

# Demand and Productivity Regimes in Switzerland: 1950-2025

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## Abstract

Since the seminal contribution of Bhaduri and Marglin (1990) and the different extensions of post-Kaleckian models which integrate international trade or technical progress, a substantial literature on the identification of demand and productivity regimes has emerged. However, Switzerland remains overlooked by the existing literature. The present contribution seeks to address this gap by investigating whether the demand and productivity regimes of the Swiss economy are wage-led or profit-led through the estimation of a post-Kaleckian model with endogenous technical change. By combining Swiss macroeconomic data from different national sources, long-run series are reconstructed for the period 1948-2025, thus covering one of the longest period in the literature on demand and productivity regimes. The results show that the domestic demand regime of Switzerland is wage-led, but turns profit-led once the effect of the wage share on net exports is taken into account. The results for the productivity regime indicate a regime switch after the economic crisis of the 1990s as the wage-led productivity regime which prevailed during the post-war period became profit-led after the crisis.

Keywords: Switzerland, demand regime, productivity, distribution, wage moderation, wage share

JEL codes: E12; E20; E21; E25; F41; O40

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# 1 Introduction

This article applies the Bhaduri and Marglin (1990) model with endogenous technical progress to Swiss macroeconomic data in order to identify the growth regime of the Swiss economy. Whereas there exists a large literature on the identification of demand regimes, empirical analysis on how the latter interact with a productivity regime to determine a growth (or accumulation) regime remains scarce<sup>1</sup>. Post-Keynesian/Kaleckian economics offers nonetheless a rich set of demand regime models which integrates productivity growth. For the present study, I use the open economy post-Kaleckian distribution and growth model elaborated by Hein and Tarassow (2010), Hein (2014), Naastepad (2006) and Storm and Naastepad (2012) with the single-equation estimation strategy of Stockhammer, Hein, and Grafl (2011) to study how the Swiss demand and productivity regimes react to a change in the wage share of national income.

Switzerland represents an interesting case study for the analysis of the dynamics between distribution, growth and productivity. One of the most salient stylized facts of finance-dominated capitalism is the overall decline in the wage share of national income in developed economies due to a redistribution of income in favor of profits (Hein 2015). Switzerland remains nonetheless relatively unaffected by this global decline as its wage share has increased substantially since the 1960s, as shown in Figure 1.

The surge of the Swiss wage share in the two decades between 1960 and 1980 is especially remarkable as it represents almost a ten percentage point increase (from 45% to 53%), meaning that real wage growth accelerated much faster than labor productivity growth. This dynamic can be explained by the social conflict that took place between capitalists and workers shortly after the end of World War II (WWII), as the 1940s and 1950s were marked by a heavy number of strikes and increasing social tensions that had built up during the war. The intensification of labor-capital conflict led to a substantial increase in the number of the so-called labor peace agreements between workers and employers, rising from 417 in 1938 to 1,000 in 1946 and 1,600 in 1960 (Aubert 1989). Collective labor agreements constitute a distinctive feature of Swiss capitalism and represent the main institutional mechanism governing Swiss industrial relations. Their expansion played a major role in establishing what became known as the “labor peace” (*paix du travail*), namely a socio-political compromise whereby Swiss workers accept a pacified system of industrial relations, notably through the renunciation of strikes, in exchange for improved working conditions and high wages (Bonoli and Mach 2000). This “labor peace” and high wages compromise was also the result of a stronger bargaining power of Swiss workers due to a very high employment rate, non-existing unemployment and chronic labor shortages, which were compensated for through the massive recruitment of foreign workers with annual

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<sup>1</sup>Whereas the concept of a growth regime refers sometimes to that of a productivity regime in the post-Keynesian/post-Kaleckian literature, I use the notion of growth regime as it is defined in Regulation Theory, that is, a pattern of economic growth determined by the interactions between a productivity regime and a demand regime (Boyer 1993, 2022; Petit 1999). In the context of this article, a growth regime is therefore not synonymous with productivity regime.

and seasonal permits. This foreign workforce helped to maintain the high employment rate of Swiss workers (and thus their bargaining power) during the economic crises of the 1970s and 1980s through the non-renewal of their residence permits, meaning that Switzerland was able to “export” its unemployed workforce in times of recession ([Flückiger 1998](#)).

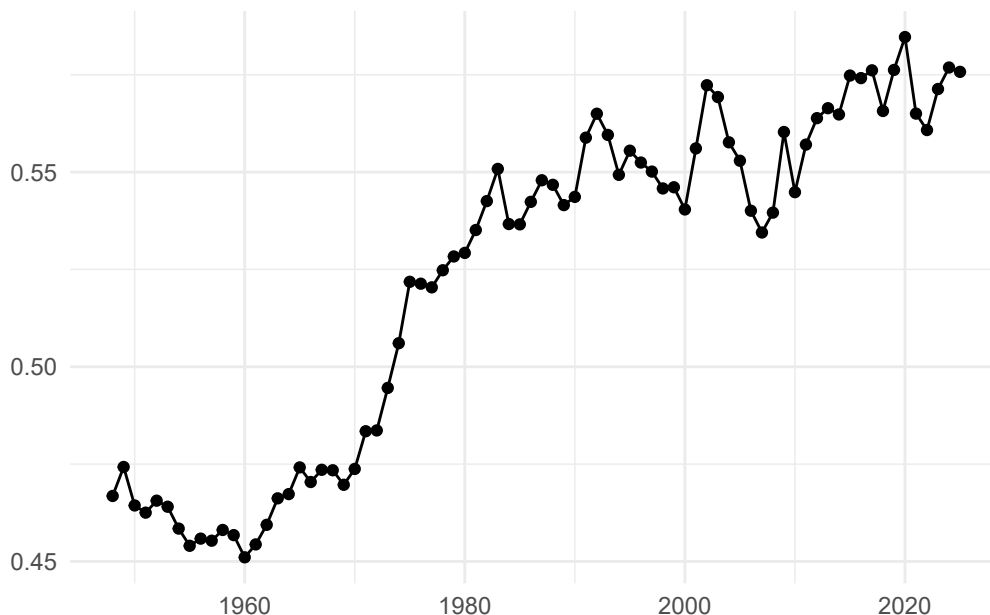


Figure 1: Wage share of national income in Switzerland. Note: the wage share is not adjusted for mixed income since statistics on the share of self-employed in total workforce are not available prior to 1990. Source: author’s own elaboration based on data from the Swiss historical statistics database (SHSD) and from the State secretariat of economic affairs (SECO).

The stagnation of the Swiss wage share during the 1990s and 2000s can be explained by the economic crisis of the 1990s which marked the return of unemployment that had virtually disappeared after WWII. The increasing internationalization and financialization of the Swiss economy, as well as the lesser ability of Switzerland to “export” its unemployed foreign workforce due to political pressures from its neighboring countries meant that Swiss workers lost their advantageous bargaining position. This loss of bargaining power was also reinforced by decreasing union density and union memberships as a result of structural change ([Oesch 2011](#)). The Swiss wage share was thus affected by a period of wage moderation during the 1990s, but seems to have increased again after the 2008 financial crisis. Wage moderation has however made a comeback since the 2020s as real wages have been slightly declining since 2020.

