

# Globalisation, Accumulation and Inequality – the Case of Germany

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## ABSTRACT

We study the conditions under which in a small open economy the labour share in national income may retain a stable value and the significance of primary savings from labour income is maintained. We conclude that the growth of domestic product must not be lower than the real rate of return on capital weighted by the savings ratio of asset holders. For Germany, we estimate a hurdle rate of growth of about 1.5% that must be surpassed in the long run just to prevent the labour share from falling indefinitely. The condition has not been met for a number of years, because of chronically sluggish growth and high structural unemployment. We present a dynamic model of economic integration to show that, to a large extent, this pattern is an effect of globalisation. Besides fostering innovation, reinforcing the education system should have priority.

## ZUSAMMENFASSUNG

Wir untersuchen die Bedingungen, unter denen in einer kleinen offenen Volkswirtschaft der Lohnanteil am Volkseinkommen langfristig konstant bleibt und die Bedeutung der primären Ersparnis erhalten bleibt. Im Ergebnis darf das Wachstum des Inlandsprodukts nicht niedriger sein als die Kapitalrendite, gewichtet mit der Sparquote der Anleger. Wir schätzen einen Schwellenwert von 1,5% für das Wachstum, der langfristig übertroffen werden muss, um einen sich stetig fortsetzenden Rückgang der Lohnquote zu verhindern. Aufgrund chronisch schleppenden Wachstums und hoher struktureller Arbeitslosigkeit ist diese Bedingung in Deutschland schon seit mehreren Jahren nicht mehr erfüllt. Mit Hilfe eines dynamischen Modells ökonomischer Integration argumentieren wir, dass dieses Muster zu einem Gutteil eine Folge der Globalisierung ist. Neben einer innovationsfreundlichen Politik wird die verstärkte Bildung von Humankapital empfohlen.

**JEL Classification:** F43, D31, O52

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## I. INTRODUCTION

Research on the topic of inequality and growth very often concentrates on interrelations that may exist between the *personal* income distribution and growth.<sup>1</sup> Usually, the international

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<sup>1</sup> See, for example Alesina and Rodrik (1994) or Persson and Tabellini (1994).

environment is not considered explicitly. This may divert attention from a close and almost mechanical relationship that exists between the evolution of the functional income distribution and economic growth in a globalising world. In this setup, national economies are small and open. If the domestic growth rate of such a small open economy is low, it will experience a decline in the share of wages and salaries in national income.

The argument has two essential parts. Firstly, in an open economy with liberalised and highly integrated capital markets, the rate of return on financial wealth and tangible assets by and large is given by the world capital market. From a national point of view, these returns are exogenous. Depending on the marginal propensity to save out of capital income, they make the value of assets grow at a certain minimum rate, a lower threshold for the growth of wealth. We want to label this the *self-generating accumulation*. Secondly, with capital mobility, aggregate wealth and domestic capital are two stocks that can grow at different rates and may diverge. If the domestic economy grows too slowly relative to the global economic environment, the share of wages and salaries in the national income will decrease further and further.

Under the given circumstances, this may present a substantive risk for some European countries, especially for Germany. Various studies show that the integration of the national capital markets is making rapid progress, whereas – in a striking departure – the national labour markets are showing a large amount of inertia owing to a dense thicket of regulations and cultural differences.<sup>2</sup> An ongoing erosion of the labour share may also have substantial fiscal consequences and indirect effects on the income distribution: with a decreasing share of labour income, government will ultimately be hard pressed to lower the share of direct taxation in favour of indirect taxation.<sup>3</sup> It will not be easy to raise growth rates rapidly. Globalisation has planted Germany into an economic environment where capital markets demand high returns, as real capital is a scarce and productive elsewhere. Therefore, real investment and domestic growth will be sluggish in the years to come, and pressure on real wages is likely to continue.

After this introduction, we begin by shining a theoretical spotlight on the conditions under which, in an open economy where capital is globally mobile, there is a stable long run equilibrium value for the labour share, and primary savings retain a non-negligible role in total asset

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<sup>2</sup> See, for example, ILO (2004), IMF (2001) or IMF (2002).

<sup>3</sup> If the government decides instead to leave the tax system and the public expenditure path unchanged, the general government sector runs into structural budget deficits.

formation. To this end, we use a neoclassical model of a small open economy. A discussion of the situation in Germany follows, which is still marked by structurally weak growth, despite some cyclical relief since 2005. Using a dynamic model of economic integration, we show that this pattern can be related to the first stage of adjustment to globalisation. Therefore much persistence can be expected. The paper concludes with policy considerations.

## II. ACCUMULATION AND DISTRIBUTION

The functional distribution equation divides national income  $Y^n$  (net national income at factor cost) into labour income from dependent employment and income from entrepreneurial activity and wealth. Let  $w$  denote real wages (per efficiency unit of labour),  $L$  the volume of labour, likewise in efficiency units,  $W$  the net wealth of an economy measured in units of output and  $r$  the annual average rate of return of wealth, in real terms. Then, by definition:

$$Y^n = wL + rW .$$

Here, the variable  $W$  comprises the value of the fixed assets held by production enterprises, the housing stock, and the positive or negative net claims on non-residents. The rate of return  $r$  is net of depreciation. Abstracting from changes in the relative price of output goods and assets, and also disregarding capital transfers to non-residents, the change in an economy's real wealth is given by the level of domestic net savings,  $S$ :

$$\dot{W} = S .$$

For analytical purposes, we want to distinguish between savings from labour income and savings from wealth income in the Kaldorian tradition:

$$S = s_L wL + s_w rW .$$

These savings rates may or may not be equal. For the aggregate national savings ratio  $s$ , this means:

$$s = s_L \lambda + s_W (1 - \lambda),$$

where the weight

$$\lambda = \frac{wL}{Y^n}$$

denotes the labour share in national income, which serves here as an aggregate measure of functional income distribution. Looking at the growth rate of national wealth, we obtain the following accumulation equation:

$$\frac{\dot{W}}{W} = s_L w \frac{L}{W} + s_W r. \quad (1)$$

The first term on the right hand side is the contribution of primary savings to total wealth creation. It depends not only on the wage rate but also on the ratio between the volume of effective labour and net wealth. We will call it the *labour-wealth ratio*. The second term is the contribution of savings from wealth income, which we will call the *self-generating accumulation rate*. Equation (1) provides a key insight: If factor prices are bounded, the contribution of primary savings vanishes over the long run if the economy's real wealth rises permanently faster than the volume of labour, measured in efficiency units. In that case, the labour-wealth ratio approaches zero and asymptotically, the growth of wealth is equal to the self-generating accumulation rate:  $\dot{W}/W = s_W r$ .

