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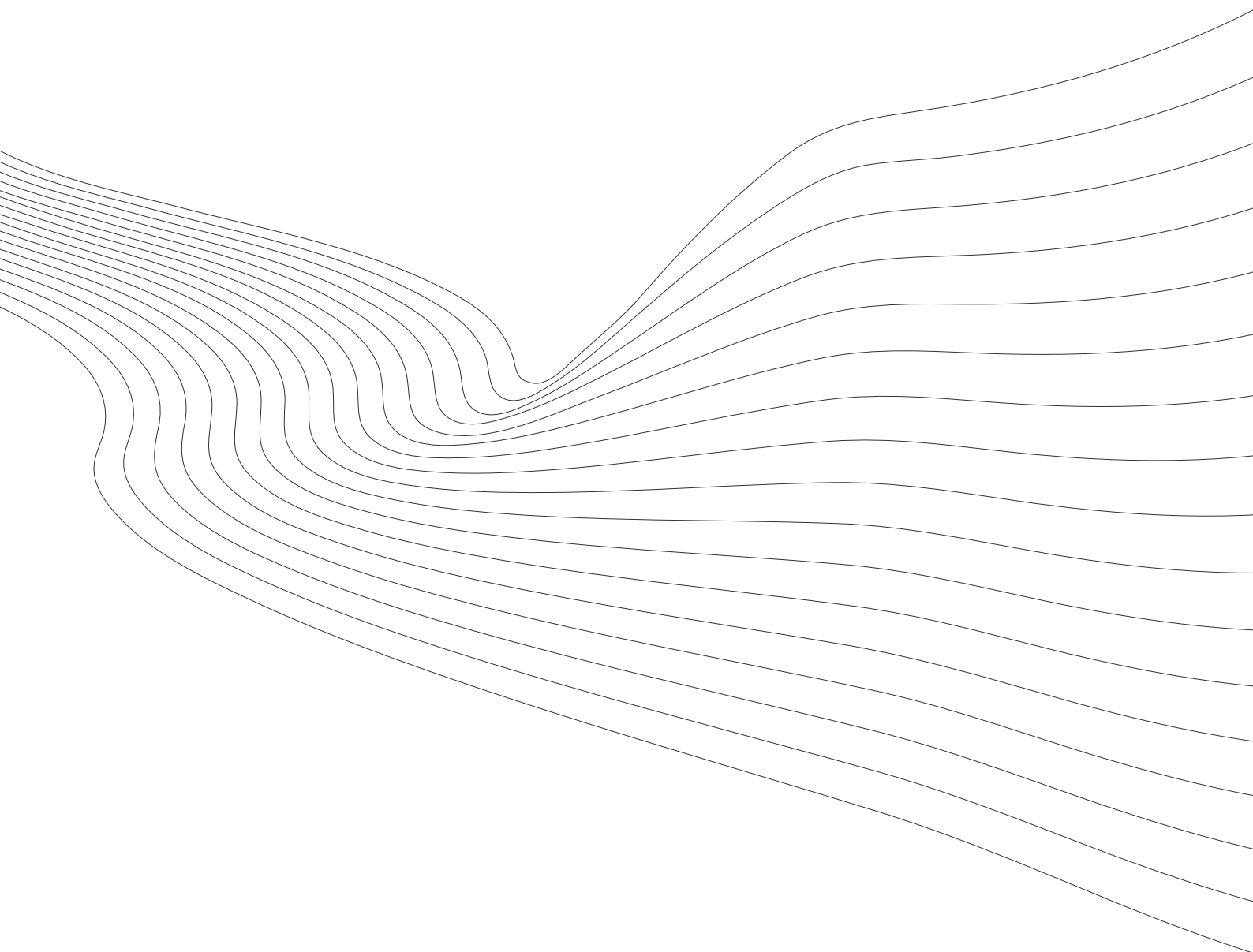
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Distribution and growth in demand and productivity in Switzerland (1950-2010)

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Abstract

I investigate whether demand growth and productivity growth in Switzerland have benefitted from the wage moderation that set in at the beginning of the 1990s in this country. The results suggest that the Swiss demand regime is profit-led while the productivity regime is wage-led. This means on the one hand that wage moderation has added almost one percentage point to GDP growth after 1990. On the other hand, it has also contributed to the drop in productivity growth. The latter effect, however, is weak.

