | 0.653 |
| Constant | 0.357 | 0.047 | 7.67 | 0.000 |
| Fixed effects | F(14,392) = 132.6[prob=0.00] | | | |
| | | | | |
| | | | | |
| (d) net profit share in business (n = 382) | | | | |
| inflation variability | 0.163 | 0.684 | 0.24 | 0.812 |
| Inflation | -0.716 | 0.220 | -3.25 | 0.001 |
| profitability | -0.001 | 0.001 | -0.86 | 0.388 |
| cyclical income | 0.311 | 0.182 | 1.71 | 0.088 |
| Constant | 0.504 | 0.046 | 10.97 | 0.000 |
| Fixed effects | F(13,364) = 163.0[prob=0.00] | | | |
| | | | | |
| | | | | |
| Notes: fixed effects shows the joint significance of the individual country effects. | | | | |

| **Table 6: Profitability elasticities based on equation results in Table 5** | | |
|---|---|---|
| Variable | elasticity | 1 standard deviation increase |
| variability of inflation[1] | -0.026 to 0.047 | -0.071 to 0.012 |
| inflation[1] | -0.144 to –0.082 | -0.033 to –0.021 |
| cyclical income | -0.001 to 0.004 | -0.001 to 0.011 |
| net profit rate in manufacturing | 0.177 | 0.031 |
| net profit rate in business | 0.279 | 0.055 |
| net profit share in manufacturing | 0.119 | 0.016 |
| net profit share in business | -0.063 | -0.009 |
| | | |
| [1] the range reflects the range over the various equations | | |

| **Table 7: The determinants of tau – multivariate regression** | | | | |
|---|---|---|---|---|
| | coefficient | standard error | t-statistic | probability |
| (a) net profit rate in manufacturing (n = 348) | | | | |
| Inflation variability | 0.468 | 0.694 | 0.67 | 0.501 |
| Inflation | 0.388 | 0.601 | 0.64 | 0.520 |
| Inflation squared | -8.109 | 3.272 | -2.48 | 0.014 |
| profitability | 0.005 | 0.002 | 3.34 | 0.001 |
| AD variability | 3.314 | 1.535 | 2.16 | 0.032 |
| AD variability squared | -42.557 | 24.041 | -1.77 | 0.078 |
| cyclical income | -0.198 | 0.244 | -0.81 | 0.418 |
| Constant | 0.271 | 0.038 | 7.07 | 0.000 |
| Fixed effects | F(12,328) = 113.9 [prob=0.00] | | | |
| | | | | |
| | | | | |
| (b) net profit rate in business (n = 320) | | | | |
| inflation variability | -0.587 | 0.652 | -0.90 | 0.369 |
| Inflation | -0.040 | 0.524 | -0.08 | 0.938 |
| inflation squared | -4.113 | 2.779 | -1.48 | 0.140 |
| profitability | 0.008 | 0.002 | 4.51 | 0.000 |
| AD variability | 2.985 | 1.339 | 2.23 | 0.027 |
| AD variability squared | -42.575 | 20.503 | -2.08 | 0.039 |
| cyclical income | -0.055 | 0.220 | -0.25 | 0.804 |
| Constant | 0.278 | 0.035 | 8.05 | 0.000 |
| Fixed effects | F(10,302 = 153.6[prob=0.00] | | | |
| | | | | |
| | | | | |
| | | | | |
| Notes: fixed effects shows the joint significance of the individual country effects. | | | | |

| **Table 8: Profitability elasticities based on equation results in Table 7** | | |
|---|---|---|
| Variable | elasticity | 1 standard deviation increase |
| variability of inflation[1] | -0.028 to 0.025 | -0.007 to 0.006 |
| inflation[1] | -0.104 to –0.084 | -0.024 to –0.021 |
| variability of AD[1] | 0.069 to 0.086 | 0.018 to 0.022 |
| cyclical income | -0.004 to –0.001 | -0.007 to –0.002 |
| net profit rate in manufacturing | 0.177 | 0.031 |
| net profit rate in business | 0.279 | 0.055 |
| | | |
| [1] the range reflects the range over the various equations | | |

