Cambridge Journal of Economics 2008, 1 of 21
doi:10.1093/cje/ben026

Functional income distribution and aggregate demand in the Euro area

Engelbert Stockhammer, Özlem Onaran and Stefan Ederer*

An increase in the wage share has contradictory effects on the subaggregates of aggregate demand. Private consumption expenditures ought to increase because wage incomes typically are associated with higher consumption propensities than capital incomes. Investment expenditures ought to be negatively affected because investment will positively depend on profits. Net exports will be negatively affected because an increase in the wage share corresponds to an increase in unit labour costs and thus a loss in competitiveness. Therefore, theoretically, aggregate demand can be either wage-led or profit-led depending on how these effects add up. The results will crucially depend on how open the economy is internationally. The paper estimates a post-Kaleckian macro model incorporating these effects for the Euro area and finds that the Euro area is presently in a wage-led demand regime. Implications for wage policies are discussed.

Key words: *Distribution*, *Demand*, *Investment*, *Consumption*, *Foreign trade*, *Macroeconomics*, *Keynesian economics*
JEL classifications: E12, E20, E22, E25, E61

1. Introduction

Maintaining international competitiveness has become one of the prime policy objectives of European politics. The Lisbon Agenda aims at making Europe the world's most competitive economic region. In a recent publication the European Commission (2006) argued that 'productivity increases, combined with wage moderation, should help to maintain the EU's competitive position in an increasingly integrated world economy' and encouraged member states to 'ensure employment-friendly labour cost developments and wage setting mechanisms' (European Commission, 2006, p. 40). The term 'employment-friendly labour costs developments' is not defined in the text, but it is clear from the context that it means wage moderation.[1]

Manuscript received 19 February 2007; final version received 14 April 2008.
Address for correspondence: Engelbert Stockhammer, Institut für Geld u. Fiskalpolitik, Wirtschaftuniversität Wien, Augasse 2–6, A1090 Vienna, Austria; email: engelbert.stockhammer@wu-wien.ac.at

* Institut für Geld u. Fiskalpolitik, Vienna. The authors are grateful to Eckhard Hein, Michael Mesch, Werner Raza, Rudolph Zwiener and two anonymous referees for comments. Support from FWF Project Nr. P18419-G05 and the Chamber of Labour, Austria, is acknowledged. The usual disclaimers apply.

[1] Wage moderation, in this paper, is defined as real wage growth below productivity growth.

These policy recommendations, it seems, are heeded by wage setters. The wage share in the Euro area has fallen by 11.6 percentage points since 1981—without any substantial improvement in economic performance. Growth rates (of real gross domestic product, GDP) remain well below those of the 1960s and 1970s (Figure 1). Not only has growth been disappointing but the unemployment rate in the Euro area has increased from the already high levels in 1981 by 1.2 percentage points, despite an almost continuous decline in the wage share (Figure 2).[1] The Euro area has experienced 25 years of 'employment-friendly' wage policy, without unemployment performance improving.

While it is straightforward that wage moderation will, all other things being equal, improve competitiveness and therefore ultimately (assuming that the Marshall–Lerner condition holds) net exports, it is not obvious that an improvement in competitiveness will automatically improve growth and employment. Foreign trade is only one component of final demand. The other components include consumption and investment (in addition to that of the state sector). To assess the effects of wage moderation it is necessary to address the effects on all three components of private demand. In the Euro area as a whole, exports and imports account for only 13.1% and 12.6% of GDP, respectively (in 2003 at current prices), for the EU25[2], the respective figures are 8.8% and 9.9%. This research is thus motivated by the hypothesis that wage moderation in the EU as a whole is likely to have only moderate effects on foreign trade but substantial effects on domestic demand.

Fig. 1. Adjusted wage share and GDP growth.

[1] Adjusted wage share at market prices (*source*: AMECO).

[2] The EU12 consists of the original Euro area member states (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain). The EU15 consists of the old member states that is the EU12 plus Denmark, Sweden, and the United Kingdom. The EU25 consists of the the EU25 plus Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia.

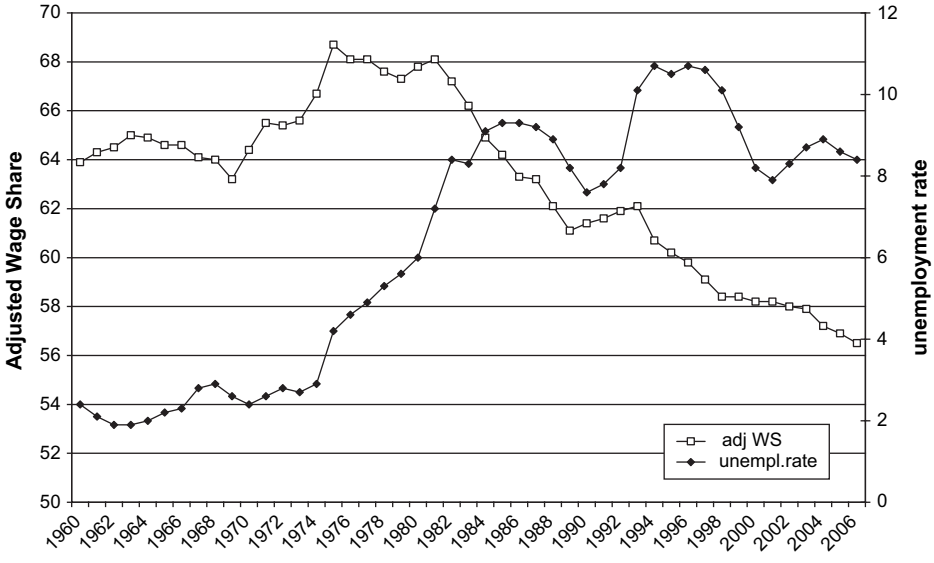

Fig. 2. Adjusted wage share and unemployment.

The appropriate geographical area for the investigation is therefore the European Union. The empirical analysis will be carried out for the Euro area (EU12), though choosing the EU12 rather than the EU15 is somewhat arbitrary. As Euro member states have frozen their exchange rates, the international conditions for wage policy are clearer for the former group. A panel approach for the constitutent countries may appear as an attractive route as country differences could be explored by means of tests for poolability. However, our research question refers to the Euro area as a whole. The relevant question therefore is not whether countries have the same relevant behavioural parameters, but whether an analysis at the EU12 level gives meaningful results.

The analysis is inspired by the work of Keynes and Kalecki. The model is a version of the model presented by Bhaduri and Marglin (1990). It is a post-Kaleckian macro model that allows for wage-led as well as for profit-led demand regimes according to the relative size of the consumption differential, the sensitivity of investment to profits and the sensitivity of net exports to unit labour costs (ULC). The paper contributes to empirical studies on theses type of models, by analysing the Euro area, by offering a careful analysis of the effects on net exports and by highlighting policy conclusions. While the model is post-Kaleckian, the estimated behavioural functions encompass standard Keynesian models as can be found in intermediate macro textbooks (Blanchard, 2006; Mankiw, 2006).

The paper is structured as follows. Section 2 presents the theoretical background and the post-Kaleckian model on which the empirical estimations are based. Section 3 summarises the empirical literature on these models. Section 4 presents the econometric results for the effect of changes in functional income distribution on private consumption, private investment and net exports. Section 5 summarises the key findings and draws policy conclusions.