1. Introduction

The question how real wage increases affect employment and output belongs to the most controversial questions in economics. Economists in the neoclassical tradition would point to the fact that the aggregate demand curve for labour is downward-sloping so that a real wage increase reduces employment *ceteris paribus*, which also lowers output via the production function. Keynesians on the other hand would claim that wages are not only a cost factor, but also a determinant of aggregate demand. Therefore, a rise in real wages might promote employment and output by supporting a higher level of demand.

The latter argument is not straightforward even from a Keynesian perspective, however, since a higher wage share in total income, while probably stimulating the demand for consumption goods, will reduce the demand for investment goods if investment is dependent on profits as well as the demand for export goods if the rise in real wages impairs the

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international competitiveness of the economy. Bhaduri and Marglin (1990) have designed a model in the Kaleckian tradition in which this becomes clear.

Whether or not a rising wage share – in other words, a change in the functional distribution of income in favour of the factor labour – promotes employment and output (growth) thus becomes an empirical question according to the Bhaduri-Marglin model. If it does, the demand regime is said to be ‘wage-led’; otherwise it is called ‘profit-led’.

Over recent years, a number of empirical studies have aimed at determining whether the demand regime is wage-led or profit-led in certain countries. Thus far, the main focus has been on seven countries: Austria, France, Germany, Japan, the Netherlands, the U.K. and the U.S. (see Bowles and Boyer, 1995; Stockhammer and Onaran, 2004; Naastepad, 2006; Naastepad and Storm, 2006-7;¹ Ederer and Stockhammer, 2007; Stockhammer and Ederer, 2008; Hein and Vogel, 2008, 2009; Onaran et al., 2011; Stockhammer et al., 2012).² From these studies, the broad picture emerges that the “demand regime in large and medium-sized open economies, as in Germany, France, the UK and the USA, tends to be wage-led, whereas for small open economies, as the Netherlands and Austria, some studies have obtained profit-led results” (Hein and Tarassow, 2010, p. 750).

In this paper, my aim is to determine whether the demand regime in Switzerland – a country that has not been investigated so far (yet has very good data availability)³ – is wage-led or profit-led. In terms of modelling I follow Naastepad (2006). The beauty of the Naastepad paper is twofold. First, of all studies mentioned above, it exhibits the closest link between the theoretical and the empirical model. Second (and even more importantly), it supplements the analysis of the demand regime by an analysis of the productivity regime. This means that besides the effects of changes in the functional income distribution on demand growth, the effects on productivity growth and the interaction between the two are also investigated.⁴

¹ This study also examines Italy and Spain.

² Stockhammer et al. (2009) focus on the Euro area as a whole. Very recently, Stockhammer and Stehrer (2011) and Onaran and Galanis (2012) have begun taking other OECD and non-OECD countries into consideration.

³ Most studies mentioned above use OECD data for the period 1960-2000 or 1960-2005. Swiss data on the other hand are available for 1950-2010, thus adding 15-20 degrees of freedom and capturing for the first time the ‘Great Recession’.

⁴ Hein and Tarassow (2010) also model the productivity regime empirically. Contrary to Naastepad (2006), however, they take estimates for the demand regime from the literature.

2. Data

Table 1 reports descriptive statistics for all variables entering the model.

<Insert Table 1>

3. The model

Demand is the sum of private consumption (c), investment (i) and net exports ($e - m$) (see eq. A.1 in the appendix).⁵ Wage and profit receivers are assumed to have different propensities to save (eq. A.2). If the wage earners' propensity to save (σ_w) is smaller than the profit receivers' propensity (σ_π), a redistribution of income towards labour increases consumption demand.

Investment is assumed to depend positively on the profit share (π), output (x), and other factors like the 'animal spirits' of entrepreneurs (b) (eq. A.3).⁶ Exports on their part depend positively on the level of world demand (z) and negatively on the ratio of domestic to foreign real unit labour cost (v/v_f) (eq. A.4).⁷ Imports, finally, are assumed to be a linear function of output ($m = \zeta x$).