The labour-wealth ratio  $L/W$  and the functional income distribution are linked by definition:

$$\lambda = \frac{w \cdot (L/W)}{w \cdot (L/W) + r}.$$

At given factor prices, the labour share increases with the labour-wealth ratio.

## ***1. Assumptions on technology***

We want to examine the dynamics of Equation (1) in the context of a growth model. First of all, let us assume labour-augmenting, Harrod-neutral technical progress at rate  $g$  for the volume of labour measured in efficiency units:

$$\dot{L}/L = g .$$

Production is based on neoclassical technology using the two homogenous primary factors, capital ( $K$ ) and labour ( $L$ ):

$$Q = F(K, L).$$

The production function is linearly homogeneous and displays decreasing marginal returns that can vary between zero and infinity. We consider the labour force a given quantity. Let  $k := K/L$  be the capital intensity of production. Under these conditions, output per effective unit of labour is a function of capital intensity only:

$$Q/L = F(K/L, 1) := f(k).$$

## ***2. The closed economy***

For an economy with no external relations we have  $W = K$ , and the labour-wealth ratio is the inverse of capital intensity,  $L/W = 1/k$ . In effect, we have a version of the Solow growth model. The capital intensity  $k$ , as well as the service price of labour,  $w$ , and the rate of return on capital  $r$ , all converge to stationary equilibrium values.<sup>4</sup>

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<sup>4</sup> See, for example, Barro and Sala-i-Martin (1995) or Maußner and Klump (1996).

This outcome is easy to generalise. Since  $W = K$  in the closed economy, in (1) a significant share of primary savings is maintained whenever the system converges to a steady state with constant capital intensity and constant factor prices (per unit of efficiency). This is true in considerably more complex models than the one outlined here. Our question concerning the labour share and the share of primary savings then is identical to the fundamental question concerning the conditions for the existence of a stable growth equilibrium such as is covered extensively in the literature, but has no other special features.

Naturally, the global economy as a whole is a closed economy. By contrast, it makes more sense to describe Europe's national economies as segments of the global economy, ie as small open economies. In this case, we may assume that the rate of return on capital is determined by the dynamic equilibrium of the global economy as a whole, and is exogenous to the individual national economy.

### ***3. The small open economy with perfect capital mobility***

In the open economy, accumulation is not confined to the domestic capital stock, and net claims to non-residents can be acquired. For domestic wealth, therefore,  $W = K + B$  holds,  $B$  being the (positive or negative) net external financial position. We want to assume the case of the small open economy which is a price-taker on the world capital market. Capital is perfectly mobile, whereas labour is immobile. The real rate of return will then be exogenous,

$$r = \bar{r} .$$

This modelling framework was first analysed by Schröder (1972). In the domestic economy, the capital input will be such that marginal productivity net of depreciation equals the real rate of return  $r$ , thereby determining the capital intensity in the home country. This capital intensity is determined as the solution  $k = \bar{k}$  to the equation:

$$\frac{\partial F}{\partial K} = f'(k) = \bar{r} . \tag{2}$$

If, for any given effective volume of labour supply  $L$ , domestic wealth is insufficient to achieve  $K/L = \bar{k}$ , capital is imported. Conversely, a surplus of domestic savings leads to capital exports. Thus, the growth of an economy's wealth is decoupled from the productively deployed capital stock, in the same way as the domestic product and the national income may diverge.

Since the capital intensity is determined by the world market rate, and the effective volume of labour increases at rate  $g$ , the capital stock and real output must grow at the same rate:<sup>5</sup>

$$\frac{\dot{K}}{K} = \frac{\dot{L}}{L} = \frac{\dot{Y}}{Y} = g.$$

The dynamics of wealth formation can now be examined more closely. Domestic capital intensity determines the real wage rate per efficiency unit:

$$\bar{w} = f(\bar{k}) - \bar{k} f'(\bar{k}).$$

Both factor prices in equation (1) are thus constants.<sup>6</sup> The growth rate of wealth can therefore be depicted as a linear function of the labour-wealth ratio, for which

$$\frac{\dot{W}}{W} = s_L \bar{w} \frac{L}{W} + s_W \bar{r}.$$

The role of primary savings in asset formation is preserved if the labour-wealth ratio attains a stationary value. This means  $\dot{W}/W = \dot{L}/L$  and thus

$$s_L \bar{w} \left( \frac{L}{W} \right) + s_W \bar{r} = g.$$

The solution to this equation gives the steady state value for the labour-wealth ratio:

$$\left( \frac{L}{W} \right)^* = \frac{g - s_W \bar{r}}{s_L \bar{w}}.$$

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<sup>5</sup> One major analytical advantage of the small open economy model used here is that this path of growth is achieved without any transitory dynamics.

<sup>6</sup> What is constant here is the compensation *per unit of efficiency*. For Harrod-neutral technical progress, real *hourly wages* rise at rate  $g$ .