2. Theoretical background: wage-led and profit-led demand regimes

This section will present a post-Keynesian model based on Bhaduri and Marglin (1990) that forms the basis for the empirical investigation. It is used to analyse the effects of

changes in functional income distribution on aggregate demand. While in the classical Kaleckian model (for a closed economy) an increase in the wage share will always lead to an increase in demand (Kalecki, 1954; Blecker, 1999), this is not necessarily the case in the Bhaduri–Marglin model. Here profit-led as well as wage-led demand regimes are possible since a positive effect of profits on investment is allowed for. The question of whether the positive effect of wages on consumption or the negative effect of profits on investment is larger, becomes an empirical one. In an open economy additional negative effects will operate through net exports.

Aggregate demand (AD) is the sum of consumption (C), investment (I), net exports (NX) and government expenditure (G). All variables are in real terms. In a general formulation, consumption, investment and net exports are written as function of income (Y), the wage share (Ω), and some other control variables (summarised as z). These latter are assumed to be independent of output and distribution. Government expenditures are considered to be a function of output (because of automatic stabilisers) and exogenous variables (such as interest rates). However, as this paper focuses on the private sector, this will play no further role in our analysis. Aggregate demand thus is:

$$AD = C(Y, \Omega) + I(Y, \Omega, z_I) + NX(Y, \Omega, z_{NX}) + G(Y, z_G) \quad (1)$$

This model is rather general in that it can be reduced to a standard Keynesian model. Most macroeconomic models pay little attention to the effects of income distribution on consumption and investment. Only in the net exports function does income distribution usually play a role, albeit in an indirect way. Typically, export and import functions include a price term and prices are thought to depend (among other things) on ULC. Unit labour costs are closely related to the wage share. The above model therefore reduces to a standard model if $\partial C/\partial \Omega$ and $\partial I/\partial \Omega$ are assumed to be zero.

The inclusion of income distribution shall briefly be explained. In the consumption function the basic assertion is that wage incomes (W) and profit incomes (R) are associated with different propensities to consume. The Kaleckian assumption is that the marginal propensity to save is higher for capital incomes than for wage income; consumption is therefore expected to increase when the wage share rises.

Keynesian as well as neoclassical investment functions depend on output (Y) and the long-term real interest rate or some other measure of the cost of capital (Chirinko, 1993). The latter is part of z_I. In addition to output and the interest rate, in our model investment is expected to decrease when the wage share rises because future profits may be expected to fall. Moreover it is often argued that retained earnings are a privileged source of finance and may thus influence investment expenditures.

Net exports are a negative function of domestic demand, a positive function of foreign demand, and will depend negatively on ULC, which are an indicator of international competitiveness. ULC are, by definiton, closely related to the wage share. In macro-econometric models ULC usually affect prices and prices enter the export and import function.

The resulting model is of a basic private open economy type and has several simplifications. Because of our focus on the effect of changes in the functional income distribution the effects of fiscal policy is excluded from the analysis. Income distribution, i.e. the wage share (Ω),[1] is taken as exogenous. Thus feedback, for example, from growth

[1] Functional income distribution and its measure, the wage share, are used synonymously throughout this paper.

on income distribution via lower unemployment and a better bargaining position of labour are ignored in this paper.

In the goods market, equilibrium income is equal to aggregate demand ($Y^{\star} = AD$). Differentiating $Y^{\star}$ with respect to Ω and collecting terms gives

$$\frac{dY^{\star}}{d\Omega} = \frac{h_2}{1 - h_1} \tag{2}$$

where $h_1 = \left(\frac{\partial C}{\partial Y} + \frac{\partial I}{\partial Y} + \frac{\partial NX}{\partial Y} + \frac{\partial G}{\partial Y}\right)$ and $h_2 = \left(\frac{\partial C}{\partial \Omega} + \frac{\partial I}{\partial \Omega} + \frac{\partial NX}{\partial \Omega}\right)$.

The term $1/(1–h_1)$ in equation (2) is a standard multiplier and has to be positive for stability. The sign of the total derivative will therefore depend on the sign of the numerator. h_2 is the sum of the partial derivatives of the components of demand with respect to income distribution. This sum is *private excess demand*, that is, the change in demand caused by a change in income distribution given a certain level of income. It is impossible to sign h_2 *a priori*, since we hypothesise that $\partial C/\partial \Omega > 0$, $\partial I/\partial \Omega < 0$ and $\partial NX/\partial \Omega < 0$. The sum of these effects can therefore only be determined empirically. Determining the sign of private excess demand is thus the focus of the empricial estimations in this study.

The total effect of the increase in the wage share on aggregate depends on the relative size of the reactions of the components of GDP, namely consumption, investment and net exports to changes in income distribution. If it is positive ($\partial Y^{\star}/\partial \Omega > 0$), the demand regime is called *wage-led*. If the effect is negative ($\partial Y^{\star}/\partial \Omega < 0$), it is called *profit-led.*

Empirically, given the high levels of international trade, one would expect net exports to play a major role in determining the overall outcome. However, while individual countries can increase demand by increasing exports, the world as a whole, of course, cannot. Therefore it is important to distinguish between the domestic sector of the economy and the open economy. The *domestic sector* in this case is defined with respect to consumption and investment only, assuming that the net export position does not change (as would be the result if wages were to change simultaneously in all countries). If consumption reacts more sensitively to an increase in the wage share than investment, domestic demand will be wage-led. Then we will integrate the effects of the foreign sector, thus changes in net exports to obtain the aggregate effect in an *open economy.*

The model will be applied to the Euro area. The conceptual distinctions discussed in the previous paragraph have to be applied with care. The Euro area as a whole is not a closed economy. However, its degree of openness is much smaller than the average of the openness of its member states, because most of the trade of the member states is within the Euro area. Therefore it is important that the analysis be carried out at the level of the EU12 rather than at the country level. We will return to this issue and its implications for wage policy in the conclusion.

3. Related literature

The first paper in the empirical literature on the Bhaduri–Marglin models is that of Bowles and Boyer (1995). They estimated the model by means of separate single equations for savings, investment and net exports for the economies of six Organisation for Economic Cooperation and Development (OECD) countries. The exposition of the model and the testing strategy are seminal, however they fail to discuss the time series properties of the economic variables and ignore the issue of unit roots. As a consequence, they do not apply difference or error correction models that form the core of modern time-series econometrics. The models are estimated in shares rather than in log levels. No discussion

of robustness is offered. Moreover, Bowles and Boyer use the employment share as a proxy for capacity utilisation, which is a misleading indicator for European countries with a high persistence of unemployment.

Gordon (1995A) estimates consumption and investment as a function of income distribution for the USA. In a vector autoregression (VAR) model, various exogenous shocks are simulated. Gordon (1995B) extends the model for an open economy and investigates reactions of aggregate demand on changes in income distribution empirically for the USA. His conclusion is that the growth regime of the USA is profit-led.

Hein and Krämer (1997) as well as Hein and Ochsen (2003) employ in their studies a model for a closed economy based on Marglin and Bhaduri (1990). Hein and Ochsen (2003) extend the model with the interest rate as exogenous variable and elaborate various accumulation regimes, depending on the sensitivity of the savings function and the investment function to the interest rate. In the empirical part, they estimate savings and investment econometrically and try to characterise the accumulation regimes of France, Germany, the USA and the UK.