Under these premises, (A.1) can be rewritten as (A.5), μ^{-1} being the Keynesian multiplier. The growth rates of x and μ are given by (A.6) and (A.7). We can derive the equation for the demand regime by calculating the growth rates of investment and exports from equations (A.3) and (A.4) and inserting them into (A.6). If (A.7) is also inserted into (A.6) and use is made of (A.8), we arrive at the final expression (A.9).

Equation (A.9) shows that the demand regime (DR) is driven by two forces: the growth of international demand (\hat{z}) and the growth of real unit labour cost ($\hat{v} = \hat{w} - \hat{\lambda}$). The term C describes the impact of wage policy on demand ($d\hat{x}/d\hat{w}$).⁸ If C is greater than zero the

⁵ Government consumption is assumed away because it should not be affected by changes in the income distribution.

⁶ Hein and Tarassow (2010) criticise that technical progress has no direct positive effect on investment in this specification. They capture this effect by including productivity growth in their capital accumulation equation.

⁷ I follow Naastepad (2006) in assuming that $v_f = 1$ and that $\hat{b} = 0$.

⁸ Note that we have to *assume* that real wage growth is exogenous for the purpose of this paper while in reality it may not be. But if one wants to determine the impact of real wage variations on demand "it is necessary to perform at least 'thought experiments' based on exogenous variations in the real wage rate" (Bhaduri and Marglin, 1990, p. 376). It is also interesting to note that Naastepad's application of the model is to a country with a deliberate real wage policy after 1982 (the Dutch 'Wassenaar agreement').

demand regime is wage-led; it is profit-led if C is smaller than zero. C can be disaggregated into three components: the effect of wage policy on consumption growth $\frac{[\xi(\sigma_\pi - \sigma_w)]}{[1 - \psi_i \phi_2]}$, its effect on investment growth $\frac{-[\psi_i \phi_1 \theta]}{[1 - \psi_i \phi_2]}$ and its effect on export growth $\frac{[\psi_e \varepsilon_1]}{[1 - \psi_i \phi_2]}$.

The final step is the modelling of the productivity regime, which is modelled as a combination of ‘Verdoorn’s Law’ (according to which productivity growth depends positively on output growth) and the proposition that high real wage growth induces entrepreneurs to innovate in order to realign productivity growth with high real wage growth (see Hicks, 1932, for instance). Equation (A.10) in the appendix captures these ideas.⁹ Rearranging (A.10) yields equation (A.11) for the productivity regime (PR).

In equilibrium, $\hat{x}_{DR} = \hat{x}_{PR}$, from which the equilibrium growth rates of output and labour productivity can be calculated (see equations A.12 and A.13 in the appendix).

4. Results

The empirical strategy in this section is twofold: (i) to obtain estimates for the model parameters σ_w , σ_π , ϕ_1 , ϕ_2 , ε_0 , ε_1 , β_1 and β_2 in order to determine whether the Swiss demand and productivity regimes are wage-led or profit-led and (ii) to calculate the model’s prediction for the *change* in demand and productivity growth ($\Delta\hat{x}^*$, $\Delta\hat{\lambda}^*$) after the inception of wage moderation in Switzerland at the beginning of the 1990s. These model predictions will be compared with the true change in GDP growth and productivity growth after 1990 against the earlier period.

4.1 Results for the demand regime

For the estimation of the parameters σ_w and σ_π a transformation is used that goes back to Bowles and Boyer (1995). It draws on the fact that (nominal) savings (s_n) – which are equal to nominal GDP (x_n) minus consumption – are the sum of employees’ and profit receivers’ savings, as in eq. 1.

$$s_n = (\sigma_w \nu + \sigma_\pi \pi) x_n \quad (1)$$

From this follows eq. 2.

$$\sigma = s_n / x_n = \sigma_w + (\sigma_\pi - \sigma_w) \pi \quad (2)$$

⁹ Hein and Tarassow (2010) prefer the wage share instead of real wage growth as cost push variable.

So if we regress the savings rate on a constant and the profit rate, the constant will measure employees' propensity to save and the coefficient on π measures the difference between the profit receivers' and the employees' propensity to save. It is expected that $\sigma_w < \sigma_\pi$.