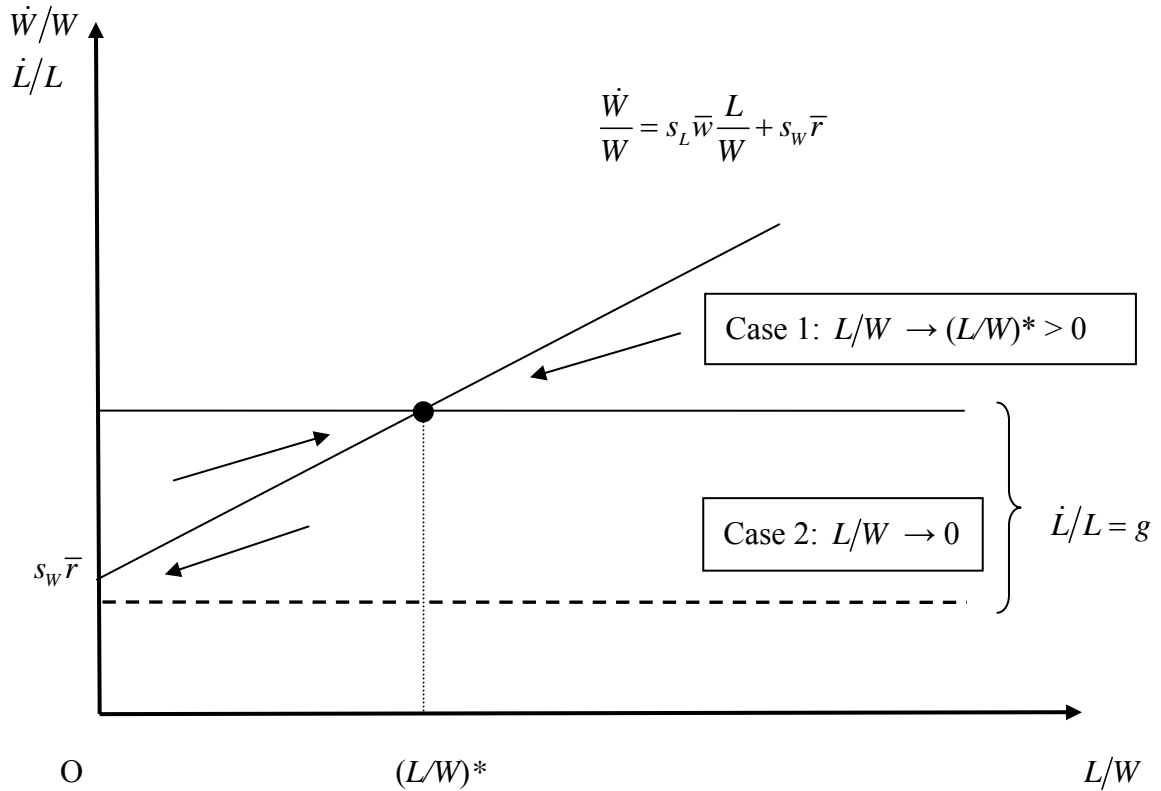
The condition for the existence of a positive steady state is simply

$$g > s_w \bar{r} . \tag{3}$$

On the right-hand side of the equation,  $s_w \bar{r}$  is the self-generating accumulation rate, the growth rate of wealth generated by wealth income alone. If the growth rate  $g$  of the domestic product is below this hurdle rate, the labour-wealth ratio, along with the labour share in national income, must converge to zero.

The graphic analysis provides further insights. In Figure 1, the self-generating accumulation rate  $s_w \bar{r}$  which would be sustained even if there were no primary savings is the intercept of the straight line that describes wealth growth. If the underlying growth dynamics are sufficient, this curve intersects the horizontal line  $\dot{L}/L = g$  from below (Case 1, solid line). Hence, if a non-zero dynamic equilibrium exists, it is always stable. If  $L/W$  is above the equilibrium, wealth will grow faster than effective labour and the labour-wealth ratio falls. Conversely, it rises if  $L/W$  is below equilibrium.

Figure 1  
Wealth dynamics and equilibrium labour-wealth ratio



If, by contrast, the rate  $g$  of productivity growth is below the intercept of the function governing the growth of wealth (Case 2, dashed line), the labour-wealth ratio falls further and further. Asymptotically, the growth rate of total assets is reduced to the self-generating accumulation rate  $s_w \bar{r}$ . At the same time, the labour share – the share of wages in national income – approaches zero. The decline in the labour share, naturally, does not imply falling real wages; rather, it means that, because wealth is growing faster than labour income, the latter accounts for an ever smaller share of national income. It is important to see that the share of labour *in domestic production* remains constant throughout: this share is determined by  $\bar{r}$  and the factor price frontier, ie by technology. However, our focus is on  $\lambda$ , the share of labour in national income. This is the more relevant concept for distributional and tax policy considerations, and its evolution follows the dynamics of wealth accumulation in its two guises, domestic capital and foreign assets.

We need to interpret this result with care. It cannot be expected that the rate  $g$  of productivity growth in the domestic economy will remain forever below the rate that characterises the international environment. Technology diffuses, and although steady state differences in the level of productivity are conceivable, steady state differences in productivity growth rates are not. An ever falling wage share will induce endogenous reactions in the rates of productivity growth and accumulations. Our model treats the growth rate of output and labour income as exogenous and works out the dynamic consequences for labour shares. The results are valid for as long as this pattern prevails. In Section IV we will delve deeper into the question of what conditions the savings and growth pattern we observe.