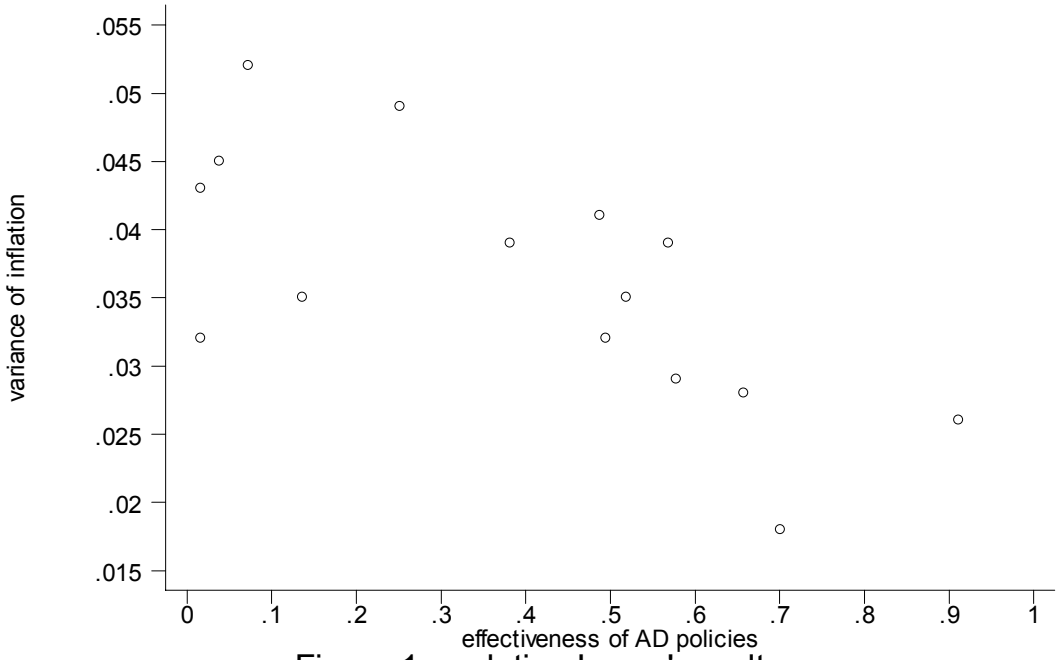


Figure 1: updating Lucas' results

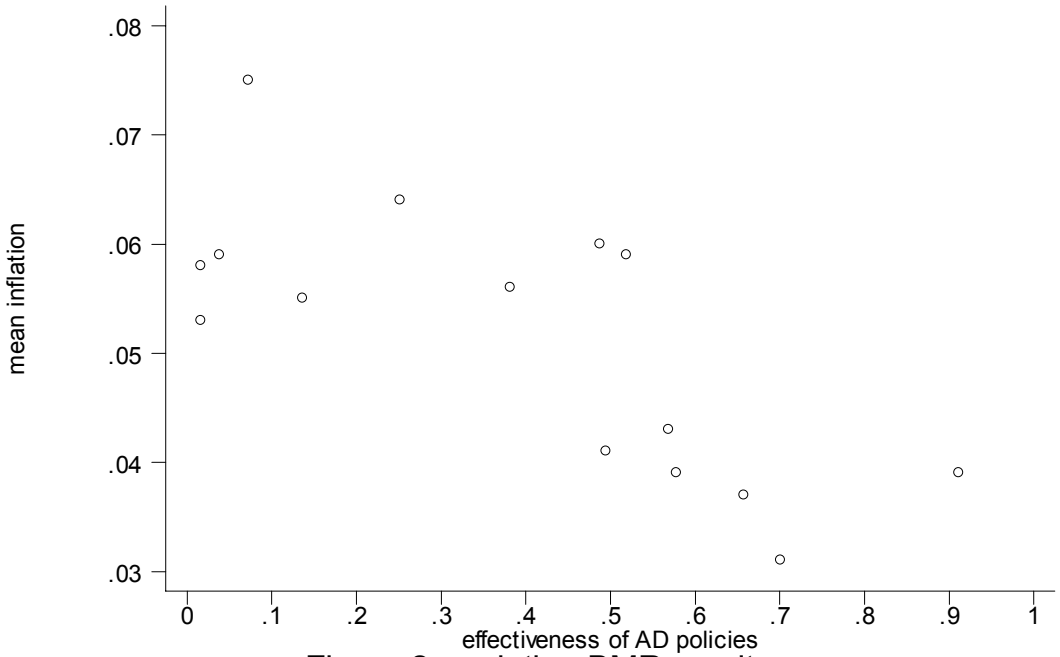


Figure 2: updating BMR results

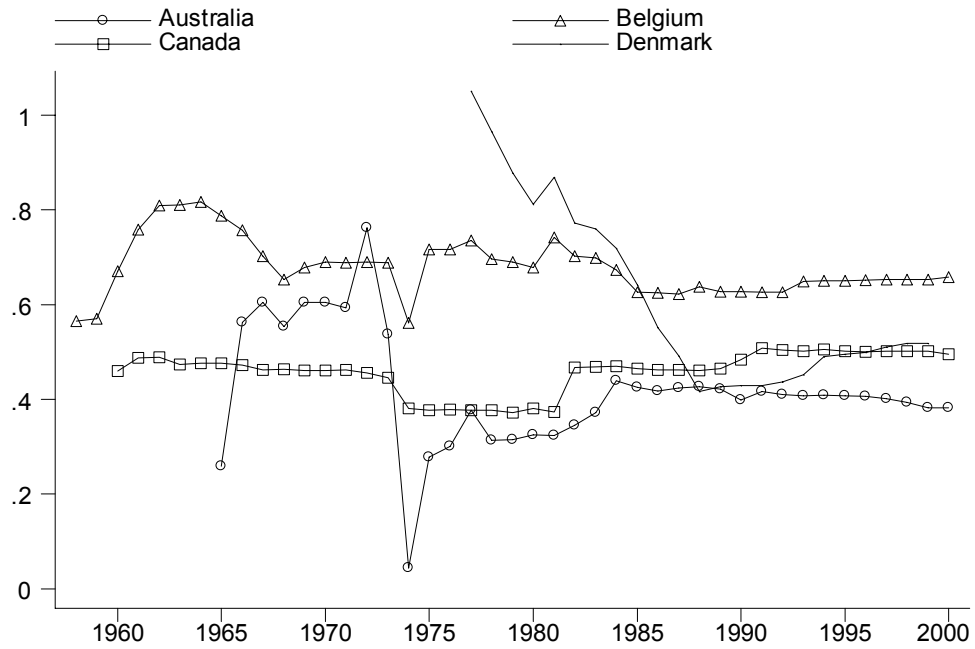


Figure 3: recursive tau measures for selected countries

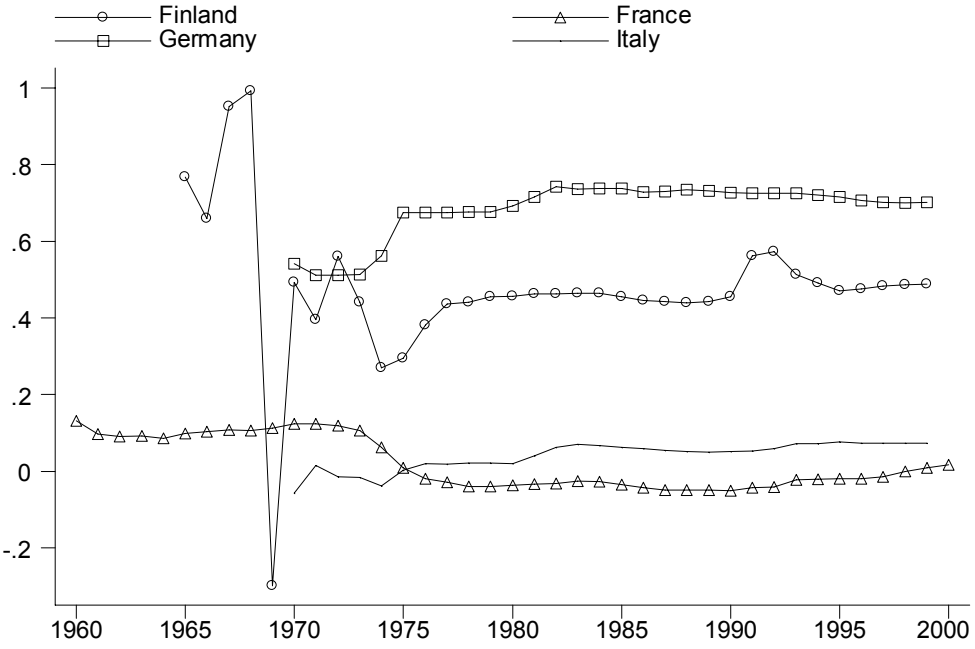


Figure 4: recursive tau measures for selected countries

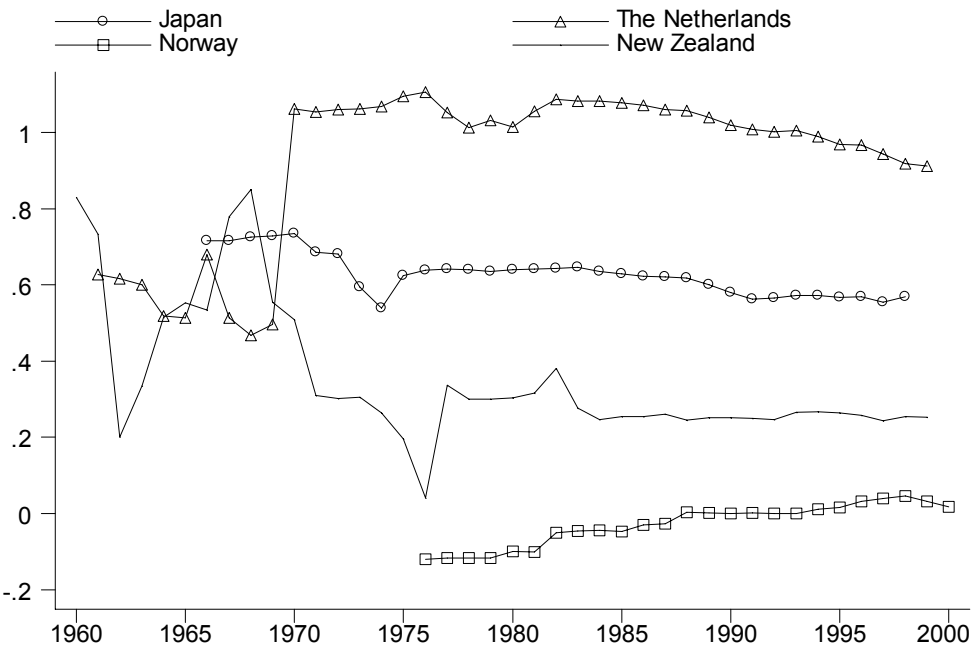


Figure 5: recursive tau measures for selected countries