The investment and exports equations (A.3 and A.4) are transformed into growth rates (eqs. 3 and 4).¹⁰

$$\hat{i} = \phi_0 \hat{b} + \phi_1 \hat{\pi} + \phi_2 \hat{x} \quad (3)$$

$$\hat{e} = \varepsilon_0 \hat{z} + \varepsilon_1 \hat{v} \quad (4)$$

Eqs. 2-4 are estimated with OLS.^{11,12} The results are presented in Table 2.¹³ For comparison, I also report the corresponding values found by Naastepad (2006) for the Netherlands. Obviously, the 'accelerator' (the coefficient on \hat{x} in eq. 3) is stronger in Switzerland – as is the (negative) impact of real unit labour cost growth on export growth –, while the foreign demand elasticity of exports is lower. The main difference, however, is that the coefficient on the profit share in the investment growth equation (3) is insignificant at the 10% level. While such a finding is not unfamiliar from the literature (see for instance Hein and Vogel, 2008), the Swiss case is a tight one. The coefficient is close-to-significant (Prob. = 0.113). Given the measurement problems with macroeconomic data, there may or may not be an impact of redistribution on investment growth in Swiss reality. I will therefore consider both possibilities in the results reported below.

<Insert Table 2>

With the estimated coefficients, it is possible to calculate C . Beforehand, it must be decided how to calibrate the 'shares' (export share, investment share, wage share etc.) entering the model. Naastepad (2006) evaluates the shares at the sample mean. Stockhammer

¹⁰ As all variables entering the regressions are growth rates or ratios, we can trust them to be stationary.

¹¹ A (Robertson) lag is added on the profit income variables π and $\hat{\pi}$. Eq. 2 is estimated allowing for an AR(1) process in the error term.

¹² In the estimation of eq. 4, exports of goods instead of exports of goods and services are used as a proxy for z . This is due to non-availability of data on exports of services for the 1950s. An estimation with the growth of exports of goods and services as explanatory variable for the sample period 1962-2010 yields almost exactly the same coefficient on \hat{z} as the one given in Table 2.

¹³ EViews7 was used for the estimations. Note that Durbin-Wu-Hausman tests do not reject the null hypothesis of exogeneity of the explanatory variables.

et al. (2009) report results for both the sample mean and the most up-to-date shares available. I will follow their lead.¹⁴

Table 3 reports values for the remaining parameters and the effects of an increase in real wage growth by one percentage point on consumption growth, investment growth, export growth and the total effect. The signs on the partial demand effects are as expected. When calculated with the mean shares, the sign on the total effect depends on whether or not an effect of redistribution on investment growth is assumed. If yes, Swiss demand growth is profit-led, otherwise it is wage-led. In any case, the absolute values for the total effect (-0.706 or 0.488) seem a bit extreme. None of the eight countries analysed by Naastepad and Storm (2006-7) with this model is either that strongly wage-led or profit-led.¹⁵ When calculated with the up-to-date shares, the redistribution effect on consumption growth and investment growth (assuming there is one) fall well into line with those found for other countries.¹⁶ The effect on export growth, however, is still much stronger in Switzerland because of a high negative impact of real unit labour cost growth on export growth (ε_I). Notably, the total effect is now negative even if we disregard any effects of income redistribution on investment growth. The growing importance of exports for total demand is responsible for this.¹⁷ We can conclude that while the Swiss demand regime may have been wage-led in the past, it is certainly profit-led today.¹⁸

<Insert Table 3>

4.2 Adding the productivity regime

Table 4 reports the results from the estimation of the productivity regime equation (A.10). Since the Durbin-Wu-Hausman test rejects the null hypothesis of exogeneity of GDP growth,

¹⁴ The most up-to-date income shares are from 2010; the most up-to-date demand component shares in GDP are from 2011.

¹⁵ The reason for the large absolute values is the high mean investment share (entering Ψ_i) of 26.1% in combination with the strong accelerator ϕ_2 .

¹⁶ The investment share has fallen to 20.2% in 2011, which raises the denominator of C .

¹⁷ The export share has risen to 51.0% in 2011 against 34.7% at the sample mean.

¹⁸ Hartwig (2005) reached the same conclusion, even though based on a completely different model (a large-scale macroeconomic policy simulation model for Switzerland).

the equation is estimated with TSLS with an AR(1) specification.¹⁹ The explanatory variables are significant with the expected signs. Compared to the Netherlands, the Verdoorn effect β_l (the coefficient on \hat{x}) has a similar magnitude in Switzerland while the productivity-enhancing effect of real wage growth (β_2) is weaker.