Whether demand and productivity growth benefit from these periods of wage moderation is the goal of the present study. The Swiss growth model has in effect being described as a strongly export-led neo-mercantilist model as exports are the main growth driver of its economy (Oesch 2022; Baccaro and Hadziabdic 2024). Switzerland being a small open economy strongly dependent on exports, the post-Kaleckian distribution and growth model would predict a depressionary effect of an increase in the wage share if the negative effect of an increase in real unit labor costs (RULC) on exports and if investment exceed the expansionary effect of higher real wages on consumption demand. On the other hand, Swiss growth is also marked by a tendency towards stagnation as a result of a decline in productivity gains. The Swiss export-led model is also under pressure due to the disruption of globalization in the context of increasing tariff rates and the dislocation of global value chains.

As wage moderation can have a negative effect on labor productivity growth as predicted by the Webb-Marx effect (Lavoie 2023), the effect of wage moderation on Switzerland's growth is not straightforward. The aim of this paper is to investigate whether the Swiss growth regime is characterized by a profit-led demand regime due to a negative impact of the wage share on net exports and by a wage-led productivity regime.

The next section presents the post-Kaleckian distribution and growth model. Then, section three reviews the literature on demand and productivity regimes. Finally, section four presents the results from a single-equation estimation of the Swiss demand and productivity regimes using Swiss macroeconomic data ranging from 1948 to 2025.

## 2 Theoretical framework

The open economy post-Kaleckian distribution and growth model was developed by Bhaduri and Marglin (1990) and others such as Robert A. Blecker (1989) to extend the basic Kaleckian model in order to allow different demand regimes by combining classical-Marxian and Keynesian/Kaleckian ideas about the effect of distribution on economic growth. According to the classical-Marxian view, profits are the main source of investment and thus a decrease in the wage share through a redistribution of income from wages to profits is seen as necessary for more rapid growth. On the other hand, Kalecki and post-Keynesians such as Kaldor argued that an increase in the wage share can have positive effect on growth as the marginal propensity to consume out of wages is higher than the marginal propensity to consume out of profits (Robert A. Blecker and Setterfield 2019). The final effect of a shift in the distribution of income thus depends on the value of the different parameters of the model, that is, the propensities to consume and to invest. In a wage-led demand regime, the expansionary effect of an increase in the wage share on consumption exceeds the negative effect on investment and therefore boosts aggregate demand. In contrast, a profit-led regime arises when an increase in the profit share raises aggregate demand as the increase in investment through higher profits exceeds the negative effect on consumption. When extended to international trade, the overall demand regime can be profit-led even though the domestic regime is wage-led if the negative effect

on net exports of an increase in ULC exceeds the positive effect on domestic consumption. As shown by Hein and Tarassow (2010) and Hein (2014), a productivity equation relating productivity to capacity utilization and the wage share (or real wage) can be added into the canonical model of Bhaduri and Marglin (1990) to endogenize technological progress through the Kaldor-Verdoorn and Webb-Marx effects.

As this post-Kaleckian model has become the benchmark in demand regime analysis, its presentation here will be brief<sup>2</sup>. Aggregate demand ( $Y$ ) is the sum of private consumption ( $C$ ), investment ( $I$ ), net exports ( $NX$ ) and government expenditure ( $G$ ). Consumption and investment are functions of income ( $Y$ ) and the wage share ( $\Omega$ ). The wage share and other potential control variables ( $z$ ) are considered as exogenous:

$$Y = C(Y, \Omega) + I(Y, \Omega, z_I) + NX(Y, P, z_{nx}) + G(Y, z_g) \quad (1)$$

With  $P$  the domestic price level written as a function of the wage share  $\Omega$ :

$$P = f(\Omega, z_p) \quad (2)$$

The model expects a positive effect of the wage share on consumption because of a higher propensity to consume out of wages than profits and a negative effect on investment due to a lower profit share. Net exports are a negative function of domestic demand and domestic price, which is in turn affected positively by the wage share since the latter is equivalent to real unit labor costs (RULC).

Ultimately, whether the demand regime is profit-led or wage-led depends on the partial effects obtained by differentiating Equation 1 with respect to  $\Omega$ :

$$\frac{dY}{d\Omega} = \frac{h_2}{1 - h_1} \quad (3)$$

Where  $\frac{1}{1-h_1}$  is a standard multiplier with  $h_1 = \frac{\delta Y}{\delta \Omega} + \frac{\delta I}{\delta Y} + \frac{\delta NX}{\delta Y} + \frac{\delta G}{\delta Y}$ . Since the term  $\frac{1}{1-h_1}$  has to be positive for stability, the final sign of Equation 3 depends on  $h_2 = \frac{\delta C}{\delta \Omega} + \frac{\delta I}{\delta \Omega} + \frac{\delta NX}{\delta P} + \frac{\delta P}{\delta \Omega}$ , which is the sum of the derivative of the components of aggregate demand with respect to the wage share. The sign of  $h_2$  is impossible to determine à priori and remains an empirical question because the derivative of consumption with respect to the wage share is supposed to be positive while the derivatives of investment and net exports are supposed to be negative. The final effect of an increase in the wage share on aggregate demand thus depends on the relative magnitude of the reactions of private consumption, investment and net exports to changes in income distribution. The regime can be considered wage-led if the effect  $\frac{\delta Y}{\delta \Omega}$  is positive or profit-led if negative.

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<sup>2</sup>I follow here the exposition of the model as presented in Stockhammer, Hein, and Grafl (2011) for the demand regime and Hein and Tarassow (2010) for the productivity regime.

Once the demand regime is identified one can simply add a productivity growth equation to integrate the productivity regime:

$$y = y_0 + y_1 u + y_2 \Omega, \quad y_1, y_2 > 0 \quad (4)$$

With  $y$  productivity growth and  $u$  the rate of capacity utilization (proxied by  $Y$  in the context of this study). The coefficients  $y_1$  and  $y_2$  capture respectively the Kaldor-Verdoorn and Webb-Marx effects which are expected to be positive.

There are two main limitations to the model presented above. On the one hand, government expenditure is not completely exogenous from income distribution and can react to the latter. Government expenditure is also largely omitted from the regression analysis in the single-equation approach. Whereas this might represent an important issue for other country case studies, this is less of a problem for Switzerland due to the minor role of government expenditure in the management of business cycles. On the other hand, the model lacks a distribution function covering the feedback effect of growth on distribution and only covers the goods market. It is therefore a simplified version of a basic private open economy (Stockhammer, Hein, and Grafl 2011). However, the scope of the present study is on the demand and productivity effects of income distribution, and the wage share is taken as exogenous.