Stockhammer and Onaran (2004) estimate a structural VAR model consisting of the variables capital accumulation, capacity utilisation, profit share, unemployment rate and labour productivity growth for the USA, UK and France. Employing a VAR model, the mutual interaction of the variables is incorporated. The goods market is simulated by a model based on Marglin and Bhaduri (1990). It is supplemented by an equation for income distribution, a productivity function and a function for unemployment. From the empirical investigation it is concluded that unemployment is determined by the goods market, but that the impact of income distribution on demand and employment is very weak. Technical progress shifts income distribution in favour of profits. Onaran and Stockhammer (2005) employ a similar model for Turkey and Korea.

Naastepad (2006) presents and estimates a model for the Netherlands, in which productivity growth is modelled explicitly. Productivity, savings, investment and exports are estimated by single equations. She finds that 'the Dutch demand regime during 1960–2000 is (. . .) wage-led' (p. 24), however, only narrowly so. Overall she concludes that 'the growth rate of Dutch aggregate demand is relatively insensitive to changes in real wage growth' (p. 29) in the postwar period.

Naastepad and Storm (2006/2007) estimate a similar model for eight OECD countries, which is similar in spirit to the one used here but differs in detail. The model estimated is strictly derived from the theoretical one. Consequently the estimated equations are typically in ratio form, which are not the ones favoured by modern time-series econometrics. No explicit attention is paid to the issues of unit roots. Naastepad and Storm find wage-led demand regimes in all European countries and profit-led ones in Japan and the USA. Compared to our findings, the estimated effects on consumption and investment are high, but those on net exports are modest.

Ederer and Stockhammer (2007) apply a single equation approach to France and estimate consumption, investment and net export functions. As their study is a prequel to the present paper, the estimation strategy is similar, with some changes in the treatment of export and imports. The result is that the French aggregate demand regime is domestically wage led, but international trade turns the demand regime into a profit-led one.

Hein and Vogel (2008) use a similar approach for Austria, France, Germany, the Netherlands, the UK and the USA. In the estimation they largely follow Ederer and Stockhammer (2007) with minor differences in the investment specification and some differences in the net export function. Surprisingly, they fail to find effects of income

distribution on net exports in four out of six countries. They also fail to find effects on investment in four out of six countries. Consequently they find profit-led demand regimes only in Austria and the Netherlands, which are the countries where effects on net exports had been found as well. The other countries are found to be wage-led.

4. Empirical results

The model will be estimated by means of separate single equations for consumption, investment, exports and imports. The key differences to the literature are the following. First, the econometric specifications differ. Following standard practice in modern econometric modelling, error-correction models (ECM) were applied whenever there was evidence of cointegration. Where there was no indication of cointegration and/or results were unsatisfactory, an unrestricted autoregressive distributed lag (ADL) model was estimated to infer which time-series specification would be appropriate. Typically, specifications in difference form were applicable. Second, as far as possible the specifications were chosen so as to be consistent with the standard literature and augmented for a distributional variable. Unfortunately there are few reference models for the Euro area (that is, aggregate models working with annual data). The European Central Bank (ECB) area-wide model (AWM; Fagan *et al.*, 2001), would be an obvious starting point. However, the AWM is characterised by numerous neoclassically motivated long-run restrictions that make it incompatable with our model.

There are three major qualifications that apply for all the results to be reported. First, functional income distribution is assumed to be exogenous. Obviously this is not the case. Demand will affect functional income distribution in at least two ways: mark ups typically vary procyclically (for example, if mark ups are set on normal ULC) and unemployment will typically (though usually with a time lag) have a negative effect on the wage share. Endogenising income distribution would require a different modelling strategy. Second, the paper takes the single equation approach widely used in the literature. The single equation approach fails to make use of the fact that consumption, investment and net exports (and state expenditures) add up to GDP. For both limitations a systems approach, such as the VAR approach used by Stockhammer and Onaran (2004), may be a solution, which, however, comes with its own cost, because results are more difficult to interpret. It is important to note that the convenience of interpretation of the results of the single equation approach come at the price of some bias because the system dimension is ignored.

Third, the Euro area is treated as one unit in the estimations, i.e., even for the period prior to monetary unification. It is thus assumed that a behavioural function can reasonably be reconstructed for, say, the 1960s. Attention was paid, therefore, to potential structural breaks; however, it turns out that Chow tests and experimentation with dummy variables (around the times of EU extensions) were usually not statistically significant and did not alter results substantially. Thus it seems that, at least statistically, the Euro area can be treated as one area prior to its coming into existence.

All data are taken from the AMECO database (downloaded in summer 2006), which offers aggregate data for the Euro area for all relevant series. Eurostat aggregates national data for real variables by adding real (national) growth rates weighted by the country's share (for the previous year) in nominal GDP (or the relevant variable). C, I, NX, X, M, Y, W and R are real consumption expenditures, investment expenditures, net exports, exports (of goods), imports (of goods), GDP, wages and profits, respectively. Wages and profits were deflated with the GDP deflator. Variable definitions can be found in the Appendix

(Table A1). Unit root tests (Table A2) suggest that all these variables are integrated of order one (I(1)). Thus ECM, cointegration, ADL or difference specifications are applicable.

4.1 Consumption

The consumption function estimated is of the general form $C = f(W,R)$. This closely resembles standard Keynesian consumption functions except that income is split into wage income and profit income. The difference in marginal savings propensities (between wage and profit incomes) gives the change of a redistribution of income. For econometric reasons the variables enter the estimation in logarithmic form.[1]

Table 1 reports the regression results for the ADL specification and several difference specifications. The ECM specification did not give meaningful and statistically significant results for the long-run effects. Moreover, the ADF test unambiguously rejected cointegration (in log levels). In the case of the consumption function this is somewhat surprising, since consumption functions can usually be modelled with ECM. The ADL specification (1) clearly indicates a specification in differences. The latter was thus applied. Moderate autocorrelation problems persist in various difference specifications. This may be due to the fact that wages and profits are pre-tax values. It was not possible to calculate disposable incomes for wage and profit incomes, because various taxes cannot be assigned. The tax rates may thus be the missing variables that show up as a serially correlated error term. A standard correction for first order autocorrelation was thus applied to some specifications. This correction had hardly any effect on the results.

Table 1. *Regression results for consumption equation*

	1		2		3		4	
Dependent variable:	ln C		Δln C		Δln C		Δln C	
Variable	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant	0.160	0.420	0.010	6.874	0.014	5.858	0.003	0.762
ln W	0.380	4.082						
ln W(–1)	–0.390	–3.885						
ln R	0.120	1.596						
ln R(–1)	–0.110	–1.607						
ln C(–1)	0.980	14.614						
Δln W			0.490	9.907	0.468	7.440	0.741	7.103
Δln R			0.110	1.671	0.108	1.622	0.259	
AR(1)					0.254	1.629	0.457	2.717
Adjusted R^2	1.000		0.780		0.778		0.549	
DW statistic	1.620		1.450		1.996		2.137	

Note: C is real private consumption, W real wages and R real profits. Specification 4 imposes that the coefficents of wages and profits add up to one. Estimation period 1962–2005.

[1] As the relevant variables exhibit exponential growth, the variance of the level of the respective variable increases over time. In logarithms this problem disappears.

In the basic difference specification (specification 2) the consumption elasticity for wages and profits are 0.49 and 0.11, respectively. The former was statistically significant at the 1% level, the latter was not statistically significant at conventional levels, but was at close to the 10% level. These elasticities may appear rather low. In the long run, one would expect a value much closer to unity.[1] However, the wage and profit variable are pre-tax (and also include social security contributions). The tax rate has a rising trend over part of our sample period, which may explain why gross income elasticities of consumption are below one. Correcting for first order autocorrelation (specification 3) has virtually no effect on coefficient estimates. Specification (4) imposes that the consumption function (in differences) is homogenous of degree 1 in wages and profits. The elasticity of wages then is 0.74 and that of profits is 0.26 (statistically significant at 1%).