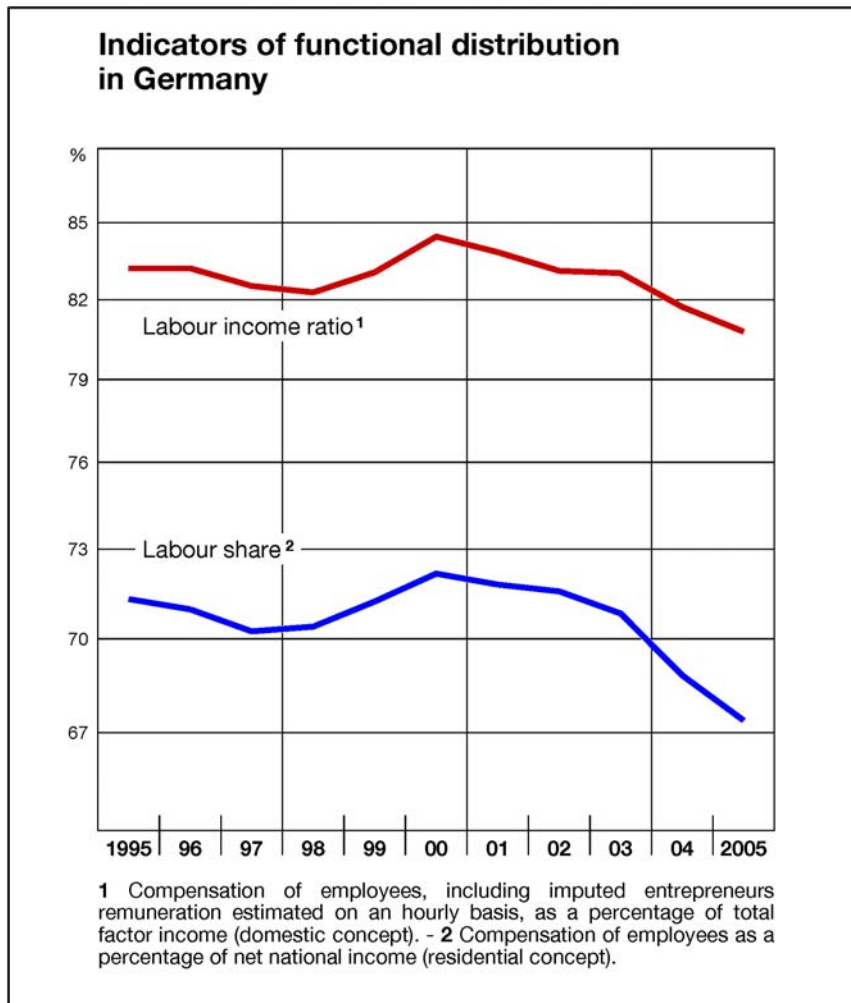
### **III. DEVELOPMENTS IN GERMANY**

In recent years, Germany has seen a rather marked decline in the share of labour income in national income. The upper half of Figure 2 depicts the labour income ratio, ie wage income including imputed entrepreneurs remuneration as a percentage of total domestic factor income. Since its peak in 2000, it has declined by almost 4 percentage points, to a level of 80.9% in 2005. Apart from a cyclical component, there also seems to be a longer run downward trend. The lower panel depicts the labour share, the compensation of employees (not including imputed entrepreneurs remuneration) as a percentage of net national income. The downturn has been even stronger, from 72.3% to 67.5%, due to both the rise in the number of self-employed persons and the growing gap between the average working hours of the self-employed and those of employees.<sup>7</sup>

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<sup>7</sup> For a detailed explanation, see Deutsche Bundesbank (2002).

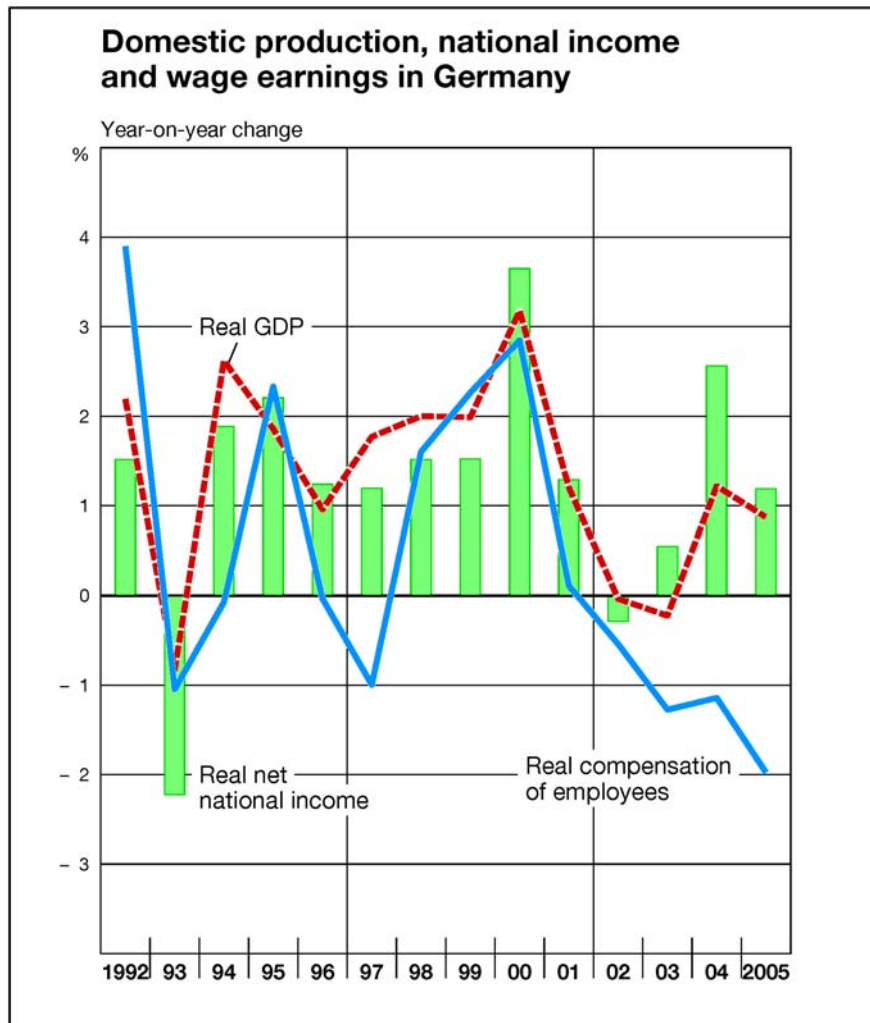
Figure 2



Source: Deutsche Bundesbank

This development has been associated with a period of poor economic performance since the mid-nineties. Figure 3 shows the growth of real national income, real gross domestic product at factor costs and real compensation of employees since German reunification. It may be noted that since 2001, net national income has been growing at a higher rate than both labour income and domestic output, and that real compensation of employees is actually decreasing.