### 3 Literature review

Since the seminal contribution of Bhaduri and Marglin (1990), an important empirical literature on the identification of demand regimes has emerged. Bowles and Boyer (1995) are the first to investigate the Bhaduri-Marglin model empirically with a sample of five developed countries (France, Germany, Japan, UK, US) for which they found wage-led domestic demand regimes over the period 1961-1987. Once international trade is introduced, France, Germany and Japan become profit-led. Naastepad and Storm (2006) study eight OECD countries: France, Germany, Italy, the Netherlands, Spain and the UK where they find wage-led demand regimes; and Japan and the US where they find profit-led demand regimes. Stockhammer and Ederer (2007) find that the domestic demand regime of Austria is wage-led, but also turns profit-led once international trade is taken into account. Hein and Vogel (2008) find that demand growth is wage-led in France, Germany, the UK and USA whereas the Netherlands and Austria are profit-led. Instead of country case studies, Stockhammer, Onaran, and Ederer (2009) estimate the overall regime of the European Union, which is found to be wage-led. Hein and Vogel (2009) analyze the demand regimes of France and Germany over the period 1960-2005 and complement their single-equation estimations by model simulations to take the interactions between the components of demand into account. The results from their single-equation and simulation approach shows evidence that France and Germany are wage-led. Stockhammer, Hein, and Grafl (2011) offers a more detailed analysis of the demand regime of Germany by estimating separate equations for exports, imports and prices instead of a single equation relating net

export to the profit share (or wage share). They find that the effects of increased international trade due to globalization are substantial, but not large enough to switch the domestic wage-led domestic demand regime of Germany into a profit-led one. Onaran, Stockhammer, and Grafl (2011) analyze the influence of financialization and income distribution the demand regime of the USA by investigating the effects of the increase in rentier income, housing and financial wealth on consumption and investment. They show that an increase in profits decreases private consumption and investment while higher rentier income and wealth has positive effects. They nonetheless find that the USA economy is still moderately wage-led because the overall final effect of a pro-capital change in distribution is negative. Stockhammer and Stehrer (2011) use quarterly data during the period 1970-2007 to estimate the demand regimes of 12 OECD countries, which are found to be wage-led. Onaran and Galanis (2013) confirm the results of Stockhammer, Onaran, and Ederer (2009) as they find the countries of the Euro area to be wage-led. Regarding Asian countries, Jetin, Ekin-Kurt, and Su (2012) and Molero-Simarro (2015) find profit-led demand in China and Jetin and Kurt (2016) profit-led demand in Thailand as well. Conversely, Latin America demand regimes tend to be wage-led as it is the case for Brazil and Central America countries (Tomio 2020; Jimenez 2026). Marsellou (2024) finds wage-led demand in Greece. All the literature cited above uses the so-called single-equation estimation approach, in which the model is estimated through separate equations for each component of aggregate demand. Another strand of the literature resorts to vector auto-regressive estimation to identify demand regimes. In contrast to the single-equation approach which tends to find wage-led demand regimes (at least for the domestic sector), the VAR estimation strategy tends to find profit-led growth and evidence of neo-Goodwin cycles (Barbosa-Filho and Taylor 2006; Tavani, Flaschel, and Taylor 2011; Nikiforos and Foley 2012; Kiefer and Rada 2015; Carvalho and Rezai 2016; Barrales and Arnim 2017; Jesus, Araujo, and Drumond 2018), or profit-led growth in the short-run and wage-led growth in the long-run (Sánchez and Luna 2014; Charpe, Bridji, and McAdam 2019; Santos and Araujo 2020). Carrillo-Maldonado and Nikiforos (2024) estimate a time-varying parameter VAR model for the US economy which allows for the demand regime to change over time. They find that the US is less profit-led since the 1970s.

Both the single-equation and VAR approaches come with advantages and drawbacks. The single-equation approach is criticized for problems of endogeneity as the distribution is considered as exogenous and potential feedback effects of growth on distribution are omitted, while the VAR approach is criticized for not correcting for the impact of cyclical fluctuations in output on distribution and labor productivity which may cause bias of spurious correlation between the profit share and demand growth (Lavoie 2017). When corrected for the procyclicality of labor productivity, VAR estimation also finds wage-led demand for the US economy, thereby confirming Lavoie's critique (Cauvel 2023). On the other hand, controlling for endogeneity in the single-equation approach using generalized method of moments (GMM) shows even more wage-led demand regimes than standard OLS estimates (Robert A. Blecker, Cauvel, and Kim 2022).

Compared to applied literature on demand regimes, the empirical literature on the identification of demand and productivity regimes using the single-equation approach, to which the present study belongs, remains scarce. Naastepad (2006) finds a wage-led productivity regime and

a weakly profit-led demand regime in the Dutch economy. Hein and Tarassow (2010) find a negative effect of the profit share on productivity growth for the UK, USA, Austria, Germany and the Netherlands. They argue that evidence of wage-led productivity regimes in economies with wage-led demand regimes reinforces the idea that income redistribution in favor of profits has stagnationist consequences in those countries. Finally, Hartwig (2013) estimates the demand and productivity regimes of the Swiss economy over the period 1950-2010. He finds a domestic wage-led demand regime, which turns strongly profit-led once the effect of distribution on net exports is taken into account. Productivity growth is on the other hand positively associated with real wage and output growth, with an estimated coefficient of 0.32 for the Webb-Marx effect and 0.69 for the Kaldor-Verdoorn effect. His estimated model predicts almost a one percent increase in output in response to wage moderation. The Swiss productivity regime is wage-led, but the predicted effects of wage moderation on productivity growth is weak in his model. To this day, Hartwig (2013) remains the only analysis on the demand and productivity regimes of the Swiss economy. The objective of the present study is to test and update his findings by extending the period of analysis to cover the past fifteen years and by employing a more appropriate estimation methodology in the context of the single-equation approach, more particularly with respect to the treatment of net exports. Whereas Hartwig (2013) estimates only a single equation for net exports, the present study adopts the more detailed approach of Stockhammer, Hein, and Grafl (2011) which estimates separate equations for prices, exports and imports. I also provide estimates for sub-samples to explore potential regime changes.

## 4 Econometric analysis

### 4.1 Data and methodology

Table 11 in the appendix provides the notation, definition and sources of each variable used in the present study. The long-run series from 1948 to 2025 are not available from official sources and were therefore recompiled by combining data from the State Secretariat for Economic Affairs (SECO), the Swiss historical statistics database (SHSD), the Federal Statistical Office (FSO) and the Annual Macroeconomic Database from the European Commission (AMECO). The SECO provides data on Swiss national accounts for most variables of the present study, but their series usually starts only from 1980 for GDP ( $Y$ ) and 1990 for the components of aggregate demand ( $C, I, G, X, M$ ), wages ( $W$ ) and profits ( $R$ ). Long-run series were thus backcasted to 1948 using series from the previous system of national accounts made available by the SHSD. Since the SECO does not provide data for the deflators of GDP ( $P$ ), exports ( $PX$ ) and imports ( $PM$ ), these data were taken from AMECO and also backcasted to 1948 using SHSD data. The series were backcasted using the splicing method (Lee 2018).  $R$ ,  $W$  and demand components are in real terms<sup>3</sup>.

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<sup>3</sup>The compiled dataset and R code are available upon request.

Regarding the econometric estimation strategy, I follow the standard approach used in the single-equation framework. First, the order of integration of each variable is determined using conventional unit root tests. Then, cointegration relationships are tested through the bounds F test of Pesaran, Shin, and Smith (2001). Cointegration is tested on an ARDL model in levels whose lag structure is the one which maximizes the Bayesian Information Criteria (BIC). when the bounds F test confirms cointegration relationships, unrestricted error correction models (UECM) are estimated. In the case of no cointegration, first-difference models are estimated. For the present study, integration orders are identified with augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. ADF tests show that most of the variables are integrated of order one, with the exception of  $PX$ ,  $PM$ ,  $P$  and  $ULC$  for which the test rejects first order integration. However, the PP tests confirms that these variables are integrated of order one along with the other variables (see Table 12 and Table 13 in the appendix). As explained below, all the models were in fine estimated using first-difference because the few models where cointegration was confirmed suffered from collinearity issues. When necessary, a lag of the endogenous variable is included to avoid autocorrelation issues. In those cases, the coefficient estimates are corrected by dividing them by one minus the estimate of the lag of the endogenous variable to obtain long-run coefficients.