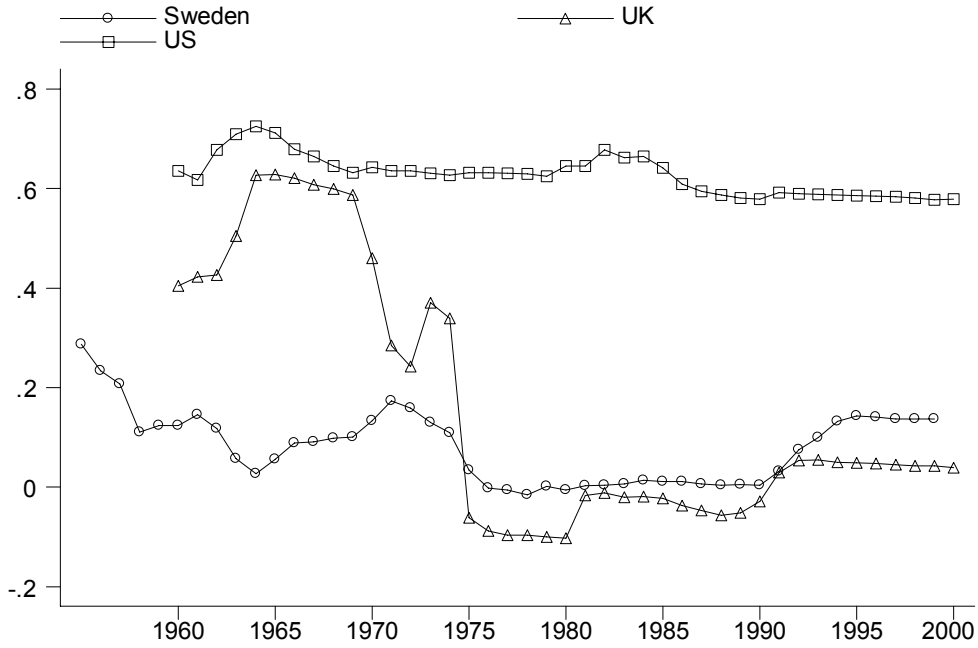


Figure 6: recursive tau measures for selected countries

## Appendix I: data availability and profits measures

| | Variable | | | | | | |
|---|---|---|---|---|---|---|---|
| **Country** | τ | inflation | nprm | nprb | npsm | npsb | |
| AUS | 65-00 | 51-00 | 67-95 | 70-95 | 67-95 | 70-95 | |
| BE | 58-00 | 51-00 | 70-90 | 70-95 | 70-90 | 70-95 | |