Figure 3

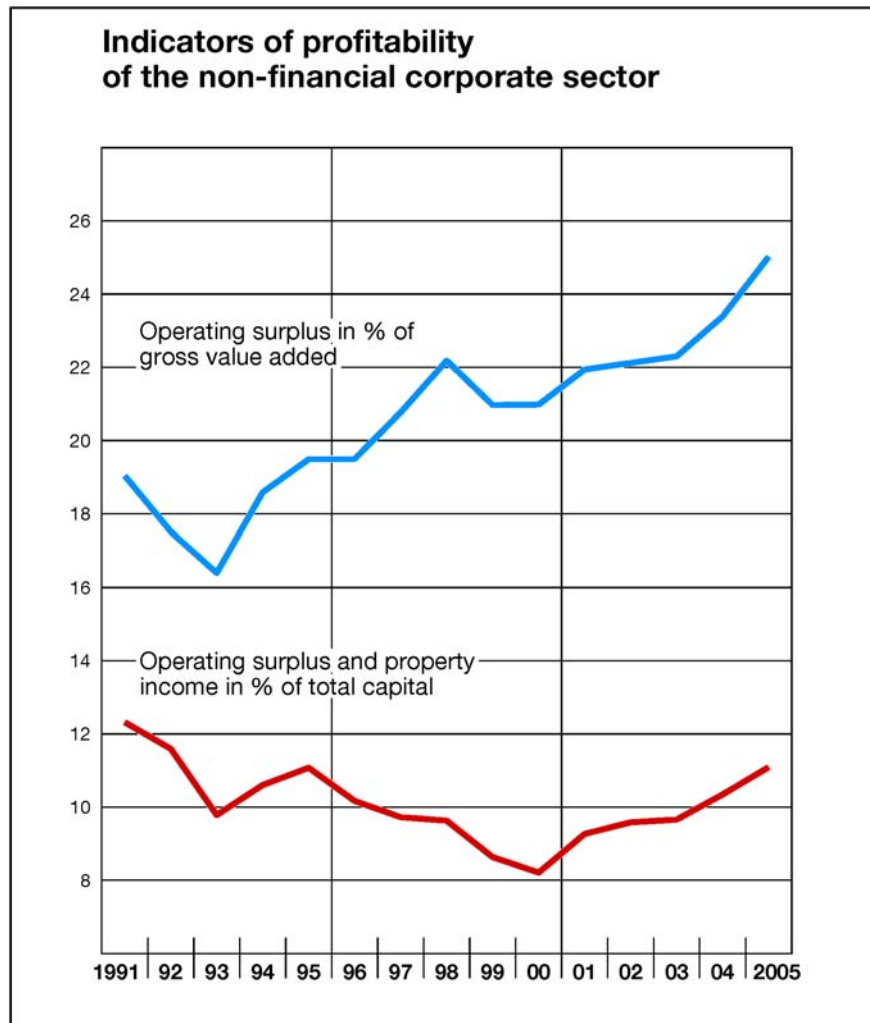


Source: Deutsche Bundesbank

It is therefore worthwhile to investigate whether the key condition (3) is met in Germany. To this end, we need to quantify the real rate of return on capital, the long run real growth rate of domestic product and the marginal rate of savings from wealth income.

The relevant rate of return is not the world market interest rate. The total return on capital generally exceeds the return on credit because the former contains liquidity and risk premia of varying levels, in addition to real economic rents. It is this (higher) yield that governs the growth of financial stocks. The bulk of German wealth is still held in the form of German assets. In order to make a conservative assessment, we therefore use the German profit rates as a benchmark, not the higher US rates.

Figure 4



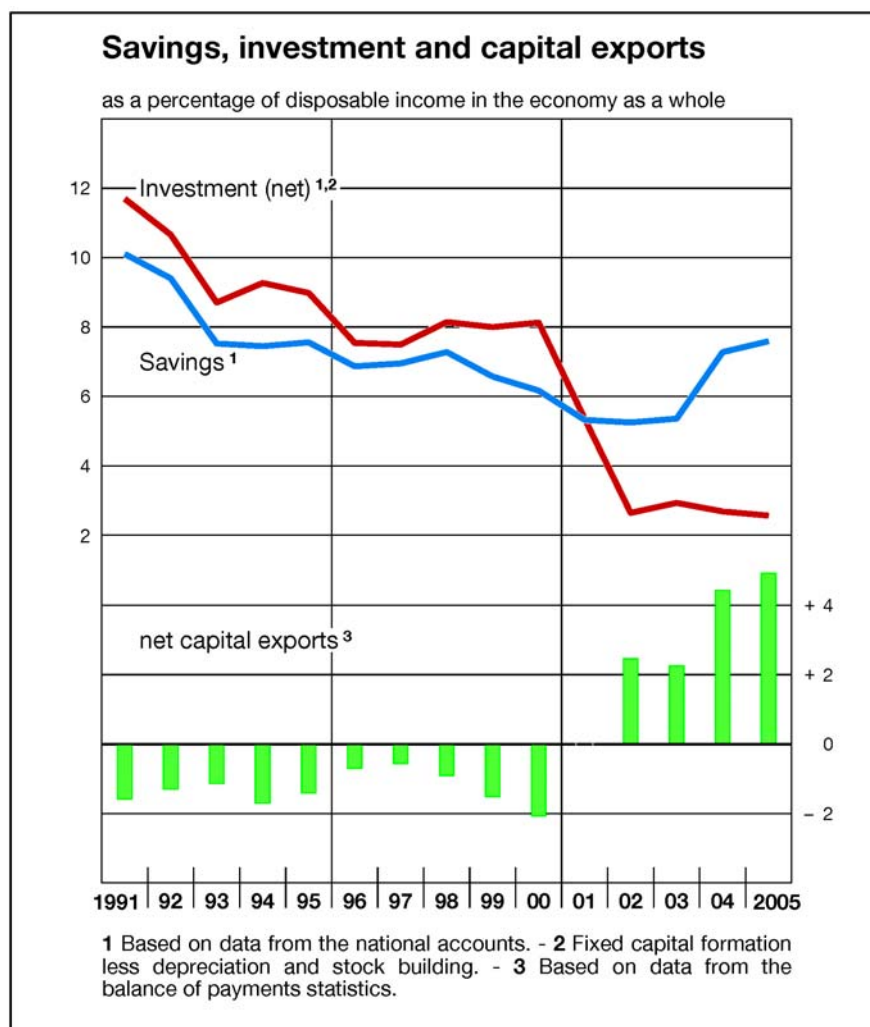
Source: Deutsche Bundesbank

The upper panel of Figure 4 shows the return on turnover, and the lower part depicts the pattern of the overall return on capital of the German non-financial corporation sector since the early 1990's. This relates corporate profits plus interest paid on borrowed money (or alternatively the sum of operating surplus and interest income received) to the value of total assets. Once the reunification effect wanes, this rate hovers around the 10% mark, picking up since 2000.