## 4.2 Empirical results

### 4.2.1 Consumption

A standard Keynesian consumption function is estimated by regressing the logarithm of consumption on (the log of) wages and profit. The function takes the following form:

$$\log(C_t) = c_0 + c_1 \log(W_t) + c_2 \log(R_t) + \epsilon_t \quad (5)$$

$c_0, c_1, c_2, \epsilon_t$  are respectively the intercept, the elasticity of consumption with respect to wages, the elasticity of consumption with respect to profit and  $\epsilon_t$  the error term. The bounds F test rejected the null hypothesis of no cointegration between the variables. However, the model is estimated in first-difference because the ARDL/UECM model in levels displayed high correlation between the explanatory variables.

Table 1: Consumption function -  $\Delta\log(C)$ 

|                         | 1950-2025           | 1950-1988         | 1989-2025           |
|-------------------------|---------------------|-------------------|---------------------|
| (Intercept)             | 0.006**<br>(0.002)  | 0.008*<br>(0.004) | 0.006*<br>(0.002)   |
| $\Delta\log(C)$ , t-1   | 0.208*<br>(0.098)   | 0.275+<br>(0.146) |                     |
| $\Delta\log(W)$         | 0.395***<br>(0.083) | 0.276+<br>(0.143) | 0.492***<br>(0.099) |
| $\Delta\log(R)$         | 0.099**<br>(0.036)  | 0.137+<br>(0.070) | 0.077*<br>(0.037)   |
| Num.Obs.                | 76                  | 36                | 39                  |
| Adj R2                  | 0.627               | 0.620             | 0.416               |
| Durbin-Watson statistic | 1.841               | 1.612             | 1.950               |
| RESET test (p)          | 0.920               | 0.931             | 0.005               |
| BG test (p)             | 0.901               | 0.508             | 0.956               |
| BP test (p)             | 0.660               | 0.735             | 0.115               |
| Max VIF                 | 2.440               | 3.485             | 1.000               |

+ p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

The results are displayed in Table 1. The estimates have expected signs and are statistically significant for all three periods. The assumptions of the models are tested throughout this contribution by a battery of statistics and statistical tests: the Durbin-Watson (DW) statistics and Breusch-Godfrey (BG) test for autocorrelation; the Ramsey regression equation specification error test (RESET) for functional form; the Breusch-Pagan (BP) test for heteroskedasticity; and the variance inflation factor (VIF) for collinearity. The model results presented in Table 1 perform well regarding these tests, except the model for the sub-sample 1988-2025 which may suffer from model misspecification.

As expected from Kaleckian theory, the elasticity of consumption with respect to wage income (0.395) is higher than for profit income (0.099) for the whole period, thus confirming the differential saving hypothesis. However, the elasticity of consumption with respect to wages seems rather small compared to other countries. Hein and Vogel (2009) found elasticities of 0.59 for France and 0.66 for Germany; Hein and Vogel (2008) 's estimates for Austria, France, Germany, the Netherlands, UK and the US range from 0.46 to 0.78.

The direct partial effect of the wage share on the consumption share of GDP is computed by multiplying the elasticities by the respective share of consumption in wages ( $C/W$ ) and profits

$(C/R)$ , evaluated at the sample mean:

$$\frac{\delta C/Y}{\delta \Omega} = c_1 \frac{C}{W} - c_2 \frac{C}{R} \quad (6)$$

Table 2: Partial effect of a change in the wage share on the growth of consumption share in GDP

| Period    | $c_1$ | $c_2$ | C/W  | C/R  | $\frac{\delta C}{\delta W}$ | $\frac{\delta C}{\delta R}$ | $\frac{\delta C}{Y}/\delta \Omega$ |
|-----------|-------|-------|------|------|-----------------------------|-----------------------------|------------------------------------|
| 1950-2025 | 0.50  | 0.12  | 1.22 | 1.38 | 0.61                        | 0.17                        | 0.44                               |
| 1950-1988 | 0.38  | 0.19  | 1.28 | 1.21 | 0.49                        | 0.23                        | 0.26                               |
| 1989-2025 | 0.49  | 0.08  | 1.16 | 1.56 | 0.57                        | 0.12                        | 0.45                               |

The results are shown in Table 2. The direct partial effect is 0.44 for the whole period, meaning that a one percentage point increase in the wage share results in a 0.44 percentage point increase in the consumption share of GDP. This impact has increased between the two sub-period under investigation: the effect of 0.26 during 1950-2025 has increased up to 0.45 for the period 1988-2025. This implies that the positive effect of wages on consumption has become more important in the last decades.

#### 4.2.2 Investment

Investment is estimated as a function of the log of GDP ( $Y$ ), the log of profits ( $R$ ) and the long term real interest rate ( $i$ ). The coefficient estimate for profits represents the impact of an increase in profits on investment given the level of income and corresponds therefore to the effect of a change in the profit share. The bounds F test confirmed the existence of a cointegration relationship between the variables. However, the variance inflation factor (VIF) indicated the presence of strong multicollinearity for the UECM/ARDL model and the model was thus re-estimated in first-difference. The real interest rate was removed because it was not significant. The final model takes the following form:

$$\log(I_t) = i_0 + i_1 \log(R_t) + i_2 \log(Y_t) + u_t \quad (7)$$

With  $I_t$  measured as gross fixed capital formation,  $R_t$  the gross operating surplus (both in real terms at 2020 prices) and  $u_t$  the error term.

Table 3: Investment function -  $\Delta\log(I)$ 

|                         | 1950-2025            | 1950-1988           | 1989-2025         |
|-------------------------|----------------------|---------------------|-------------------|
| (Intercept)             | -0.031***<br>(0.008) | -0.041*<br>(0.016)  | -0.006<br>(0.008) |
| $\Delta\log(R)$         | -0.331<br>(0.296)    | 0.251<br>(0.529)    | -0.012<br>(0.309) |
| $\Delta\log(Y)$         | 3.173***<br>(0.467)  | 2.899***<br>(0.746) | 1.275+<br>(0.664) |
| $\Delta\log(I)$ , t-1   | -0.182**<br>(0.065)  | -0.177*<br>(0.082)  | 0.106<br>(0.156)  |
| Num.Obs.                | 76                   | 37                  | 38                |
| Adj R2                  | 0.663                | 0.729               | 0.412             |
| Durbin-Watson statistic | 1.447                | 1.227               | 1.806             |
| RESET test (p)          | 0.012                | 0.155               | 0.092             |
| BG test (p)             | 0.001                | 0.005               | 0.497             |
| BP test (p)             | 0.096                | 0.443               | 0.584             |
| Max VIF                 | 4.627                | 5.552               | 7.344             |

+ p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

The results (Table 3) do not provide evidence of any significant impact of profits on investment for the whole sample and the two sub-periods whereas demand plays a much greater and significant role. The estimates for profits may be surprising at first, but are coherent with a substantial part of the literature on demand regimes. As underlined by Stockhammer, Hein, and Grafl (2011), the effects of profits are often elusive when demand is controlled for in the context of aggregative investment functions. As the estimates for profits are not significant, they will be treated as zero for the rest of the study.