| CA | 55-00 | 51-00 | 52-92 | 52-92 | 52-92 | 52-92 | |
| DK | 71-99 | 51-00 | 70-81 | n.a. | 66-95 | 70-95 | |
| FN | 65-99 | 51-00 | 61-96 | 71-96 | 61-96 | 70-96 | |
| FR | 55-00 | 51-00 | 51-92 | 52-96 | 51-92 | 51-95 | |
| GE | 65-99 | 51-00 | 52-93 | 52-93 | 52-93 | 52-93 | |
| IT | 65-99 | 51-00 | 52-92 | 52-96 | 52-92 | 52-96 | |
| JA | 61-98 | 51-00 | 60-95 | 52-96 | 60-95 | 52-87 | |
| NL | 61-99 | 51-00 | n.a. | n.a. | 75-95 | 70-96 | |
| NW | 71-00 | 51-00 | 62-91 | 70-91 | 62-91 | 70-91 | |
| NZ | 59-99 | 51-00 | n.a. | n.a. | 71-94 | 71-94 | |
| SW | 55-99 | 51-00 | 63-93 | n.a. | 60-94 | n.a. | |
| UK | 55-00 | 51-00 | 52-95 | 52-95 | 52-95 | 52-95 | |
| US | 55-00 | 51-00 | 52-93 | 50-97 | 52-93 | 50-97 | |

Note: the τ requires nominal GDP and real GDP and is usually missing in the early part of the period because there is no real GDP data.