Next we need to assign a value to the savings ratio from investment income. A direct statistical breakdown of overall savings into primary and wealth-induced savings is not available. Following Kaldorian lines of thought, the savings ratio of “capitalists” would be higher than that of “workers”. In reality, of course, the same households typically receive both types of

income. The ratios  $s_L$  and  $s_W$  then determine the sensitivity of the aggregate savings rate to shifts in the income shares. We may assume that, at the micro level, the product  $s_W r$ , the rate of self-generating accumulation, is an increasing function of individual wealth. The persistently high preference of wide segments of the public for (non-interest-bearing) private property ownership has to be taken into account. Furthermore, the attainable return on wealth is likely to be positively correlated with the size of assets. Ultimately, the scope for savings becomes larger with higher income.

Figure 5



Source: Deutsche Bundesbank

In Germany, both the overall and private savings ratios declined in the 1990s. Households' savings according to ESA 95, which also includes the private purchase of residential property and its financing, fell between 1991 and 2000 from around 13% to less than 10% of house-

holds' disposable income, and was thus more than 3 percentage points down on its level at the time of German unification.<sup>8</sup> The sectoral savings trend had a clear impact on overall saving. As a percentage of total disposable income, the domestic sectors' savings rate fell by 4½ percentage points between 1991 and 2001 and then hovers around 5½% until 2003. Recently, the savings rate has picked up again, to 7.7% in 2005. This may be due to rising doubts concerning the sustainability of the present public health and pension systems, as well as to higher dispersion in the personal income distribution. The development of overall savings and investment (all sectors) can be seen in Figure 5. Since 2002, there has been a large and growing gap between national savings and investment, pointing to the increasing significance of net capital exports.

The Federal Statistical Office's income and expenditure survey (EVS), conducted every five years, allows us to break down savings behaviour by socioeconomic characteristics. According to the 2003 wave, the savings ratio of self-employed persons was 20.9%, whereas it is much lower for salaried employees (13.5%) and workers (12.5%). This is not only because entrepreneurs and self-employed persons have a greater ability to save, but also because they have to provide for their own pension and their earning prospects are more volatile and uncertain. If households are arranged in order of available income, the savings ratio of the group in the highest income category, that of between € 5,000 and € 18,000 in disposable income per month, is 22.2%, whereas in the two lowest income categories (less than € 900 per month and € 900 – € 1,300 per month) the figure is even negative. The survey shows, moreover, that German households' financial assets are concentrated in the higher income brackets.

Ultimately, the numbers shown in Figure 3 allow us to get an empirical equivalent for the exogenous rate of domestic growth. Between 1992 and 2004, the average rate of growth of real compensation of employees was 0.5%, whereas real GDP grew by 1.4% on average. Since the peak of the last cycle in 2000, the situation has been even worse: The average growth rate of real labour income since the year 2001 is down to -0.9%, and GDP has been growing at a bare 0.6% meanwhile. The growth rate of national income is still a positive 1.1%. However, it is quite clear that it is GDP and wage income which are relevant for our question, not the national income that also contains the income from investment abroad.

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<sup>8</sup> See Deutsche Bundesbank (2004a).



Depending on how exactly we parameterise the expression (3), we see that the situation is critical. If we set a conservative 15% for the savings ratio out of wealth income, and if we assume a rate of return on capital of 10%, we need a long term real growth rate of 1.5% simply to avoid the labour share converging to zero. This hurdle rate is not attained by the growth of net national product or labour income, in either the medium or longer term. In fact, the figure of 1.5% is very near to the current estimates for the growth of potential output in Germany.<sup>9</sup>

And it is important to be clear that it is not enough to only just surpass the hurdle rate. A glance at Figure 1 shows that if the difference between the growth rate and the rate of self-generating accumulation is positive but small, this bodes ill for society: the labour share would settle at an extremely low level. This has consequences also for fiscal policy. It has been noticed that the macroeconomic base for income taxation in Germany is eroding.<sup>10</sup> It is far easier to tax wage income than capital income – as capital is highly mobile and labour is less so. In the recent past, the decreasing wage ratio has induced a shift to indirect taxation, and this trend is likely to continue if expenditure-based consolidation is not given priority. There are obvious implications for the distribution of after-tax income.

#### **IV. PROBING DEEPER: GLOBALISATION AND DOMESTIC GROWTH**

The theoretical framework laid out in Section 2 is robust, in a sense that there are few critical assumptions. The most important is a constant savings ratio and a given rate of productivity growth. In analytical terms, this can be interpreted as a short- to medium term approximation of any more complex model. But confronted with a certain empirical parameter configuration, it is not enough to translate this pattern into the projected evolution of the functional distribution, as we have done so far. In order to understand the process, we need to endogenise those parameters.

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<sup>9</sup> On this, see, for example, Kamps, Meier and Oskamp (2004). These authors estimate that the growth rate of potential output fell quite steadily from 2% in 1994 to no more than 1¼% in 2002 and 2003.

<sup>10</sup> See Deutsche Bundesbank (2006), pp. 52.

It is our conviction that the adequate explanatory context is the ongoing process of globalisation. Before reunification and the demise of the iron curtain, West Germany could be considered a mature economy near its steady state, in line with other major trading partners. The economic integration of Eastern European and East Asian Economies during the nineties has changed this situation drastically. Germany's economic environment now is a world economy endowed with a capital stock far *below* steady state, with high rates of return to capital and low wages. We will argue that in this situation, high savings, slow domestic growth, the accumulation of a positive net external position and a divergence of domestic product and national income is a natural outcome.

We use the dynamic current account model of Obstfeld and Rogoff (1996) that explains the savings and capital accumulation behaviour of a small economy jointly. It can easily be recast into the stochastic framework common to business cycle or monetary policy analysis.<sup>11</sup> Essentially, it is a Ramsey-model for a small economy that takes the world market interest rate as given, and is free to accumulate a positive or negative net foreign position, in addition to domestic capital.