### 4.2.3 Prices

I now turn to the analysis of the effect of a change in the wage share on net exports, beginning with the effect on domestic and export prices. Following Stockhammer, Hein, and Grafl (2011) and Marsellou (2024), the analysis starts with the estimation of a domestic prices and export prices equation. The domestic price is a function of ULC and price of imports ( $PM_t$ ). Export prices are a function of domestic prices  $P_t$  and prices of imports. For domestic prices, the question at stake is how a change in ULC affects the domestic price level and thus real unit labor costs (RULC, equivalent to the wage share). For export prices, the estimated coefficient

will give the pass-through of domestic prices to export prices. The Domestic prices  $P$  and export prices  $PX$  equations take the following forms:

$$\begin{aligned} \log(P_t) &= p_0 + p_{ulc}\log(ULC_t) + p_{pm}\log(PM_t) + \nu_t \\ \log(PX_t) &= p_{x0} + p_{xp}\log(P_t) + p_{xm}\log(PM_t) + \tau_t \end{aligned} \quad (8)$$

With  $PX$  export prices (measured by the export price deflator),  $PM$  the prices of imports (measured by the import price deflator).  $\nu_t$  and  $\tau_t$  are the respective error terms.

Again, the models were first estimated through an ARDL model for which the bounds F tests are applied to test for cointegration. The test was conclusive only for the domestic price ARDL model. However, as for the investment equation, there is an important problem of multicollinearity between the model's variables and thus both the domestic and export prices were estimated in first-difference. The results are presented in Table 4 for domestic prices and Table 5 for export prices.

Table 4: Price function -  $\Delta\log(P)$

|                         | 1950-2025 | 1950-1988 | 1989-2025 |
|-------------------------|-----------|-----------|-----------|
| (Intercept)             | 0.004*    | 0.008***  | 0.001     |
|                         | (0.002)   | (0.002)   | (0.002)   |
| $\Delta\log(P)$ , t-1   | 0.169*    |           | 0.524**   |
|                         | (0.072)   |           | (0.146)   |
| $\Delta\log(ULC)$       | 0.590***  | 0.704***  | 0.190+    |
|                         | (0.056)   | (0.037)   | (0.104)   |
| $\Delta\log(PM)$        | 0.048*    | 0.009     | 0.137**   |
|                         | (0.023)   | (0.018)   | (0.044)   |
| Num.Obs.                | 76        | 38        | 38        |
| Adj R2                  | 0.812     | 0.910     | 0.611     |
| Durbin-Watson statistic | 2.088     | 2.418     | 1.922     |
| RESET test (p)          | 0.115     | 0.716     | 0.515     |
| BG test (p)             | 0.577     | 0.590     | 0.195     |
| BP test (p)             | 0.575     | 0.951     | 0.376     |
| Max VIF                 | 2.083     | 1.031     | 2.095     |

+ p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

The estimates for ULC in the domestic price equation have the expected signs and are significant for the three periods. The overall pass-through of 0.59 (0.71 when corrected for the lag of the endogenous variable) is greater for the first sub-period (0.7) than for the second one (0.19). The pass-through of ULC on domestic prices thus declined from 0.7 to 0.19 between the two periods, which is substantial. This discrepancy is still considerable after correcting the coefficient estimate of 0.19 for the lag of the endogenous variable (0.39). This suggests that increases in ULCs have lesser pass-through on domestic prices since the last decades compared to the post-war period.

Since ULC is equal to  $RULCP$ , the elasticity of prices with respect to RULC is  $e_{p/rulc} = \frac{p_{ulc}}{1-p_{ulc}}$  and therefore the elasticity of ULC with respect to RULC can be calculated by taking the ratio  $\frac{p_{ulc}}{e_{ulc/rulc}}$ . For instance, the estimated elasticity of prices to ULC of 0.59 for the whole sample gives an elasticity of prices to RULC of 1.43 and thus a ULC-RULC elasticity of  $0.59/1.43 = 0.41$ . An increase of RULC of one percent will thus raise ULC by 0.41 percent and domestic prices by 1.43 percent (based on the parameters for the whole sample). The latter's value is 2.3 for the first sub-period and 0.23 for the second, meaning that the ability of firms to pass on nominal unit labor costs increase on domestic prices has decreased over time.

Table 5: Export price function -  $\Delta\log(PX)$

|                         | 1950-2025           | 1950-1988           | 1989-2025           |
|-------------------------|---------------------|---------------------|---------------------|
| (Intercept)             | 0.000<br>(0.002)    | -0.003<br>(0.004)   | -0.001<br>(0.002)   |
| $\Delta\log(PM)$        | 0.524***<br>(0.030) | 0.471***<br>(0.034) | 0.699***<br>(0.055) |
| $\Delta\log(P)$         | 0.384***<br>(0.066) | 0.412***<br>(0.094) | 0.500***<br>(0.131) |
| Num.Obs.                | 77                  | 38                  | 39                  |
| Adj R2                  | 0.836               | 0.865               | 0.852               |
| Durbin-Watson statistic | 1.743               | 1.445               | 2.087               |
| RESET test (p)          | 0.149               | 0.179               | 0.219               |
| BG test (p)             | 0.547               | 0.377               | 0.943               |
| BP test (p)             | 0.933               | 0.887               | 0.421               |
| Max VIF                 | 1.032               | 1.038               | 1.082               |

+ p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Table 5 show the results for the export prices equation. All coefficients are statistically significant and have expected signs. The pass-through of domestic prices on export prices is 0.38 for the

whole period, 0.412 for the sub-sample 1950-1988 and 0.5 for the sub-sample 1989-2025 whereas the pass-through of import prices on export prices are respectively 0.52, 0.47 and 0.69. This indicates that both pass-through have increased between the two periods: export prices have become more responsive to both domestic and import prices.

#### 4.2.4 Net exports

The exports and imports functions take the following forms:

$$\log(X_t) = x_0 + x_1 \log\left(\frac{PX_t}{PM_t}\right) + x_2 \log(YW_t) + v_t \quad (9)$$

$$\log(M_t) = m_0 + m_1 \log\left(\frac{P_t}{PM_t}\right) + m_2 \log(Y_t) + \zeta_t \quad (10)$$

Exports  $X_t$  are a function of relative price of exports and imports ( $PX_t/PM_t$ ) and foreign demand  $YW_t$ , measured by the real GDP of Switzerland's top ten trading partners. Imports are a function of domestic prices relative to import prices  $P_t/PM_t$  and domestic demand  $Y_t$ .  $v_t$  and  $\zeta_t$  are the error terms. As no cointegration was found for both equations, the models are estimated in first-difference.