The hypothesis that consumption propensities vary between profit and wage income is confirmed. Converting elasticities into marginal effects will give different results according to where the partial effect is evaluated. Therefore, we calculate two marginal effects, one at the mean of our sample and one at its end, which is the year 2005. At the sample mean the marginal propensity to consume out of wages is 0.52, whereas that out of profits is 0.15, which gives a consumption differential of 0.37.[2] At the levels of 2005 the consumption propensities are 0.58 and 0.16, respectively, which gives a consumption differential of 0.43.[3] This change in the consumption differential is due to the substantial shift in income distribution since 1980. Since the coefficient estimate for the coefficient on profits is not statistically significant different from zero, this has to be regarded as the lower bound of the value. A redistribution of 1 percentage point of GDP from profits to wages would thus induce additional consumption expenditures of 0.43 percentage points of GDP in 2005 (and 0.37 at the sample mean). The restricted version of the estimation gives a consumption differential of 0.51 in 2005 and 0.44 at the sample mean. However, the former estimate is preferred because the restriction is expected to be valid for net rather than gross income.

4.2 Investment

The investment function estimated is of the general form $I = f(Y,R,i)$. As the coefficients are interpreted as the effects in one variable, keeping the other variables constant, the coefficient estimate on profits will give the effect of an increase in profits given the level of income (and the interest) and therefore a change in income distribution.

The investment function was estimated in an ECM form with the restriction that in the long run the investment share in GDP is stable, that is, the long-run coefficient of output on investment is unity.[4] The investment function includes the profits and the (*ex post*) real

[1] Note that since the estimation is in logarithms, our estimation equation implies a consumption function that is Cobb–Douglas. Therefore the coefficients on wages and profits add up to the elasticity of income.

[2] Because a logarithmic consumption function was estimated, the consumption function is of the Cobb–Douglas type. If the 'true' relation is additive in levels rather than in logarithms, this can only be regarded as an approximation. An estimation in levels gives qualitatively similar results but is fraught with (serious) autocorrelation and heteroscedasticity problems.

[3] These values are rounded to two digits. The values are 0.584, 0.158 and 0.426 respectively.

[4] A similar investment function with the same restriction was used by Baumgartner, Breuss and Kaniovski (2005). Hein and Vogel (2008) use different specification for different countries. They utilise the profit share rather than profits. Naastepad and Storm (2006/2007) estimate investment as ln(I/Y) = f(ln(R/Y),ln(Y)). The coefficients of the latter can be readily transformed to be comparable with our results. The time series properties of the variables, however, are inconsistent, because ln(Y) is typically I(1), whereas I/Y and R/Y supposedly are I(0).

long-term interest rate (deflated with the GDP deflator). After experimentation with the lag structure of the differenced variables, a structure with one lag for the short run effects was adopted. The results are summarised in Table 2.

The regression performs reasonably well overall. In accordance with the literature (Chirinko, 1993; Ford and Poret, 1991) demand plays the key role in determining investment expenditures.[1] The accelerator effects are well above two (1.59 + 0.84) in the short run and have been restricted to one in the long run. The interest rate has the expected sign, but is not statistically significant. The long-run elasticity of profits is 0.15 and is statistically significant only at the 10% level. Again this is line with the literature. While firm-level investment functions usually find a larger effect of cash flow on investment (Fazzari and Mott, 1986), in aggregate investment functions this effect is more tenuous (Chirinko, 1993). Our results correspond to a marginal effect of profits on investment of 0.07.[2] Since the investment to profit ratio is stable in the sample period, the partial effects are virtually identical at the mean and in 2005.

4.3 Net exports

In the age of globalisation the estimation of the net export effect is a very sensitive part of the estimation, because exports and imports have typically grown faster than GDP. Consequently two estimation methods were applied. First the net exports (as a share of GDP) were estimated directly as a function of domestic GDP growth, the GDP growth of the most important trading partners, nominal exchange rates and real ULC $\left(\frac{NX}{Y}=f\left(Y, Y_w, E, RULC\right)\right)$. This approach is frequently found in the literature (Bowles and Boyer, 1995; Hein and Vogel, 2008). However, it imposes that a change in the real ULC (RULC) has a constant effect on net exports, which is a rather strong assumption for

Table 2. *Regression results for investment equation*

	ECM		ECM with lags	
Dependent variable:	Δln I		Δln I	
Variable	Coeff.	t-stat.	Coeff.	t-stat.
Constant	–0.300	–3.248	–0.590	–4.033
Δln Y	1.890	6.248	1.590	4.885
Δln Y(–1)			0.840	2.355
Δln R	0.130	0.698	0.380	1.965
Δln R(–1)			–0.180	–0.894
ln I(–1)/Y(–1)	–0.140	–2.820	–0.210	–3.130
ln R(–1)	0.010	0.512	0.030	1.910
i (–1)			0.000	–0.808
Adjusted R^2	0.720		0.730	
DW statistic	1.730		1.750	

Note: I is real private investment, Y real GDP, R real profits and i the long-term real interest rate. Estimation period 1968–2005.

[1] However, some macroeconomtric models such as the ECB's AWM (Fagan *et al.*, 2001) impose strong long run effects of interest via long run restrictions.

[2] This is the conversion from elasticities to partial effects: $\frac{\partial I}{\partial R}=e_{IR}\frac{I}{R}$.

a period when export and import shares have been rising. It is also inconsistent with the import and export functions as currently used in most macroeconometric models since in these prices rather than ULC enter import and export functions. Throughout this section ULC, rather than the wage share, will be used as the explanatory variable, since this variable is the one that is relevant for competitiveness and the effects of (changes in) RULC can easily be converted into effects of (changes in) the wage share.[1]

A second approach follows standard modelling practice more closely and allows for an increasing effect on net exports in the course of globalisation. Here (in a first step) domestic prices (or export prices) enter the export and import functions. Then (in a second step) domestic prices are estimated as a function of nominal ULC and import prices. This latter equation also allows for the calculation of how much an increase in RULC (of, say, 1%) will (on average) raise domestic prices.

For the trading partners' GDP a trade-weighted GDP based on the trade shares of the year 1990–2005 was calculated for the largest trading partners. From 1992 on these include Eastern European countries and China; prior to 1992 only OECD countries were included. In the same fashion a trade-weighted effective exchange rate was calculated.

Unfortunately export and import data for extra-EU12 trade only exists for goods, not for services. Thus all estimations had to be performed for goods trade only and then the results were multiplied by a fixed factor (1.25, which is the share in the year 2005 for which data exists) to account for trade in services. For the USA, data on trade in goods and services exist and the share of services in total exports and imports is stable (with temporary changes in the 1970s, which are presumably due to the oil price shock). Thus, the error arising from our adjustment for EU trade is probably small.

The time-series properties for the variables used in the following specifications are not straightforward. Unit root tests suggest at the 5% level that NX/Y and ln Px/Pm are I(0) as expected, ln E is also I(0) and RULC is I(1). The latter is surprising since RULC is also a ratio. Ln Yw also seems to be I(0). For consistency, ln Yw and ln Y are both treated as I(1). In the case of RULC, experiments with additional lags were performed.