<Insert Table 4>

With the estimates for β_l and β_2 , we can now calculate the total impact of wage policy on output and productivity growth, taking into account the interactions between the demand and productivity regimes. From eqs. A.12 and A.13 it follows that

$$\frac{d\hat{x}^*}{d\hat{w}} = \left[\frac{(1 - \beta_2)C}{1 + \beta_l C} \right] \quad (5)$$

$$\frac{d\hat{\lambda}^*}{d\hat{w}} = \left[\frac{\beta_2 + \beta_l C}{1 + \beta_l C} \right] \quad (6)$$

Table 5 reports the results for eqs. 5 and 6, distinguishing between the four different variants of C (with and without an assumed impact of redistribution on investment growth and calibrated on mean vs. up-to-date shares). Taking account of the interactions between the demand and productivity regimes does not alter the conclusion from Section 4.1: Swiss output growth is profit-led today. The productivity regime, however, is wage-led when C is calibrated on up-to-date shares. This means that the direct positive effect of real wage growth on productivity growth (‘wage induced technological progress’) is stronger than its indirect negative effect that stems from real wage growth lowering demand growth, which in turn lowers productivity growth through the Verdoorn channel.

<Insert Table 5>

4.3 Comparing the model’s predictions with reality

The 1950s were a decade of wage moderation in Switzerland. Between 1950 and 1960, real unit labour costs declined in eight years out of eleven. The next three decades, however, were

¹⁹ \hat{z} , \hat{w} , u , \hat{x}_{-1} , \hat{z}_{-1} , \hat{w}_{-1} and u_{-1} are used as instruments. The p-value of the J-statistic indicates that the overidentifying restrictions need not be rejected. We can thus assume that the error term is uncorrelated with the instruments. Note that since EViews7 estimates TSLS regressions with AR(1) errors as nonlinear regression models, Fair’s (1970) warning that all of the lagged left- and right-hand side variables must be included in the instrument list to obtain consistent estimates does not apply.

characterised by rising real unit labour costs. In the wake of the protracted stagnation, which held the Swiss economy in its grip during most of the 1990s, wage moderation returned. The first decade of the new millennium also saw declining real unit labour costs during most of the years.

From eqs. A.12 and A.13 it follows that

$$\Delta\hat{x}^* = \left[\frac{1}{1+\beta_1 C} \right] \left[\frac{\psi_e \varepsilon_0}{1-\psi_i \phi_2} \right] \Delta\hat{z} + \left[\frac{(1-\beta_2)C}{1+\beta_1 C} \right] \Delta\hat{w} \quad (7)$$

$$\Delta\hat{\lambda}^* = \left[\frac{1}{1+\beta_1 C} \right] \left[\frac{\psi_e \varepsilon_0}{1-\psi_i \phi_2} \right] \beta_1 \Delta\hat{z} + \left[\frac{\beta_2 + \beta_1 C}{1+\beta_1 C} \right] \Delta\hat{w} \quad (8)$$

Given the change in the average growth rates of world trade and the Swiss real wage between the 1961-1990 and the 1990-2008 periods,²⁰ we can calculate the model's predictions for the change in the growth rates of Swiss GDP and labour productivity growth from eqs. 7 and 8. Also, since $\Delta\hat{l}^* = \Delta\hat{x}^* - \Delta\hat{\lambda}^*$, we can do the same for hours worked. The model's predictions can then be compared with the actual developments.

Table 6 shows the results. Obviously, the model's predictions are very precise. The actual drop in real GDP growth by 1.1 percentage points (PP) and in productivity growth by 1.4 PP is predicted with an error margin of only 0.1 PP. The increase in employment growth by 0.3 PP is exactly predicted.²¹

<Insert Table 6>

5 Conclusion

An estimated Bhaduri-Marglin model for Switzerland shows that demand growth is profit-led in this country. The preferred model specification (which includes a positive impact of wage moderation on investment growth) predicts the actual change in GDP growth after the inception of wage moderation around 1990 very well. It suggests that wage moderation added almost one percentage point to GDP growth after 1990. In other words, the drop in real GDP

²⁰ I exclude the Great Recession from this averaging because it entailed a collapse of world trade. Including it would arguably bias the average growth rate of world trade too much downward to be still representative for 'normal' post-1990 world trade growth.