Table 6: Export function -  $\Delta\log(X)$ 

|                         | 1950-2025 | 1950-1988 | 1989-2025 |
|-------------------------|-----------|-----------|-----------|
| (Intercept)             | 0.018*    | 0.011     | 0.018*    |
|                         | (0.008)   | (0.015)   | (0.008)   |
| $\Delta\log(PX/PM)$     | -0.428*   | -0.224    | -1.237**  |
|                         | (0.163)   | (0.173)   | (0.396)   |
| $\Delta\log(YW)$        | 1.712***  | 1.528***  | 1.920***  |
|                         | (0.223)   | (0.394)   | (0.308)   |
| $\Delta\log(X)$ , t-1   | -0.202*   |           | -0.233*   |
|                         | (0.088)   |           | (0.109)   |
| Num.Obs.                | 76        | 38        | 38        |
| Adj R2                  | 0.447     | 0.295     | 0.546     |
| Durbin-Watson statistic | 2.111     | 2.305     | 2.042     |
| RESET test (p)          | 0.297     | 0.377     | 0.640     |
| BG test (p)             | 0.042     | 0.006     | 0.136     |
| BP test (p)             | 0.204     | 0.098     | 0.302     |
| Max VIF                 | 1.051     | 1.004     | 1.026     |

+ p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

Table 6 summarizes the results for the export equation. The coefficient estimates have the expected positive signs for foreign demand and negative signs for relative prices and are statistically significant, except the estimate of relative prices for the first sub-period (-0.224) which is only significant at the 20% level. However, as the results of a one-sided Wald test reject the null hypothesis that this estimate is greater or equal to zero at the 10% level (p-value = 0.0976), its magnitude is kept as in the computations of the chain effects on real exports because it is still more likely that the true estimate is negative than zero or positive.

Table 7: Import function -  $\Delta\log(M)$ 

|                          | 1950-2025           | 1950-1988           | 1990-2025          |
|--------------------------|---------------------|---------------------|--------------------|
| (Intercept)              | -0.006<br>(0.008)   | -0.021<br>(0.013)   | 0.010<br>(0.009)   |
| $\Delta\log(P/PM)$       | 0.270*<br>(0.103)   | 0.413**<br>(0.134)  | -0.050<br>(0.189)  |
| $\Delta\log(Y)$          | 2.123***<br>(0.212) | 2.454***<br>(0.280) | 1.227**<br>(0.384) |
| $\Delta\log(P/PM)$ , t-1 |                     |                     | -0.174<br>(0.212)  |
| $\Delta\log(P/PM)$ , t-2 |                     |                     | 0.575**<br>(0.192) |
| Num.Obs.                 | 77                  | 38                  | 37                 |
| Adj R2                   | 0.565               | 0.671               | 0.351              |
| Durbin-Watson statistic  | 1.943               | 1.374               | 2.201              |
| RESET test (p)           | 0.027               | 0.146               | 0.277              |
| BG test (p)              | 0.965               | 0.251               | 0.096              |
| BP test (p)              | 0.115               | 0.168               | 0.896              |
| Max VIF                  | 1.125               | 1.244               | 1.247              |

+ p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

The results for imports are displayed in Table 7. The estimates for relative prices for the whole period and first sub-period have the expected sign and are significant at least at the 5% level. However, the contemporaneous effect of domestic prices (relative to import prices) on imports is both very small (-0.05) and not significantly different than zero. The two-periods lagged effect is nonetheless significant at the 5% level and has the expected sign (+0.575), meaning that the positive effect of domestic prices on imports is delayed in the second sub-sample. This estimate is the one kept in the calculations of the chain effects on imports.

The total causal effect of the wage share on net exports is the result of a causal chain going from real unit labor costs to nominal labor costs and export prices to exports and imports. The effect is computed as follows:

$$\frac{\delta X/Y}{\delta \Omega} = e_{px} \cdot e_{pyp} \cdot \frac{e_{pulc}}{1 - e_{pulc}} \cdot \frac{1}{\Omega} \cdot \frac{X}{Y} \quad (11)$$

$$\frac{\delta M/Y}{\delta \Omega} = e_{m,p} \cdot \frac{e_{pulc}}{1 - e_{pulc}} \cdot \frac{1}{\Omega} \cdot \frac{M}{Y} \quad (12)$$

These formulas can be read as the effect on a one percentage increase in the wage share on export and import share of GDP.  $e_{xpx}$  is the elasticity of exports to export prices from Table 6;  $e_{pxp}$  the elasticity of export prices to domestic prices from Table 5 and  $e_{m,p}$  the elasticity of imports to domestic prices from Table 7.  $e_{pulc}$  is the elasticity of domestic prices to unit labor costs from Table 4. The total effect on net export is then calculated by adding the effect on export and import.

Table 8: Effect chain of a change in the wage share (real unit labor costs) on net exports.

|           | $e_{x,px}, e_{m,p}$ | $e_{px,p}$ | $\frac{e_{pulc}}{1-e_{pulc}}$ | $\frac{1}{\Omega}$ | $\frac{X}{Y}$ or $\frac{M}{Y}$ | $\delta(\cdot/Y)/\delta\Omega$ | $\delta(NX/Y)/\delta\Omega$ |
|-----------|---------------------|------------|-------------------------------|--------------------|--------------------------------|--------------------------------|-----------------------------|
| Exports   |                     |            |                               |                    |                                |                                |                             |
| 1950-2025 | -0.356              | 0.384      | 2.453                         | 1.911              | 0.380                          | -0.244                         | -0.676                      |
| 1950-1988 | -0.224              | 0.412      | 2.382                         | 2.039              | 0.230                          | -0.103                         | -0.492                      |
| 1989-2025 | -1.003              | 0.500      | 0.666                         | 1.790              | 0.544                          | -0.326                         | -0.670                      |
| Imports   |                     |            |                               |                    |                                |                                |                             |
| 1950-2025 | 0.270               | —          | 2.453                         | 1.911              | 0.341                          | 0.432                          | -0.676                      |
| 1950-1988 | 0.413               | —          | 2.382                         | 2.039              | 0.194                          | 0.389                          | -0.492                      |
| 1989-2025 | 0.575               | —          | 0.666                         | 1.790              | 0.502                          | 0.344                          | -0.670                      |

The resulting decomposition is shown in Table 8. The final effect of an increase of the wage share on net export is -0.676 for the whole period. The negative impact of the wage share on net exports has increased between the two periods, as the negative effect increased in absolute value from 0.49 to 0.67. This increase mostly comes from a greater negative impact on exports share in GDP (from -0.1 to -0.3), while the positive impact on import share remains stable around 0.389-0.344.

#### 4.2.5 Total effects for the demand regime

Table 9 assembles the results from the partial effects to determine whether the Swiss demand regime is profit-led or demand-led. As the partial effects of profits on investment are not significant, they are treated as zero and the domestic demand-regime of the Swiss economy can be considered to be wage-led. The wage-ledness of the Swiss domestic economy seems to have increase over the two sub-periods. Once the effect of distribution on net exports is taken into account, the demand regime becomes strongly profit-led due to a substantial negative effect of real unit labor costs on exports and a positive effect on imports. A one percentage point increase in the wage share thus leads to a 0.24 percent decrease in the share of demand in GDP for the whole period.

Table 9: Private excess demand (in % of GDP) resulting from a one percentage point increase in the wage share

| Period    | $\frac{\delta C/Y}{\delta \Omega}$ | $\frac{\delta I/Y}{\delta \Omega}$ | $\frac{\delta X/Y}{\delta \Omega}$ | $\frac{\delta M/Y}{\delta \Omega}$ | $\frac{\delta NX/Y}{\delta \Omega}$ | $\frac{\delta Y/Y}{\delta \Omega}$ |
|-----------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|-------------------------------------|------------------------------------|
| 1950-2025 | 0.437                              | -                                  | -0.244                             | 0.432                              | -0.676                              | -0.239                             |
| 1950-1988 | 0.258                              | -                                  | -0.103                             | 0.389                              | -0.492                              | -0.233                             |
| 1989-2025 | 0.450                              | -                                  | -0.326                             | 0.344                              | -0.670                              | -0.220                             |

The magnitude of the negative effect of the wage share on demand growth remains stable over the two periods. The increase in the propensity to consume out of wages since 1987 could have rendered the Swiss economy less profit-led, but this was offset by a parallel increase in the negative impact of the wage share on the export share in GDP, while the impact on the import share remained stable.