**Profit measures**

We confine ourselves in this appendix to outlining the principles used in calculating profit rates and profit shares. Excel data files for individual countries are available from the author on request. In general, we follow the methodology used by Armstrong *et al* (1987) and Glyn (1997). That is, where available we use the figures in the OECD *National Accounts*, Table 14. This is what Glyn (1997) does and we update his figures from later OECD *National Accounts* volumes where possible. Table 14 was published by the OECD for selected countries from x to y (with statistics going back to z in many cases). In order to extend the series back to 1970 or where the statistics were not reported in Table 14, we used where possible data on the cost components of GDP from Table 13 (which include gross value added, depreciation, gross operating surplus and wages). The figures for manufacturing (taken either from Table 14 or calculated from Table 13) are adjusted for self-employment in the following manner. From Table 15 of the OECD *National Accounts*, we calculate self-employment in manufacturing as the difference between all persons in manufacturing and employees in manufacturing. From Table 13, we have wage costs in manufacturing which along with the number of employees in manufacturing generates an average wage. We then assume that this average wage applies to the self-employed, thus generating a wage cost for the self-employed which we subtract from the gross operating surplus. This approach thus goes some way for correcting for the fact that national accounts figures do not impute a wage to the self-employed and thus overestimate profit rates or shares. For the business sector, this problem does not exist since it is defined as the corporate or quasi-corporate enterprises and does not include the self-employed. In order to extend the series further to cover the 1950s and 1960s, we link in our data with that of Armstrong *et al* (1987) who provide figures from the early 1950s for a number of the countries we examine here and Glyn (1997) who as figures from the 1960s for manufacturing.