Table 3 summarises the results of the estimations of the net export share according to the first, direct estimation strategy. Table 3 reports two specifications where RULC is entered in levels and one (specification 3) where it is entered in difference form. The unit root tests suggest the latter specificiation. However, this specification implies that changes in the ULC have a one-time effect on net exports, which is to say there is no long-term effect. From an economic point of view this is not plausible. Therefore specifications 1 and 2 are preferred. In specifications 1 and 2 all variables show the expected sign and, with the exception of the exchange rate, are statistically significant at the 5% level. Specification 1 was performed with an autocorrelation correction (for first order autocorrelation). Autcorrelation problems persist, which may indicate misspecification. However, the coefficient estimates seem to be robust. A 1% increase in RULC leads to a 0.08% decrease of net exports (of goods). After appropriate transformation this effect of a 1 percentage point increase in the wage share leads to a 0.13 percentage point (of GDP) of net exports in goods and services. In specification 3, RULC enter in difference form. The coefficient estimate for RULC is not statistically significant at the 10% level. The other

[1] RULC are $RULC=\frac{W}{Y}\frac{ET}{EE}$, where ET and EE stand for total employment and dependent employment, respectively. In the conversion differences between consumer prices and GDP prices are ignored. Since we are interested in medium-term developments and the two indices are highly correlated over longer periods, an additional step in lengthy transformation is avoided. See Marterbauer and Walterskirchen (2003) for more discussion on the relation of wage shares and ULC. The relevant values are summarised in Table 6.

Table 3. *Regression results for net export share equation*

	1		2		3	
Dependent variable:	NX/Y		NX/Y		NX/Y	
Variable	Coeff.	*t-stat.*	Coeff.	*t-stat.*	Coeff.	*t-stat.*
Constant	0.046	1.852	0.053	3.836	–0.006	–2.368
Δln Y	–0.185	–4.334	–0.120	–2.285	–0.201	–4.342
Δln Yw	0.131	2.898	0.137	2.304	0.116	2.526
ln E	–0.012	–1.012	–0.014	–1.347	–0.007	–0.546
RULC	–0.084	–2.133	–0.095	–4.396		
ΔRULC					–0.147	–1.472
AR (1)	0.667	5.383			0.747	7.632
Adjusted R^2	0.719		0.462		0.708	
DW statistic	1.469		0.688		1.549	

Note: NX are the net exports, Y real GDP, Yw real GDP of the main trading partners, E a trade-weighted exchange rate, RULC the real unit labour costs. Estimation period 1962–2005.

variables are barely affected by this change in specification. The coeffient estimate from specification 1 forms the basis for later calculations.

The second estimation strategy is more round about. In a first step exports are estimated as a function of relative prices (and other control variables) and in a second step prices are estimated as a function of (nominal) ULC (and other control variables). Then the same procedure is applied to imports. Table 4 summarises the results of the export function. The explanatory variables are export prices relative to import prices (measured in a hypothetical world currency),[1] the output of trading partners and the exchange rates. Since no support for a cointegrating relation was found, the equation was estimated in difference form. A correction for first order autocorrelation was applied. The coefficients have the expected signs and are statistically significant at the 5% level or higher. The results indicate that a 1% increase in foreign demand leads to a 1.34% increase of exports (of goods). Exports also react strongly to the exchange rate, with an elasticity of –1.54. The coefficient on relative prices is statistically significant at the 1% level and has an elasticity of –1.17.

For the import estimation a difference equation was applied after cointegration tests failed to find cointegration. Overall, the import regression did not work very well. While domestic demand consistently has the expected sign and is statistically significant (at the 1% level), the domestic price level, import prices and the exchange rate frequently had perverse signs and/or were statistically insignificant. In particular, contemporaneous prices showed 'perverse' signs (possibly because of a J-curve effect). Table 4 reports two specifications. Specification 2 includes the exchange rate and the ratio of domestic to import prices (in world currency), both lagged. Relative prices in this specification are not statistically significant and the coefficient estimate has a value that is economically negligible. Specification 3 includes domestic prices and import prices (in domestic currency), both lagged. In addition a dummy variable that takes the value of one from 1995 onwards was used.[2] Since this specification was adopted after experimentation,

[1] Pmwc = Pm*E

[2] The dummy variable was included after visual inspection of the residuals of the original equation. One possible explanation is the increased integration with Eastern Europe after the fall of the wall.

Table 4. *Regression results for export and import equations*

	1			2		3	
Dependent variable:	Δln X		Dependent variable:	Δln M		Δln M	
Variable	Coeff.	t-stat.	Variable	Coeff.	t-stat.	Coeff.	t-stat.
Constant	0.018	0.905	Constant	–0.006	–0.309	–0.034	–1.555
Δln Yw	1.337	2.322	Δln Y	1.977	3.219	2.339	3.868
Δln E	–1.537	–5.274	Δln E(–1)	0.364	1.580		
Δln Px/Pmwc	–1.173	–3.173	Δln P(–1)/Pmwc(–1)	0.007	0.029		
AR (1)	0.415	2.795	Δln P(–1)/Pmeu(–1)			0.183	0.941
			T95			0.058	2.653
Adjusted R^2	0.388		Adjusted R^2	0.247		0.326	
DW statistic	1.802		DW statistic	1.742		1.938	

Note. Yw is the GDP of main trade partners, E the trade-weighted exchange rate. Px the export price deflator, Pmwc the import price deflator in a (hypothetical, trade-weighted) world currency, Y is GDP, P the GDP-deflator, Pmeu is the import price deflator in euros. T95 is a dummy variable that takes on the value of 1 from 1995. Estimation period 1962–2005.

inference based on t-values may be misleading (Charemza and Deadman, 1997, ch. 2). This specification is one of the few where the domestic price level has the expected sign and an economically significant coefficient, though at 0.18 it is low and is not statistically significant. Domestic GDP on the other hand is statistically significant at the 1% level. The estimated income elasticity of imports is 2.34, which is rather high.[1] The conclusion, thus, is that domestic prices have a weak, if any, effect on imports. Based on our results a coefficient estimate of zero is equally arguable.

In two auxiliary regressions the inflation (of the GDP deflator) was explained by (nominal) ULC, and import prices and export prices were explained by domestic prices and import prices. Both estimations were performed in difference form (after ECM specifications proved unsuccessful) and autocorrelation procedures had to be applied. An increase of nominal ULC by 1% increases domestic inflation by 0.45. An increase in domestic prices by 1% increases export prices by 0.47. From the price equation it can be derived that nominal ULC have to increase by 1.82% such that RULC increase by 1% (because prices would rise by 0.82%) (see Table 5).

The calculation of the effects of a change in income distribution on exports and imports involves several steps, which are summarised in Table 6. As import and export shares display a clear trend (reflecting globalisation), the transformation from elasticities to marginal effects will yield different results according to the point (in time) where marginal effects are calculated. Values for mean exports and imports as well as value at the end of the period are reported.

The total effect of a change in functional income distribution on exports includes the effect of RULC on prices and the effect of prices on export prices. This value has to be transformed from an elasticity into a marginal effect.[2] Then the effects of changes in the

[1] This value is high compared with the demand elasticity of exports. Our results imply that if the EU and its trade partners grow at the same rate, the EU would experience a widening current account deficit, which is not very plausible.