The utility of the representative agent refers to current and future consumption:

$$U_t = \sum_{s=t}^{\infty} \beta^{s-t} u(C_s), \quad (4)$$

with  $u(\cdot)$  increasing and concave. Domestic labour input  $L$  is fixed, and we normalise it to 1, such that the values for the capital stock and the capital intensity are the same. Domestic output at any date  $t$  is given by a production function:

$$Q_t = A_t F(K_t),$$

where  $K_t$  is the capital stock allocated in the domestic economy,  $A_t$  is a time varying productivity parameter, and the function  $F(K_t)$  is concave, with a first derivative that varies smoothly between  $\infty$  and 0. Capital is perfectly mobile between the small country and the rest of the world, and funds can be borrowed and lent at rate  $r_t$ . At date  $t$ , the economy starts out

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<sup>11</sup> Obstfeld and Rogoff (1996) work out a stochastic version, see also Heer and Maußner (2005) for more general aspects of DSGE modelling.

with predetermined asset stocks: capital  $K_t$  and net foreign assets  $B_t$ . Ignoring government expenditures, the budget constraint of the domestic economy in all periods  $t$  is given by

$$B_{t+1} = (1 + r_t)B_t + A_t F(K_t) - C_t - (K_{t+1} - K_t). \quad (5)$$

Using (5) to substitute for the consumption levels in eq. (4), we obtain two necessary conditions for optimality that must be fulfilled in each period:

$$\frac{\beta u'(C_{t+1})}{u'(C_t)} = \frac{1}{1 + r_{t+1}}, \text{ and} \quad (6)$$

$$A_{t+1} F'(K_{t+1}) = r_{t+1}. \quad (7)$$

Ultimately, the following condition is needed:

$$\lim_{T \rightarrow \infty} R_{t,T} B_{T+1} = 0, \text{ with } R_{t,T} = 1 / \prod_{s=t+1}^T (1 + r_s). \quad (8)$$

Equation (6) is the well-known consumption Euler equation that links current and future consumption. The expected growth of marginal utility is to be a decreasing function of interest. With an elevated world market rate  $r_{t+1}$ , consumption is chosen such that expected  $C_{t+1}$  is high in comparison with  $C_t$ , and the following period's expected marginal utility is low compared to the current period. Equation (7) characterises static efficiency of capital allocation restating equation (2) in the new context. Equation (8) is a transversality condition that makes sure that the expected present value of consumption is neither higher than the sum of initial resources and the expected present value of all future production - the foreign creditors would not permit this - nor lower, as this would not make full use of consumption opportunities.<sup>12</sup>

The world economy as such is a closed economy. With assumptions analogous to those made for the small economy above, it will behave according to the standard Ramsey model.<sup>13</sup> The

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<sup>12</sup> In a stochastic version of the model, with the productivity parameter  $A_t$  disturbed by a random shock, equation (6) would hold only in expectations. Equation (7) would refer to expected marginal productivity on the left hand side. In addition to the real interest rate, the right hand side would also contain an equity risk premium that depends on the covariance of the productivity shock term and marginal utility of consumption. See Obstfeld and Rogoff (1996), Ch. 2, and more extensively, Woodford (2003), Ch. 2.

<sup>13</sup> See, for example, Barro and Sala-i-Martin (1995), Ch. 2. For a discrete time version see Obstfeld and Rogoff (1996), Ch. 7, for the stochastic case see eg. Woodford (2003) or Heer and Maußner (2005).

first order conditions (6) and (7) are valid in the global context, too, but the interest rate is endogenous on this scale. It is determined such that savings equals investment at all times.<sup>14</sup> Let  $K_t^W$  be the capital intensity in the world economy, and  $K^*$  be the steady state capital intensity in the world economy. Let us assume that preferences and the steady state capital intensities in the domestic economy and the rest of the world are the same.

What happens if, in period  $t_0$ , a small country at or near the steady state  $K^*$  merges into an economic environment with capital intensity far below  $K^*$ ? As the capital stock of the world is relatively low, the world market interest rate according to equation (7) will be high relative to the pre-integration value in the small domestic economy. This induces high savings rates: following eq. (6), world market consumers defer consumption to later periods. The growing consumption of the world economy during transition is accompanied by a growing capital stock.

Upon integration in period  $t_0$ , the small open mature economy becomes part of this process. We assume that the consumption of period  $t_0$ ,  $C_{t_0}$ , has already been determined and that  $B_{t_0} = 0$ . Analytically, we may distinguish two stages of adjustment. The first stage is the adjustment of the small open economy to the relative prices prevailing in the world economy. The high marginal productivity and the high interest rate on the world market enforce a high marginal productivity of domestic capital. As  $F'(K_{t_0}^W) > F'(K_{t_0})$ , domestic wealth owners switch from holding domestic real capital to foreign assets. Equation (7) in conjunction with equation (5) determines the induced capital export:

$$B_{t_0+1} = K^* - K_{t_0+1}^W.$$

This goes along with decreasing wages, as the marginal productivity of labour is tied to the capital intensity. On the other hand, real returns of wealth have increased in line with the high productivity abroad. The result is a falling labour share in national income. The savings rates remain at a high level all the while, as the consumption profile is dictated by equation (6), and the high returns of capital demand a shift from current to future consumption.

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<sup>14</sup> This implies that a different transversality condition is needed: the relevant restriction in the closed economy relates to the present value of the real capital stock.

The second stage of adjustment is the move towards the common steady state, jointly with the world economy. The model predicts that after the domestic capital stock has been adjusted downward (literally speaking: within a single analytic period of time) and real output has fallen concomitantly, the small open economy will grow in line with the world economy from period  $t_0 + 1$  onward. In that second stage of adjustment, growth rates will be positive and high, and the labour share need not fall any further.

During the entire adjustment process, though, real wages will be lower than before, and the labour share will never again reach the original value. The shift in the income distribution survives into the new steady state. This is because in stage 2, both capital accumulation and the time profile of marginal utility are in line with the international environment, whereas the initial wealth is considerably higher. Part of this wealth will be brought forward into the distant future and induce a difference between national income and national product that persists even when factor prices and output have reached their old levels. As labour input is normalised to 1, the labour share of income in the new steady state is given by:

$$\lambda^* = \frac{w^*}{r^* \cdot B^* + Q^*} = \frac{1}{1 + (r/w)^* (K^* + B^*)},$$

which is less than in the old dynamic equilibrium with  $B_{t_0} = 0$ .