²¹ This precise prediction is obtained with the version of C that is calibrated on up-to-date shares and which includes an effect of redistribution on investment growth. The other versions of C work less well. Also note that the inclusion of the Great Recession in the calculation of the average growth rate of world trade for the post-1990 period leads to an overestimation of the drop in GDP growth.

growth, which was mainly caused by a slowdown in the international economy, would have been more severe without wage moderation. Average GDP growth would have been little more than 0.5% instead of 1.5%.

The results also show that the productivity regime is wage-led in Switzerland. This means that wage moderation has contributed to the drop in productivity growth after 1990. This effect, however, is weak.

Appendix A. The theoretical model

$$x = c + i + e - m \quad (\text{A.1})$$

$$c = (1 - \sigma_w) \frac{w}{\lambda} x + (1 - \sigma_\pi) \pi x = [(1 - \sigma_w)v + (1 - \sigma_\pi)(1 - v)]x; \quad \sigma_\pi > \sigma_w \quad (\text{A.2})$$

$$i = a_i b^{\phi_0} \pi^{\phi_1} x^{\phi_2} \quad \phi_0, \phi_1, \phi_2 > 0 \quad (\text{A.3})$$

$$e = a_e z^{\varepsilon_0} \left(\frac{v}{v_f} \right)^{\varepsilon_1} \quad \varepsilon_0 > 0; \varepsilon_1 < 0 \quad (\text{A.4})$$

$$x = \frac{i + e}{[\sigma_\pi - v(\sigma_\pi - \sigma_w) + \zeta]} = \frac{1}{\mu}(i + e); \quad \frac{1}{\mu} > 1 \quad (\text{A.5})$$

$$\hat{x} = -\hat{\mu} + \frac{l}{\mu} \hat{i} + \frac{\chi}{\mu} \hat{e} = -\hat{\mu} + \psi_i \hat{i} + \psi_e \hat{e} \quad (\text{A.6})$$

$$\hat{\mu} = -\frac{v}{\mu}(\sigma_\pi - \sigma_w) \hat{v} = -\xi(\sigma_\pi - \sigma_w) [\hat{w} - \hat{\lambda}] \quad (\text{A.7})$$

$$\hat{\pi} = \frac{\Delta \pi}{\pi} = -\frac{\Delta v}{\pi} \frac{v}{v} = -\theta \hat{v} = -\theta(\hat{w} - \hat{\lambda}) \quad (\text{A.8})$$

$$\hat{x}_{DR} = \frac{\psi_e \varepsilon_0 \hat{z}}{[1 - \psi_i \phi_2]} + C \hat{w} - C \hat{\lambda}; \quad C = \frac{[\xi(\sigma_\pi - \sigma_w) - \psi_i \phi_1 \theta + \psi_e \varepsilon_1]}{[1 - \psi_i \phi_2]} \quad (\text{A.9})$$

$$\hat{\lambda} = \beta_0 + \beta_1 \hat{x} + \beta_2 \hat{w}; \quad \beta_0, \beta_2 > 0; \quad 0 < \beta_1 < 1 \quad (\text{A.10})$$

$$\hat{x}_{PR} = -\frac{\beta_0}{\beta_1} - \frac{\beta_2}{\beta_1} \hat{w} + \frac{1}{\beta_1} \hat{\lambda} \quad (\text{A.11})$$

$$\hat{x}^* = -\frac{\beta_0 C}{1 + \beta_1 C} + \left[\frac{1}{1 + \beta_1 C} \right] \left[\frac{\psi_e \varepsilon_0}{1 - \psi_i \phi_2} \right] \hat{z} + \left[\frac{(1 - \beta_2) C}{1 + \beta_1 C} \right] \hat{w} \quad (\text{A.12})$$

$$\hat{\lambda}^* = \frac{\beta_0}{1 + \beta_1 C} + \left[\frac{1}{1 + \beta_1 C} \right] \left[\frac{\psi_e \varepsilon_0}{1 - \psi_i \phi_2} \right] \beta_1 \hat{z} + \left[\frac{\beta_2 + \beta_1 C}{1 + \beta_1 C} \right] \hat{w} \quad (\text{A.13})$$