[2] $\frac{\partial M/Y}{\partial RULC} = e_{MP} e_{PRULC} \frac{M}{Y} \frac{1}{RULC}$

Table 5. *Regression results for price equations*

Dependent variable:	Δln P		Dependent variable:	Δln Px	
Variable	Coeff.	t-stat.	Variable	Coeff.	t-stat.
C	0.029	3.087	C	0.000	–0.921
Δln Pm	0.036	2.269	Δln Pm	0.510	15.943
Δln ULC	0.449	7.139	Δln P	0.470	4.648
AR(1)	0.887	12.038	AR(1)	0.440	3.161
Adjusted R^2	0.950		Adjusted R^2	0.940	
DW statistic	2.120		DW statistic	2.150	

Note: P is the GDP deflator, Pm the import price deflator, Px the export price deflator and ULC the nominal unit labour costs. Estimation period 1962–2005.

Table 6. *Calculation of partial effects on net exports, exports and imports*

	1	2	3	4	5	6	7	8
Net exports			e_{PRULC}	1/RULC		ET/ED	G&S/G	Effect
NX/Y	–0.084					1.27	1.25	–0.13
Exports	e_{XPx}	e_{PxP}			X/Y			
2005	–1.17	0.47	0.82	1.76	0.10	1.18	1.25	–0.12
mean	–1.17	0.47	0.82	1.58	0.07	1.27	1.25	–0.08
Imports	e_{MP}				M/Y			
2005	0.18		0.82	1.76	0.11	1.18	1.25	0.04
mean	0.18		0.82	1.58	0.08	1.27	1.25	0.03

Note: column 1 estimates from Tables 3 and 4, respectively. Column 2 estimates from Table 5. Column 3: ∂P/∂RULC is calculated as ∂P/∂ULC (from Table 5) divided by 1–∂P/∂ULC. Column 6: ET, total employment; ED, dependent employment. Column 7: G&S, extra-EU12 exports of goods and services; G, extra-EU12 exports of goods.

ULC have to be transformed to effects of changes in the wage share. The result of this has to be adjusted for services. These transformations are summarised in Table 6. Overall an increase in the wage share by 1% currently leads to a reduction in exports by 0.12 percentage points of GDP. In the middle of the sample (roughly the 1970s) the respective effect would have been 0.08 percentage points of GDP. The corresponding values of the reduction of imports are 0.04 and 0.03 percentage points of GDP.

The effect of an increase in the wage share by 1% on the net export share thus totals –0.16 (and was –0.11 at the mean of the period). The difference between these two values reflects the increasing importance of international trade or globalisation. Conveniently, the differences are not large enough to modify the overall result.

4.4 Total effects

Table 7 puts together the partial results presented above. The results of the different ways to calculate the effect on net exports are listed separately. The positive effect of an increase

Table 7. *Private excess demand (in percentage points of GDP) caused by a 1%-point increase of the wage share*

	Effects at mean levels, NX-share regression	Effects in 2005, X, M-regression	Effects at mean levels, X, M-regression
Consumption	0.37	0.43	0.37
Investment	–0.07	–0.07	–0.07
Domestic excess demand	0.30	0.35	0.30
Net exports	–0.13	–0.16	–0.11
Private excess demand (h_2):	**0.19**	**0.17**	**0.19**

Note: Column 'NX-share', estimation of net export share as a function of real unit labour costs and other control variables (based on results in Table 3). Columns X, M-regression, based on estimation of exports and imports as a function of domestic prices (and other control variables) and of prices as a function of unit labour costs (and import prices) (based on results from Tables 4 and 5). Private excess demand (h_2) is the sum of the effects of a change in income distribution on consumption, investment and net exports given the level of income.

in the wage share by one percentage point on private consumption is 0.37 percentage points of GDP at mean values and 0.43 percentage points in 2005. Either is substantially larger than the negative effect on investment (0.07 percentage points of GDP). The *domestic sector* of the economy is thus clearly wage led. Our estimations suggest that a 1 percentage point increase of the wage share (assuming no changes in government expenditures and income) leads to an increase of domestic demand by a 0.3 percentage points increase in GDP at sample means and and by 0.35 in 2005.

The effect of an increase of the wage share on net exports is stronger than the effect on investment. Table 7 lists all three variants of calculating the effect on net exports. First, the direct estimation of the net export share as a function of RULC (and standard control variables). This method (labeled 'NX-share regression' in Table 7) gives a medium effect on net exports, which is –0.13 percentage points of GDP. This estimation procedure, however, imposes that the effect of RULC on NX is constant over time despite an increase in export and import shares. Second, exports and imports were regressed on the domestic price level (and other control variables) and prices were regressed on nominal ULC and import prices. The price equation allows for the calculation of the effects of an increase in RULC. This approach is consistent with the present modelling strategy in macro-econometic models. Since the estimations give elasticities rather than partial effects, the elasticities have to be converted. As the import and exports shares in GDP show a strong trend the results differ (for a given elasticity) if evaluated at the mean or at the end of the period. This second method is therefore more suited to a period of globalisation. In Table 7 the evaluation with the current value is referred to as 'X, M-regressions, 2005 levels' and gives a value of –0.16. An increase in the wage share by 1 percentage point today would thus decrease net exports by 0.16 percentage points of GDP. Alternatively, column 'X, M regressions, mean levels' evaluates the marginal effect for the export and import shares at the mean values of our sample, which gives an effect of –0.11. This can be interpreted as a 1 percentage point increase in the wage share in the middle of the period, i.e. the 1970s, causing a decrease in net exports by 0.11 percentage points of GDP.

The total effect of a 1 percentage point increase in the wage share on *private excess demand* (h_2 in equation 2) ranges between +0.17 and +0.19 percentage points of GDP. In

all cases the effect is positive. These are conservative estimates as the actual effect is likely to be understated. First, the effect of domestic prices on imports is not statistically significant and the coefficient estimate is not robust. Second, as international outsourcing has increased in the relevant period, our estimates will overstate the effect on net exports because the effect on intermediate import goods induced by the production of exports goods is not accounted for. The qualitative result of this study is thus clear: wage moderation overall will have negative effects on (private) aggregate demand in the Euro area. A plausible, conservative point estimate of the total effect is 0.2 percentage points of GDP. The net results at mean levels are similar to those for 2005. However, the components do differ. The decreasing wage share has led to an increase in the consumption differential, while increases in international trade have led to stronger effects on net exports. The fact that these two developments in opposite directions almost cancel out is mere coincidence.

To get the total private effects of a change in income distribution on *equilibrium demand*, excess demand has to be multiplied by the multiplier of equation 2, that is $\frac{1}{1-h_1}$. This is done in Table 8. These calculations have to be interpreted with care for two reasons. First, these results are equilibrium effects. The exogeneity assumptions outlined in Section 2 seem to be rather strong in this context.[1] Second, and more technically, the results are very sensitive to the specific parameters applied and lack the robustness of the results for excess demand: h_1 consists of the partial effects of changes in income on consumption, investment and imports; Tables 1, 2 and 4 contain the relevant coefficient estimates. Again, the coefficient estimates are elasticities that have to be converted into partial effects.[2] For the case of consumption, this elasticity was estimated to be 0.6 (Table 1). In the literature the assumption of a long-run elasticity of one is frequently found. By assumption, the long-run demand elasticity of investment was one (Table 2). The income elasticity of imports is 2.34 (Table 4), which is a rather high value. Moreover, it makes a big difference if the elasticity is converted into a partial effect at the mean import share or its 2005 value. Depending on the assumption of the long-run consumption elasticity and on where the import elasticity is converted the private multiplier ranges from 1.38 (with the $e_{CY} = 1$ and the M/Y of 2005) to 2.69 (with $e_{CY} = 0.6$ and the mean M/Y).[3] The latter

Table 8. *Private equilibrium demand (in percentage points of GDP) caused by a 1%-point increase of the wage share*

	NX-share regression	X, M-regression, 2005 levels	X, M-regression, mean levels
Private excess demand (h_2):	0.19	0.17	0.19
Total private demand effects ($h_2/(1-h_1)$):	0.23	0.26	0.26

Total private demand effects is private excess demand multiplied by the sum of the effects of a change in income on consumption, investment and imports. Calculations based on a long-run income elasticity of consumption of 0.6 (Table 1).