#### 4.2.6 Productivity regime

The productivity regime is now estimated to explore the extent to which distribution affect productivity in Switzerland. Following Hein and Tarassow (2010) and Hein (2014), the productivity regime is modeled as follows:

$$\log(y_t) = y_0 + y_1 \log(Y_t) + y_2 \log(\Omega_t) + \iota_t \quad (13)$$

With  $y_t$  the real output per person employed (measured as GDP at constant 2020 prices divided by the number of persons employed),  $Y_t$  the real output,  $\Omega_t$  the wage share and  $\iota_t$  the error term.

The positive effect of the wage share on productivity growth is a well-established fact in the literature. Hein and Tarassow (2010) find a negative effect of the profit share on productivity growth for the UK, USA, Austria, Germany and the Netherlands. Amendola and Ruggeri (2026) find a positive effect of the wage share for a panel of 26 OECD countries from 1970 to 2019. Regarding Switzerland, Hartwig (2013) finds a Kaldor-Verdoorn effect of 0.686 and a positive effect of real wage on productivity growth of 0.32 for the period 1950-2010. However, using the real wage to estimate the effect of wage-driven productivity growth might not be the best option, because real wage growth will only influence firms' efforts to adopt labor-saving technologies if it exceeds productivity growth and thus puts a downward pressure on the profit share. As argued by Hein and Tarassow (2010) and Hein (2014), the wage share (or profit share) is thus a better explanatory variable to estimate the effect of wage-induced labor productivity growth.

The model is estimated in first-difference as there is no evidence of cointegration. Table 10 summarizes the results of the three regressions for the overall period and two sub-periods.

Table 10: Productivity equation -  $\Delta\log(y)$ 

|                                       | 1951-2025            | 1951-1994           | 1995-2025            |
|---------------------------------------|----------------------|---------------------|----------------------|
| (Intercept)                           | 0.001<br>(0.002)     | 0.000<br>(0.004)    | 0.004*<br>(0.002)    |
| $\Delta\log(y)$ , t-1                 | 0.330**<br>(0.099)   | 0.310*<br>(0.135)   | 0.320**<br>(0.109)   |
| $\Delta\log(Y)$                       | 0.725***<br>(0.062)  | 0.756***<br>(0.094) | 0.586***<br>(0.084)  |
| $\Delta\log(Y)$ , t-1                 | -0.440***<br>(0.084) | -0.412**<br>(0.116) | -0.508***<br>(0.118) |
| $\Delta\log(\text{wage share})$       | -0.070<br>(0.110)    | -0.024<br>(0.221)   | -0.197*<br>(0.096)   |
| $\Delta\log(\text{wage share})$ , t-1 | 0.222*<br>(0.101)    | 0.444*<br>(0.212)   |                      |
| Num.Obs.                              | 76                   | 43                  | 32                   |
| Adj R2                                | 0.777                | 0.734               | 0.908                |
| Durbin-Watson statistic               | 1.845                | 1.871               | 2.224                |
| RESET test (p)                        | 0.015                | 0.049               | 0.951                |
| BG test (p)                           | 0.102                | 0.279               | 0.478                |
| BP test (p)                           | 0.141                | 0.145               | 0.050                |
| Max VIF                               | 3.600                | 3.377               | 5.688                |

+ p < 0.1, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001

The year 1995 is chosen as a cut-off point in the division of the whole sample for the two sub-samples regressions because dividing the whole sample at the midpoint did not yield relevant results. Moreover, the economic crisis of the 1990s may represent a turning point regarding the relationships between labor productivity and distribution. This hypothesis is verified in the results, presented in Table 10. The estimated models find no evidence of contemporaneous effects of wage share growth on labor productivity growth for the whole sample and first sub-sample (1951-2025). However, the coefficient estimates with a one-period lag are significant and positive (0.22 for 1951-2025; 0.44 for 1951-2025). Labor productivity growth is thus associated positively with wage share growth for the whole period and until the 1990s. However, the regression results for the last sub-sample (1995-2025) show that the economic crisis of the 90s indeed marked a turning point in the relationships between the

wage share and productivity as the contemporaneous effect of wage share growth on labor productivity growth becomes significant and negative (-0.197). This is a surprising result given our theoretical framework, as the Webb-Marx effect only predicts a positive effect of the wage share (or real wage) on labor productivity.

One possible explanation lies in an endogeneity bias of labor productivity which is not corrected for. The reverse causality effect of labor productivity on the wage share may dominate the Webb-Marx effect for this period, especially if labor unions had become less able to translate productivity gains into higher wages. In addition, the Webb-Marx effect may simply not be true for this period, meaning that firms did not invest in labor-saving technologies in times of growing wage share. Regarding the Kaldor-Verdoorn effect, the contemporaneous coefficient estimates are 0.725 for the whole sample and 0.756 for the first sub-sample. The long-run coefficients are respectively 0.42 and 0.49. The Kaldor-Verdoorn effect declines substantially in the second sub-sample as the long-run effect is only 0.115. The reduction of the Kaldor-Verdoorn reflects the fact that growth has become less intensive since the crisis of the 90s as a gradually increasing share of output growth is due to employment growth rather than productivity gains.

## 5 Conclusion

The objective of this contribution was to update the analysis of the Swiss demand and productivity regimes of Hartwig (2013) by expanding the time frame to the last fifteen years as well as using a more detailed treatment of the effect of distribution on net exports. The novelty of this new analysis of the Swiss growth regime was also to explore possible changes in regimes by assessing potential changes in the values of the parameters, an issue that was not covered by the only previous study of the Swiss growth regime by Hartwig (2013). The results show that the Swiss demand regime is profit-led due to a substantial negative effect of real unit labor costs on net exports. This effect was however stronger during the post-war period than in the last decades, while the positive effect of the wage share on the consumption share in GDP has increased, thus pointing out a reduction in the profit-ledness of the Swiss demand regime. During the Golden Age of Capitalism, the Swiss growth regime was therefore the combination of a profit-led demand regime which interacted with a wage-led productivity regime. After the economic crisis of the 1990s, however, the productivity regime became profit-led.

The approach of the present study suffers from several limitations that should be addressed in future research. On the one hand, the treatment of the wage share and output as exogenous variables might lead to simultaneity bias that should be corrected using for instance an instrumental variable approach or the generalized method of moments as in Robert A. Blecker, Cauvel, and Kim (2022). On the other hand, the estimated models should include more control variables to deal with potential omitted variables bias. Such refinements were not possible in the context of the present study as macroeconomic data on the Swiss economy remains scarce before the 1990s. Potential control variables and instruments are thus not available for the

whole period covered here. However, a study with a time frame starting from the 1990s on could offer a more detailed analysis, especially on the regime switch which that was identified in this contribution.