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Table 1: Descriptive statistics of the model variables (1948-2011)

	\hat{x}	$\hat{\lambda}$	\hat{l}	\hat{w}	\hat{v}	\hat{i}	\hat{e}	\hat{z}	v	π	ζ	χ	ι	θ	u
Mean	0.025	0.021	0.005	0.024	0.003	0.032	0.051	0.065	0.549	0.451	0.324	0.347	0.261	1.237	1.163
Median	0.027	0.023	0.004	0.027	0.002	0.041	0.051	0.064	0.564	0.436	0.319	0.348	0.254	1.295	0.266
Maximum	0.080	0.074	0.033	0.071	0.049	0.211	0.126	0.145	0.615	0.518	0.444	0.544	0.361	1.598	4.771
Minimum	-0.069	-0.026	-0.067	-0.039	-0.036	-0.159	-0.080	-0.144	0.482	0.385	0.218	0.230	0.185	0.929	0.002
Std. Dev.	0.027	0.020	0.016	0.021	0.018	0.067	0.042	0.047	0.045	0.045	0.053	0.080	0.047	0.221	1.534
Obs.	63	60	60	60	62	63	63	61	63	63	64	64	64	63	63

Notes: \hat{x} = growth rate of real* GDP (Seco); $\hat{\lambda}$ = growth rate of labour productivity (real GDP per hour) (Seco; Siegenthaler, 2012); \hat{l} = growth rate of aggregate employment in hours (Siegenthaler, 2012); \hat{w} = growth rate of the real wage (compensation of employees per hour, deflated by the GDP deflator) (BFS, Siegenthaler, 2012, Seco); \hat{v} = growth rate of real unit labour cost per hour (BFS, Seco); \hat{i} = growth rate of real gross fixed investment (Seco); \hat{e} = growth rate of real exports (Seco); \hat{z} = growth rate of the volume of world trade, approximated by goods exports of OECD countries (OECD[†]); v = wage share (compensation of employees divided by nominal GDP) (BFS[‡], Seco); π = profit share ($\pi = 1 - v$); ζ = import share (nominal imports divided by nominal GDP) (Seco); χ = export share (nominal exports divided by nominal GDP) (Seco); ι = investment share (nominal private gross fixed investment divided by nominal GDP) (Seco); $\theta = v / \pi$; u = rate of unemployment (Seco).

Data sources in parenthesis: Seco = Swiss State Secretariat for Economic Affairs; BFS = Swiss Federal Statistical Office. OECD = Organisation for Economic Co-operation and Development. All data are also available from the author upon request.

* ‘Real’ always means: in Mio. Swiss Francs, at prices of the preceding year, chained values, reference year 2005

[†] The time series on OECD goods exports (extracted in July 2012) covered the years 1956-2011. The series was back-cast to 1950 with data from United Nations Statistics Division (1962).

[‡] BFS currently publishes data on the compensation of employees for the years 1990-2010. The series was back-cast to 1948 with data from earlier versions of the System of National Accounts.

Table 2: Regression results for the demand regime

	σ		\hat{i}		\hat{e}	
	<i>Naastepad (2006)</i>		<i>Naastepad (2006)</i>		<i>Naastepad (2006)</i>	
Const.			-0.019*** (-3.218)	-0.009** (1.88)		
σ_w	0.118* (1.965)	0.140** (2.23)				
π_{-1}	0.429*** (3.114)	0.354** (2.17)				
$\hat{\pi}_{-1}$			0.331 (1.610)	0.392** (2.17)		
\hat{x}			2.086*** (13.062)	1.336*** (4.56)		
\hat{z}					0.756*** (15.976)	0.976*** (18.99)
$\hat{\phi}$					-0.551** (-2.180)	-0.188** (1.83)
Adj. R^2	0.887	0.10	0.763	0.36	0.611	0.91
SE	0.010	0.02	0.031	0.01	0.029	2.19
D.W.	1.945	2.24	1.601	1.76	1.714	1.71
Obs.	62	41	62	39	60	40
Period	1950-2011	1960-2000	1950-2011	1960-2000	1951-2010	1960-2000

Notes: Numbers in parentheses below the coefficients are t -statistics. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. SE = standard error. D.W. = Durbin-Watson statistic. The symbols are defined below Table 1.