[1] Note that the private excess demand effects discussed above are, by definition, partial (and disequilibrium effects). Here, however, the effects are general equilibrium effects. The assumption that other control variables are exogenous with respect to income and income distribution, is therefore much more restrictive.

[2] $h_1 = \frac{\partial C}{\partial Y} + \frac{\partial I}{\partial Y} + \frac{\partial NX}{\partial Y} = e_{CY}\frac{C}{Y} + e_{YI}\frac{I}{Y} - e_{MY}\frac{M}{Y}$

[3] The multiplier values are 1.66 assuming $e_{CY}=0.6$ and mean M/Y and 2.01 assuming $e_{CY}=1$ and 2005 M/Y.

value seems rather high. The state sector has been excluded from the analysis in this paper. If automatic stabilisers are operating, then the values will be accordingly smaller. Assuming an income elasticity of consumption of 0.6 the total effect of a 1 percentage point increase in the wage share on equilibrium income is 0.23 percentage points of GDP (evaluated at the mean import share).

5. Implications for wage policy

The first, and most obvious, policy implication of our findings is that wage moderation in the EU is unlikely to stimulate employment. The results presented above suggest that wage moderation leads to a (moderate) contraction in output. Since an expansion in output can be regarded as a necessary (but not sufficient) condition for an expansion in employment, wage moderation (at the EU level) is *not* an 'employment-friendly' wage policy. This finding is consistent with the fact that unemployment has been stable or increasing in the last two decades despite substantial declines in RULC. Thus the first conclusion is that, rather than wage moderation, a return to productivity-oriented wage setting has to be part of a macroeconomic policy package that is aimed at stimulating demand and employment in Europe.

A second implication refers to wage coordination. While our findings suggest that demand is wage-led in the Euro area, this finding does not extend to individual Euro member states. While the Euro area is a relatively closed economy, its member states typically are rather open economies, with most of their trade being conducted with other member states. Indeed, the parameter estimates imply that the Euro area would switch from a wage-led to a profit-led demand regime at export and import shares of between 23% and 30%.[1] Most EU members have export and import shares in this order of magnitude or even higher. It seems likely, therefore, that many EU member states exhibit (individually, not collectively) profit-led demand regimes. In other words, small open economies are likely to be profit-led, because foreign trade constitutes a much larger share of their GDP.

If this is the case, European wage policy is in a prisoners' dilemma-type situation. While for each country it may be expansionary to exercise wage moderation (assuming constant wages abroad), wage moderation in all countries will have a contractionary effect. This is likely to generate a downward bias in wage settlements if wages are negotiated nationally. The actual situation is, of course, much more complicated. First, the EU consists of countries of varying size, with some of them, most notably Germany, being large enough to make a wage-led demand regime likely. Second, wage negotiations do not take place at the national level, but at the sectoral level or the firm level, with substantial differences in national labour relations systems persisting (Visser, 2004; Marginson and Sisson, 2004). Any concrete policy suggestion would have to take into account these complications. However, at the general level it seems likely that wage competition fostered by trade integration and increasing foreign direct investment flows has contributed to reduction in wage growth (Hatzius, 2000; Rodrik, 1997). A coordination of wage bargaining across the Euro area (or the EU in general), therefore, seems desirable.

The third conclusion concerns the macro economic policy package currently in place in the Euro area, which is defined as a common currency directed by an independent ECB,

[1] Both figures are based on the second, indirect estimate of the effect on exports and imports (referred to as X, M-estimates in Table 7). If the statistically insignificant (and not robust) effect of prices on imports is taken at face value, then the switch from a wage-led to a profit-led demand regime occurs at export and import shares of 23%. If the effect of prices on imports is assumed to be zero, the switch occurs at 30%.

almost exclusively concerned with price stability, and national fiscal policies which are (asymmetrically) severely constrained by the Stability and Growth Pact. In this setting wage policy plays a crucial role as a shock absorber for asymmetric as well as for symmetric shocks, which is why the ECB is consistently insisting that labour market flexibility is needed to ensure the proper functioning of the monetary union (Alsopp and Artis, 2003). However, if demand is wage-led in the EU, then flexible wage will send perverse signals in the case of adverse demand shocks. Rather than stimulating demand, falling wages (or, more precisely, wage shares) will dampen demand further. Therefore the whole design of the policy package in Europe has to be modified. Monetary policy would have to be reoriented to output stabilisation or fiscal policy would need more room (and co-ordination) for counter-cyclical policy.

The estimation approach taken in this paper has several limitations that should be addressed in future research. First, the estimation has been based on the Euro area, which is appropriate if one is interested in the effects on the European level; however, a panel approach could (provided that countries are similar) give more precise estimates for the behavioural functions. Second, the paper has employed a single equation approach. An alternative would be a systems approach such as that used by Stockhammer and Onaran (2004). The VAR approach has the advantage of explicitly taken into account simultaneity, whereas the advantage of the single equation-approach is that the individual effects can be identified more clearly. Third, the underlying model has been kept simple to focus on the role of distribution in demand formation. Possible extensions include a richer modelling of the supply side, of the state and of the financial sector.

Bibliography

Alsopp, C. and Artis, M. 2003. The assessment: EMU, four years on, *Oxford Review of Economic Policy*, vol. 19, no. 1, 1–29

Baumgartner, J., Breuss, F. and Kaniovski, S. 2005. WIFO-Macromod – An econometric model of the Austrian economy, in: OeNB (ed.), *Macroeconomic Models and Forcasts for Austria*, Proceedings of OeNB Workshops No. 5

Bhaduri, A. and Marglin, S. 1990. Unemployment and the real wage: the economic basis for contesting political ideologies, *Cambridge Journal of Economics*, vol. 14, 375–93

Blanchard, O. 2006. *Macroeconomics*, 4th edn. 4th ednUpper Saddle River, NJ, Prentice Hall

Blecker, R. 1999. Kaleckian macromodels for open economies, in Deprez, J. and Harvey, J. T. (eds), *Foundations of International Economics: post-Keynesian Perspectives*, London, New York, Routledge

Bowles, S. and Boyer, R. 1995. Wages, aggregate demand, and employment in an open economy: an empirical investigation, in Epstein, G. and Gintis, H. (eds), *Macroeconomic Policy After the Conservative Era. Studies in Investment, Saving and Finance*, Cambridge, Cambridge University Press

Charemza, W. and Deadman, D. 1997. *New Directions in Econometric Practice*, Cheltenham, Edward Elgar

Chirinko, R. 1993. Business fixed investment spending: modeling strategies, empirical results and policy implications, *Journal of Economic Literature*, vol. 31, 1875–911

Ederer, S. and Stockhammer, E. 2007. Wages and aggregate demand in France: An empirical investigation, in Hein, E. and Truger, A. (eds), *Money, Distribution, and Economic Policy – Alternatives to Orthodox Macroeconomics*, Cheltenham, Edward Elgar, 138–40