## Appendix II: Unit root tests

| | Variable | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Country** | lnvgdp | dlnvgdp | dlngdp | tau | inflation | moving SD inflation | GARCH inflation | nprb | nprm | npsb | npsm | AD variability | capacity utilisation |
| Australia | -3.20$^{+}$ | -4.15$^{*}$ | -3.09 | -3.06$^{**}$ | -2.13$^{**}$ | -4.84$^{**}$ | -4.55$^{**}$ | -3.11$^{**}$ | -2.41$^{*}$ | -2.69$^{**}$ | -2.53$^{*}$ | -3.98$^{**}$ | -2.39$^{*}$ |
| Belgium | -1.03 | -3.24$^{+}$ | -2.27 | -2.32$^{*}$ | -2.36$^{*}$ | -2.45$^{*}$ | -2.18$^{*}$ | -3.97$^{**}$ | -0.69 | -3.36$^{**}$ | 0.49 | -2.77$^{*}$ | -2.27$^{*}$ |
| Canada | -1.24 | -5.26$^{**}$ | -3.39$^{*}$ | -2.18$^{*}$ | -2.10$^{*}$ | -3.82$^{**}$ | -3.13$^{**}$ | -3.31$^{**}$ | -4.19$^{**}$ | -3.57$^{**}$ | -3.54$^{**}$ | -4.24$^{**}$ | -3.23$^{**}$ |
| Denmark | -3.66$^{*}$ | -4.01$^{*}$ | -2.83 | -2.99$^{**}$ | -1.73$^{+}$ | -2.32$^{*}$ | -3.10$^{**}$ | n.a. | -3.06$^{**}$ | -1.24 | -0.90 | -3.37$^{**}$ | -2.95$^{**}$ |
| Finland | -2.19 | -4.07$^{*}$ | -3.94$^{*}$ | -4.24$^{**}$ | -2.03$^{*}$ | -1.94$^{+}$ | -1.61 | -3.64$^{**}$ | -4.71$^{**}$ | -3.20$^{**}$ | -3.26$^{**}$ | -3.02$^{**}$ | -4.03$^{**}$ |
| France | -0.64 | -3.60$^{*}$ | -2.97 | -1.72$^{+}$ | -1.72$^{+}$ | -3.88$^{**}$ | -2.36$^{*}$ | -2.22$^{*}$ | -2.19$^{*}$ | -2.17$^{*}$ | -1.80$^{+}$ | -5.18$^{**}$ | -2.46$^{*}$ |
| Germany | -2.66 | -4.75$^{**}$ | -4.38$^{**}$ | -2.98$^{**}$ | -2.36$^{*}$ | -3.94$^{**}$ | -4.62$^{**}$ | -1.73$^{+}$ | -1.65$^{+}$ | -1.73$^{+}$ | -1.18 | -2.31$^{*}$ | -2.47$^{*}$ |
| Italy | -1.58 | -4.89$^{**}$ | -2.46 | -2.24$^{*}$ | -1.71$^{+}$ | -3.38$^{**}$ | -3.88$^{**}$ | -2.44$^{*}$ | -2.07$^{*}$ | -1.29 | -1.82$^{+}$ | -3.50$^{**}$ | -1.98$^{*}$ |
| Japan | -0.87 | -4.53$^{**}$ | -4.13$^{*}$ | -1.94$^{+}$ | -1.95$^{*}$ | -2.04$^{*}$ | -2.48$^{*}$ | -2.13$^{*}$ | -1.69$^{+}$ | -1.88$^{+}$ | -2.07$^{*}$ | -2.73$^{**}$ | -1.97$^{*}$ |
| Netherlands | -1.32 | -4.33$^{**}$ | -1.54 | -0.46 | -2.04$^{*}$ | -3.02$^{**}$ | -1.38 | n.a. | n.a. | -2.55$^{*}$ | -1.14 | -4.66$^{**}$ | -1.86$^{+}$ |
| Norway | -1.64 | -3.33$^{+}$ | -3.68$^{*}$ | -1.78$^{+}$ | -1.67$^{+-}$ | -1.76$^{+}$ | 0.26 | 3.13$^{**}$ | -3.51$^{**}$ | -3.45$^{**}$ | -3.09$^{**}$ | -2.96$^{**}$ | -2.84$^{**}$ |
| New Zealand | -1.82 | -4.41$^{**}$ | -2.43 | -3.51$^{**}$ | -1.27 | -2.43$^{*}$ | -2.24$^{*}$ | n.a. | n.a. | -0.61 | -1.07 | -2.87$^{**}$ | -2.28$^{*}$ |
| Sweden | -1.31 | -4.92$^{**}$ | -4.19$^{**}$ | -2.52$^{*}$ | -1.73$^{+}$ | -4.24$^{**}$ | -2.57$^{*}$ | n.a. | -3.06$^{**}$ | n.a. | -2.72$^{**}$ | -2.66$^{**}$ | -3.17$^{**}$ |
| UK | -2.81 | -5.84$^{**}$ | -1.34 | -2.13$^{*}$ | -2.11$^{*}$ | -2.05$^{*}$ | -3.80$^{**}$ | -2.27$^{*}$ | -2.23$^{*}$ | -2.70$^{**}$ | -2.35$^{*}$ | -3.48$^{**}$ | -3.71$^{**}$ |
| US | -2.25 | -5.00$^{**}$ | -3.22$^{+}$ | -2.59$^{*}$ | -3.02$^{**}$ | -2.40$^{*}$ | -3.91$^{**}$ | -1.82$^{+}$ | -1.68$^{+}$ | -2.00$^{*}$ | -2.27$^{*}$ | -2.30$^{*}$ | -3.93$^{**}$ |

We test for a unit root in the level of the variable; a significant t-statistic represents rejection of a unit root in favour of stationarity.
$^{**}$ significant at 1%; $^{*}$ significant at 5%; $^{+}$ significant at 10%.

Where lnvgdp is the log of real GDP; dlnvgdp is the first difference of the log of GDP; dlngdp is the first difference of the log of nominal GDP; nprb is the net profit rate in business; nprm is the net profit rate in manufacturing; npsb is the net profit share in business; npsm is the net profit share in manufacturing.

lnvgdp, dlnvgdp and dlngdp appear in equation (1a); the unit root tests include a constant and trend. The unit root tests for tau and the variables in the tau equations are conducted on the variable minus the country mean for that variable (so as to match the variables used in the fixed effects panel equation).