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## Appendix

Table 11: Variable definition

| Symbol              | Description                                                             | Source                |
|---------------------|-------------------------------------------------------------------------|-----------------------|
| Y                   | GDP at 2020 prices                                                      | SHSD, SECO            |
| C                   | Private final consumption expenditures at 2020 prices                   | SHSD, SECO, AMECO     |
| I                   | Private investment (gross fixed capital formation) at 2020 prices       | SHSD, SECO, AMECO     |
| X                   | Exports of goods and services at 2020 prices                            | SHSD, SECO, AMECO     |
| M                   | Imports of goods and services at 2020 prices                            | SHSD, SECO, AMECO     |
| PX                  | Export price deflator (2020 = 1)                                        | SHSD, SECO, AMECO     |
| P                   | GDP price deflator (2020 = 1)                                           | SHSD, AMECO           |
| W                   | Compensation of employees at 2020 prices                                | SHSD, SECO            |
| YW                  | Real GDP (constant US 2015\$) of Switzerland's top ten trading partners | Global Macro Database |
| R                   | Gross operating surplus at 2020 prices                                  | SHSD, SECO            |
| ULC                 | RULC * P                                                                | -                     |
| RULC (= wage share) | Computed as W divided by GDP at current prices                          | -                     |
| i                   | Long term interest rate                                                 | SNB, OECD             |
| y                   | Real GDP per person employed                                            | SHSD, FSO, SECO       |

SHSD = Swiss Historical Statistics Database, SECO = State Secretariat for Economic Affairs, FSO = Federal Statistical Office

Table 12: ADF test on log-transformed series (levels) and on first log-differences.

| Variable          | Level (log) |               |         | first-difference (log) |               |         | Order of integration |
|-------------------|-------------|---------------|---------|------------------------|---------------|---------|----------------------|
|                   | Lag order   | ADF statistic | p-value | Lag order              | ADF statistic | p-value |                      |
| Y (real)          | 4           | -3.14         | 0.108   | 4                      | -3.68         | 0.032   | I(1)                 |
| C (real)          | 4           | -2.37         | 0.424   | 4                      | -3.86         | 0.021   | I(1)                 |
| I (real)          | 4           | -3.95         | 0.016   | 4                      | -4.84         | 0.010   | I(0)                 |
| X (real)          | 4           | -2.24         | 0.476   | 4                      | -4.11         | 0.010   | I(1)                 |
| M (real)          | 4           | -1.96         | 0.591   | 4                      | -5.67         | 0.010   | I(1)                 |
| PX                | 4           | -1.85         | 0.637   | 4                      | -2.91         | 0.203   | I(2)+                |
| PM                | 4           | -1.78         | 0.667   | 4                      | -3.34         | 0.072   | I(2)+                |
| P                 | 4           | -0.39         | 0.984   | 4                      | -3.30         | 0.079   | I(2)+                |
| NA                | 4           | -0.58         | 0.976   | 4                      | -3.83         | 0.022   | I(1)                 |
| NA                | 4           | -1.99         | 0.581   | 4                      | -4.71         | 0.010   | I(1)                 |
| RULC (wage share) | 4           | -1.76         | 0.673   | 4                      | -4.41         | 0.010   | I(1)                 |
| PX/PM             | 4           | -0.58         | 0.976   | 4                      | -4.11         | 0.010   | I(1)                 |
| ULC               | 4           | -0.67         | 0.969   | 4                      | -3.45         | 0.053   | I(2)+                |
| YW (foreign GDP)  | 4           | -1.25         | 0.883   | 4                      | -4.00         | 0.014   | I(1)                 |

Table 13: Phillips-Perron test on log-transformed series (levels) and on first log-differences.

| Variable          | Level (log)    |              |         | first-difference (log) |              |         | Order of integration |
|-------------------|----------------|--------------|---------|------------------------|--------------|---------|----------------------|
|                   | Truncation lag | PP statistic | p-value | Truncation lag         | PP statistic | p-value |                      |
| Y (real)          | 3              | -4.29        | 0.866   | 3                      | -60.19       | 0.010   | I(1)                 |
| C (real)          | 3              | -2.25        | 0.960   | 3                      | -39.29       | 0.010   | I(1)                 |
| I (real)          | 3              | -8.11        | 0.640   | 3                      | -77.02       | 0.010   | I(1)                 |
| X (real)          | 3              | -4.42        | 0.859   | 3                      | -73.36       | 0.010   | I(1)                 |
| M (real)          | 3              | -3.19        | 0.924   | 3                      | -78.74       | 0.010   | I(1)                 |
| PX                | 3              | -3.98        | 0.885   | 3                      | -63.87       | 0.010   | I(1)                 |
| PM                | 3              | -9.98        | 0.528   | 3                      | -66.55       | 0.010   | I(1)                 |
| P                 | 3              | 0.62         | 0.990   | 3                      | -26.40       | 0.011   | I(1)                 |
| NA                | 3              | -2.64        | 0.949   | 3                      | -72.92       | 0.010   | I(1)                 |
| NA                | 3              | -9.72        | 0.543   | 3                      | -65.25       | 0.010   | I(1)                 |
| RULC (wage share) | 3              | -7.03        | 0.703   | 3                      | -66.34       | 0.010   | I(1)                 |
| PX/PM             | 3              | -8.20        | 0.634   | 3                      | -67.59       | 0.010   | I(1)                 |
| ULC               | 3              | 0.31         | 0.990   | 3                      | -33.19       | 0.010   | I(1)                 |
| YW (foreign GDP)  | 3              | -1.65        | 0.976   | 3                      | -68.41       | 0.010   | I(1)                 |

Table 14: Bounds F tests (with unrestricted intercept and not trend term) for cointegration of Pesaran et al. (2001) and maximum variance inflation factor (VIF)

| Variable | Model                                                                                                                    | F statistic | p-value | Max VIF  |
|----------|--------------------------------------------------------------------------------------------------------------------------|-------------|---------|----------|
| C        | $\log\_C\_real \sim L(\log\_C\_real, 1) + \log\_R\_real + \log\_W\_real + L(\log\_W\_real, 1)$                           | 5.40        | 0.03    | 1,417.11 |
| I        | $\log\_I \sim L(\log\_I, 1) + d\log\_gdp + L(d\log\_gdp, 1) + \log\_r + L(\log\_r, 1)$                                   | 16.46       | 0.00    | 507.85   |
| P        | $\log\_P \sim L(\log\_P, 1) + L(\log\_P, 2) + \log\_ulc + L(\log\_ulc, 1) + \log\_PM + L(\log\_PM, 1) + L(\log\_PM, 2)$  | 9.16        | 0.00    | 1,746.98 |
| PX       | $\log\_PX \sim L(\log\_PX, 1) + \log\_PM + L(\log\_PM, 1) + \log\_ulc$                                                   | 2.00        | 0.55    | 52.66    |
| X        | $\log\_X \sim L(\log\_X, 1) + \log\_PX\_PM + \log\_YW + L(\log\_YW, 1)$                                                  | 1.19        | 0.81    | 1,127.57 |
| M        | $\log\_M \sim L(\log\_M, 1) + \log\_Y + L(\log\_Y, 1) + L(\log\_Y, 2) + L(\log\_Y, 3) + \log\_P\_PM + L(\log\_P\_PM, 1)$ | 3.07        | 0.25    | 1,667.99 |
| y        | $\log\_y \sim L(\log\_y, 1) + \log\_w + L(\log\_w, 1) + \log\_Y + L(\log\_Y, 1) + L(\log\_Y, 2) + L(\log\_Y, 3)$         | 3.41        | 0.19    | 1,270.73 |