European Commission 2006. Time to move up a gear, *The new partnership for jobs and growth, available at http://ec.europa.eu/growthandjobs/pdf/illustrated-version_en.pdf [date last accessed 26 May 2008]*

Fagan, G., Henry, J. and Mestre, R. 2001. *'An Area-wide Model (AWM) for the Euro Area', ECB Working Paper 42*

Fazzari, S. and Mott, T. 1986. The investment theories of Kalecki and Keynes: an empirical study of firm data, 1970–1982, *Journal of Post Keynesian Economics*, vol. 9, no. 2, 171–87

Flassbeck, H. and Spiecker, F. 2005. 'Die deutsche Lohnpolitik Sprengt die Europäische Währungsunion', *WSI-Mitteilungen*, no. 12/2005, 707–13

Gordon, D. 1995A. Growth distribution, and the rules of the game: social structuralist macro foundations for a democratic economic policy, in Epstein, G. and Gintis, H. (eds), *Macroeconomic Policy after the Conservative Era. Studies in Investment, Saving and Finance*, Cambridge, Cambridge University Press

Gordon, D. 1995B. Putting the horse (back) before the cart: disentangeling the macro relationship between investment and saving, in Epstein, G. and Gintis, H. (eds), *Macroeconomic Policy after the Conservative Era. Studies in Investment, Saving and Finance*, Cambridge, Cambridge University Press

Hatzius, J. 2000. Foreign direct investment and factor demand elasticities, *European Economic Review*, vol. 44, no. 1, 77–143

Hein, E. and Ochsen, C. 2003. Regimes of interest rates, income shares, savings, and investment: a Kaleckian model and empirical estimations for some advanced OECD-economies, *Metroeconomica*, vol. 54, 404–33

Hein, E. and Krämer, H. 1997. Income shares and capital formation: patterns of recent developments, *Journal of Income Distribution*, vol. 7, no. 1, 5–28

Hein, E. and Vogel, L. 2008. Distribution and growth reconsidered – empirical results for Austria, France, Germany, the Netherlands, the UK and the USA, *Cambridge Journal of Economics*, vol. 32, 479–511

Kalecki, M. 1954. Theory of Economic Dynamics, Osiatynski, J. (ed.), *Collected Works of Michal Kalecki*, Vol. 1, Oxford, Clarendon Press reprinted in

Mankiw, G. 2006. *Macroeconomics*, 6th edn, New York, Worth

Marginson, P. and Sisson, K. 2004. *European Integration and Industrial Relations. Multi-level Governance in the Making*, Houndsmill, Palgrave MacMillan

Marglin, S. and Bhaduri, A. 1990. Profit squeeze and Keynesian theory, in Marglin, S. and Schor, J. (eds), *The Golden Age of Capitalism. Reinterpreting the Postwar Experience*, Oxford, Clarendon

Marterbauer, M. and Walterskirchen, E. 2003. 'Bestimmungsgründe der Lohnquote und Realen Lohnstückkosten', *Wifo-Monatsberichte*, no. 2/03, 151–9

Naastepad, C. W. M. 2006. Technology, demand and dstrrbution: a cumulative growth model with an application to the Dutch productivity slowdown, *Cambridge Journal of Economics*, vol. 30, no. 3, 403–34

Naastepad, C. W. M. and Storm, S. 2006/2007. OECD demand regimes (1960–2000), *Journal of Post-Keynesian Economics*, vol. 29, no. 2, 213–48

Onaran, Ö. and Stockhammer, E. 2005. Two different export-oriented growth strategies: accumulation and distribution a la Turca and a la South Korea, *Emerging Markets Finance and Trade*, vol. 41, no. 1, 65–89

Rodrik, D. 1997. *Has globalization gone too far?*, Washington, Institute for International Economics

Stockhammer, E. and Onaran, Ö. 2004. Accumulation, distribution and employment: a structural VAR approach to a Kaleckian macro-model, *Structural Change and Economic Dynamics*, vol. 15, no. 4, 421–47

Visser, J. 2004. Patterns and variations in European industrial relations, *ch. 1 in* European Commission: Industrial relations in Europe 2004, Luxembourg, European Communities

Appendix

Table A1. *Variable definitions*

Notation	Description	Ameco notation or notes on variable construction
C	Private consumption, real	AMECO: OCPH
E	Exchange rate	Index (1960 = 100). Growth rate of trade-weighted exchange rates. Exchange rate in price notation (1€ in foreign currency). Weights: see YW
E_D	Dependent employment, private sector	AMECO: NWTD
E_T	Employment, private sector	AMECO: NETD
Y	GDP, real	AMECO: OVGD
YW	Trade-weighted GDP of main trading partners, real	Index (1960 = 100). Weighted growth rates of real GDP of main trading partner. Weights: shares of exports of EU12, 2000–2005. Main trading partners: USA, UK, Sweden, Japan, Switzerland, Turkey; from 1991 also: China, Russia, Czech Republic, Hungary, Poland. (*source*: Eurostat).
I	Private investitionen, real	AMECO: OIGT
i	Long-run interest rate, real: deflated by the GDP deflator	*source*: OECD Economic Outlook: IRL
M	Extra EU12 imports of goods, real	AMECO: DMGE (Belgium, Lux from 1999)
NX	Net exports, real	NX = X – M
R	Gross operating surplus, real	R = UOGD/PVGD
P	GDP deflator	AMECO: PVGD
P_M	Import price deflator	AMECO: PXGS
P_X	Export price deflator	AMECO: PMGS
ULC	Unit labour costs	AMECO: PLCD
RULC	Real unit labour costs	AMECO: ALCD
W	Compensation of employees, real	W = UWCD/PVGD
X	Extra EU12 Exports of goods, real	AMECO: DXGE (Belgium, Lux from 1999)

Note on construction of EU12 variables in the AMECO database. Real variables and deflators are constructed by adding the respective growth rates weighted by nominal GDP (or appropriate variable) of the previous year as share of EU12 GDP (or appropriate variable).

Table A2. *Unit root tests*

Variable	Levels				Differences			
	Deterministic	Lags	Test stat.	Significance	Deterministic	Lags	Test stat.	Significance
ln C	c,t	1	–2.054	–	c	0	–2.985	***
ln W	c,t	1	–2.090	–	c	0	–2.405	**
ln R	c,t	0	–2.161	–	c	0	–5.204	***
ln I	c,t	1	–2.878	*	c	0	–3.823	***
ln Y	c,t	0	–2.607	–	c	0	–3.969	***
I	c	0	–1.370	–	c	0	–6.150	***
ln X	c,t	0	–1.721	–	c	0	–5.678	***
ln YW	c,t	1	–3.125	**	c	0	–4.696	***
ln Ex	c	0	–2.258	**	c	0	–5.559	***
ln Px/Pm	c	1	–3.278	***	c	0	–5.529	***
ln M	c,t	0	–1.632	–	c	0	–6.150	***
ln P/Pm	c	0	–1.027	–	c	0	–5.126	***
NX/Y	c	0	–2.512	**	c	1	–5.927	***
RULC	c	1	–0.040	–	c	0	–4.571	***
ln Px	c,t	1	–0.820	–	c	0	–3.182	***
ln Pm	c,t	1	–1.059	–	c	0	–4.081	***
ln P	c,t	1	–1.855	–	c	0	–0.937	-
ln ULC	c,t	1	–1.083	–	c	0	–1.533	*

Note: Critical values according to Charemza and Deadman (1997).
Statistically significant at: ***1%; **5%; *10%.