We argue that currently stage 1 of adjustment is relevant for Germany. In the reality of developed industrial economies, the adjustment of the capital stock cannot happen instantaneously. There are clear limits to the mobility of installed real capital, as opposed to financial capital, and there is downward rigidity of wages. Therefore, the period of adjustment stretches over a longer time interval. Within that time interval, the predicted decrease of the capital stock will translate into sluggish investment and high capital exports. It does not really matter whether these take the form of foreign direct investments or financial flows. The predicted reduction of real output, followed by stronger growth, will show up as a reduced rate of growth of potential output. And the predicted downward adjustment of real wages will take the form of a persistent decrease of labour income, resulting both from falling real wages and increasing unemployment. But all the while, equations (6) and (7) will act as an attractor.

## V. SOME POLICY CONSIDERATIONS

Figure 2 indicates a marked decrease of the labour share in recent years, mainly due to higher unemployment and a rather moderate growth of nominal wages, leading to an absolute decrease in the real compensation of employees. This is well in line with one of our main predictions from the analysis of the consequences of globalisation for growth and distribution. Also another major prediction bears out. Since the beginning of the recent downturn in 2001, the German economy is exporting capital at a rapidly increasing pace. The development is depicted in Figure 5. The long run consequences of this development, following the mechanics traced out in Section II, will be a further slow, but sustained fall of the labour share, due to a growing net external position.

In an open economy, it is possible for the domestic product and residents' income to diverge. As residents can invest their wealth abroad in the same way as non-residents can invest in the home country, there is no clear correspondence between national wealth and the domestic capital stock. Examples of a divergent development of this kind are, on the one hand, Switzerland, which obtains a large part of its national income as wealth income from abroad, and, on the other, Ireland, where domestic product and national income diverge widely owing to heavy foreign investment.

Domestically, capital is allocated only if and to the extent that expected profitability attains the cost of capital given by world market returns. The rest of national savings flows outward. The wealth of an open economy, as well as the capital income earned abroad, grows at a certain minimum rate that is fundamentally independent of domestic output growth. The rate of self-generating accumulation depends solely on the rate of return on capital on the world market and on marginal savings from wealth income. In an open economy, especially in one at a mature stage of economic development, investors successfully keep their rates of return at a permanently high level because some of their assets are working abroad.

By contrast, the largely immobile wage and salary earners are bound "come what may" to the development and capitalisation of the domestic economy – as experience reveals, migration is an option only for relatively few people. We have seen that this creates a problem if the

growth of an economy is lagging behind. Accumulation from wealth income then gains increasing weight and the labour share declines, accompanied by capital exports. This pattern is very general and robust; it is not linked to specific details of our two models.

A persistently declining labour share and a steadily increasing weight of self-generating accumulation is not only inconsistent with distributional policy objectives but also a cause for concern in meta-economic terms: the cohesion of society and the acceptance of the economic system are jeopardised if the economic prospects of the suppliers of capital and labour are decoupled. In this context, the economic position of the median voter becomes critical. With high inequality of income, this median voter will prefer redistribution policies, thereby lowering the growth prospect further: a vicious circle begins.

The issue ultimately roots in the pattern of global development, and therefore there will not be a quick fix. Traditional transfer-oriented social policy applying the "Robin-Hood" method – robbing the rich to give to the poor – is doomed to failure. There is no "opting out" of globalisation, either. Describing the problem, however, gives us a key to its solution, at least in general terms. Because of the direct relationship between economic growth and the long-term development of the labour share, the cherished political conflict between growth and distribution turns out to be a phantom. In this situation, a growth-oriented economic policy is in fact a very effective form of long term social policy. It is harder for economies at or near the technological frontier to keep up high growth rates than for transition countries, and clinging to traditional products and methods of production will be utterly unsuccessful. Theoretically and empirically, it has been shown over the past two decades that there are two core engines growth for developed economies: the accumulation of human capital and technological innovation.

Attempts to foster innovation in Germany have to deal with two countervailing forces: a rapidly aging population and a high regulatory density with respect to many aspects of economic activity, together with politically induced tastes for or against certain sectors and technologies. If nuclear energy, green biotechnology, reproduction medicine, military equipment, chemical industry, cars, airplanes and even trains are all "bad" or need to be politically contained, then what else is left? The first of these countervailing forces can be dealt with – if at all – only in the very long run. As to the second, we can leave the moral high ground, and sooner or later we will. Being creative in a changing world and making use of new possibilities is stressful, but finally will more than compensate for the loss of the old ways and – for

the individual as well as for society as a whole – can be a source of immense satisfaction. But clearly, not everybody will have that chance.

Next, the education system, where human capital is largely formed, is an especially promising field for effective social policy in the context of globalisation. Education pays, in monetary as well as in non-monetary terms, with private benefits and additional social returns. It is an investment that promotes aggregate growth<sup>15</sup> as well as the relative economic position of individuals. On the personal level this type of investment is irreversible and non-tradable and thus highly risky. Furthermore, the rate of depreciation may be high and increasing. Past attempts to give higher education certificates to as many young people as possible without really increasing capacity were motivated by redistribution objectives and equity considerations and, in the eyes of many, have led to a lamentable decline in standards of schools and universities.

This tendency needs to be reversed. The education system in Germany is not simply underfunded, it is inefficient, and spending patterns are misled.<sup>16</sup> Too little public funds are allocated to day-care centres, preschools and primary schools. An alarmingly large group of children, many of them with a migratory background, enters the secondary school stage without the minimum prerequisites and fail. On the other end of the road, university education is still almost free of charge in Germany, despite recent attempts to introduce some moderate fees. The system of state universities, where middle class students are largely among themselves, amounts to nothing less than a tax subsidy for the more affluent parts of the population. Much of this system could usefully be decentralised and privatised, with grants and credits for promising, but poor students.

With their labour, workers supply a specific form of capital: their knowledge, skills, experience and motivation. A new focus on the quality<sup>17</sup> of the education and training systems that goes beyond election speechmaking therefore not only has the potential to increase the rate of growth and thus the labour share but will also transform wage and salary earners into “capitalists”, ie owners of human capital – a valuable and internationally sought category of assets.

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<sup>15</sup> See Mankiw, Romer and Weil (1992) and OECD (2003) on the significance of human capital accumulation for long run growth.

<sup>16</sup> A survey on this topic is provided by Deutsche Bundesbank (2004b).

<sup>17</sup> The need of quality in education as opposed to numerical "output" is addressed by Wößmann (2003).



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