Table 3: Parameter values

Coefficients	σ_w	σ_π	ϕ_1	ϕ_2	ε_0	ε_1
	0.118	0.547	0 or 0.331	2.086	0.756	-0.551
Other parameters	μ^{-1}	ξ	ψ_e	ψ_i	θ	
At mean shares	1.575	0.864	0.547	0.412	1.237	
At up-to-date shares	1.443	0.847	0.736	0.291	1.423	
Effects of an increase in real wage growth by one percentage point on						
	Consumption growth $\frac{[\xi(\sigma_\pi - \sigma_w)]}{[1 - \psi_i \phi_2]}$	Investment growth $\frac{-[\psi_i \phi_1 \theta]}{[1 - \psi_i \phi_2]}$	Export growth $\frac{[\psi_e \varepsilon_1]}{[1 - \psi_i \phi_2]}$	Total effect C		
				With investment	Without investment	
At mean shares	2.620	0 or -1.194	-2.132	-0.706	0.488	
At up-to-date shares	0.924	0 or -0.349	-1.033	-0.458	-0.109	

Table 4: Regression results for the productivity regime

	$\hat{\lambda}$	
	<i>Naastepad (2006)</i>	
Const.	-0.003 (-0.65)	-1.014 (1.52)
\hat{x}	0.686*** (7.512)	0.630*** (4.37)
\hat{w}	0.320*** (4.501)	0.520*** (4.40)
Adj. R ²	0.721	0.64
SE	0.010	1.34
D.W.	2.039	1.68
Instrument rank	8	
J-statistic (Prob.)	6.557 (0.161)	
Obs.	59	40
Period	1952-2010	1961-2000

Notes: Numbers in parentheses below the coefficients are *t*-statistics. *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels respectively. SE = standard error. D.W. = Durbin-Watson statistic. The J-statistic can be used as a test of over-identifying moment conditions. The symbols are defined below Table 1.

Table 5: Effects of an increase in real wage growth by one percentage point on output growth and productivity growth in Switzerland, taking account of interactions between the demand and productivity regimes

	(5) Output growth		(6) Productivity growth	
	C		C	
	With investment	Without investment	With investment	Without investment
At mean shares	-0.931	0.249	-0.319	0.491
At up-to-date shares	-0.453	-0.080	0.009	0.265

Table 6: Extent of the change in output growth, productivity growth and employment growth explained by the model

	Growth rate 1961-1990	Growth rate 1990-2008	Δ
<i>Real observations</i>			
GDP (x)	2.6%	1.5%	-1.1 PP
Productivity (λ)	2.5%	1.1%	-1.4 PP
Employment (l)	0.1%	0.4%	0.3 PP
World trade (z)	7.2%	6.3%	-0.9 PP
Real wage (w)	3.2%	1.1%	-2.1 PP
<i>Model predictions</i>			
World trade effect on change in GDP growth	$\left[\frac{1}{1 + \beta_1 C} \right] \left[\frac{\psi_e \varepsilon_0}{1 - \psi_i \phi_2} \right] \Delta \hat{z}$		-1.9 PP
Wage moderation effect on change in GDP growth	$\left[\frac{(1 - \beta_2) C}{1 + \beta_1 C} \right] \Delta \hat{w}$		0.9 PP
Predicted change in GDP growth	$\Delta \hat{x}^*$		-1.0 PP
World trade effect on change in productivity growth	$\left[\frac{1}{1 + \beta_1 C} \right] \left[\frac{\psi_e \varepsilon_0}{1 - \psi_i \phi_2} \right] \beta_1 \Delta \hat{z}$		-1.3 PP
Wage moderation effect on change in productivity growth	$\left[\frac{\beta_2 + \beta_1 C}{1 + \beta_1 C} \right] \Delta \hat{w}$		-0.0 PP
Predicted change in productivity growth	$\Delta \hat{\lambda}^*$		-1.3 PP
Predicted change in employment growth	$\Delta \hat{l}^* = \Delta \hat{x}^* - \Delta \hat{\lambda}^*$		0.3 PP