How to Explain the High Prices in Switzerland?[a]

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1. Introduction

Switzerland is one of the most expensive countries in the world. In August 2009, the price of a Big Mac was CHF 6.50 in Switzerland, 22.6% higher than the price of the same product in Germany (EUR 3.49, or CHF 5.10; actual prices in Basel and Koblenz). According to the Big Mac Index of July 2009, a global survey of Big Mac prices by *The Economist*, Switzerland has shown the second highest price (USD 5.98), beaten only by Norway (USD 6.15). However, not all products are more expensive in Switzerland. In August 2009, Apple's cheapest iMac has been sold for CHF 1499.00 in Switzerland, 10.8% cheaper than the same product in Germany (EUR 1099.00, or CHF 1681.00; apple.ch and apple.de). Other examples are CDs, roses, energy drinks, TVs or US-cars that were sold at a higher price in the neighboring countries in 2008 (SECO, 2008, p. 87).

On an aggregate level, Swiss prices are indeed higher than abroad. According to Eurostat's "comparative price level index", prices of goods and services consumed by households in Switzerland were approximately 25% higher than in the EU27 in 2007. In comparison with Germany and France, prices were approximately 20% higher in 2007. In 2002, prices had been even higher with a difference of approximately 30 to 40%. As there were no major differences in the inflation rates, the relative fall of Swiss prices from 2002 to 2007 is largely the result of the appreciation of the Euro by approximately 15% during this period.

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Since about 1990, complaints about the high prices in Switzerland have become part of a policy debate. Among others, the State Secretariat for Foreign Affairs (SECO) contributed to the debate with a study on the "Swiss Price Island", (entitled "Preisinsel Schweiz" in German, SECO, 2008). It's policy recommendations include, first, a strengthening of the competition policy; second, a reduction of non-tariff barriers to trade (e.g. with the unilateral introduction of the "Cassis de Dijon" principle); third, the opening of trade in agricultural products (e.g. based on a bilateral free trade agreement with the European Union) and fourth, the liberalization and deregulation of services. The line of reasoning in the study promotes the popular perception that there is a lack of competition and an abundance of protectionist regulations in Switzerland, both responsible for the high prices.

This view has a long tradition as can be seen, for instance, from quotes from the OECD (1992): "Widespread horizontal and vertical collusive arrangements may have contributed to higher and more rigid prices than in comparable European countries […]." (p. 68) and "High domestic price levels in Switzerland may point out the scope of non-competitive pricing behavior in the economy" (p. 82). Sometimes the argumentation's logic is circular, as in the following quote by OECD (2000, p. 76), where evidence of the lack of competition is drawn from the existence of high prices: "Although it is inherently difficult to gauge the degree of competition in an economy, international comparisons of price levels […] arrive at prices in Switzerland that are substantially higher than in most other OECD countries." Following this analysis, economic policy conclusions are made: open up the economy, deregulate, implement a tougher competition policy and – if all of this cannot be done – join the European Union in order to be forced to do it.[1]

We remain skeptical[2] towards this view for at least three reasons: first, the argumentation ignores the timing of the issue. The discussion implicitly assumes that the high prices in Switzerland are the result of a development that took place during the last 10 to 20 years. As we will show below, this contradicts the facts. Second, the comparison of competition in Switzerland with an idealized textbook scenario naturally reveals room for improvement. However, compared to other countries, the differences in regulation and competition may be much smaller

1 A SECO funded study by Infras (Iten, Peter, Vettori, and Menegale, 2003, p. 21) on the causes for the high prices in Switzerland proposes "a closer integration of the Swiss market with the European market" and "an increase in competition between the agents in the individual goods markets in Switzerland" (authors' translation).

2 We are not completely alone; see e.g. Lutz (2005).

than suggested by the mentioned literature. It is the extent of these differences relative to other countries – rather than the absolute value of the level of competition –, that really matters for the explanation of price differences. Third, we doubt whether being a member of the European Union with its single market and its more active competition policy would make a big difference. After all, there are member countries such as Sweden, Denmark or Finland with pretty high prices, too. Finally, a thorough analysis would also have to take into account differences in the quality of products and services. In our view, all of these points have not accurately been taken into account in the mentioned studies which are used as a basis for policy conclusions.

In this article, we want to start a deeper analysis by having a closer look at the economic determinants of the aggregate price level in Switzerland. In order to do so, we use insights from the well-established literature on the explanation of the real exchange rate. In section 2, we present some stylized facts that support our claim that we should move beyond the current popular view that the high prices in Switzerland are the result of a lack of competition and a high level of regulation. Section 3 briefly sketches the main hypotheses from the literature on the real exchange rate. Based on a panel estimation of 22 OECD countries from 1970 to 2004, section 4 empirically assesses the potential determinants of the real exchange rate, including the role of competition. Additionally, section 4 analyzes the predictive power of the estimations for Switzerland. Section 5 concludes.

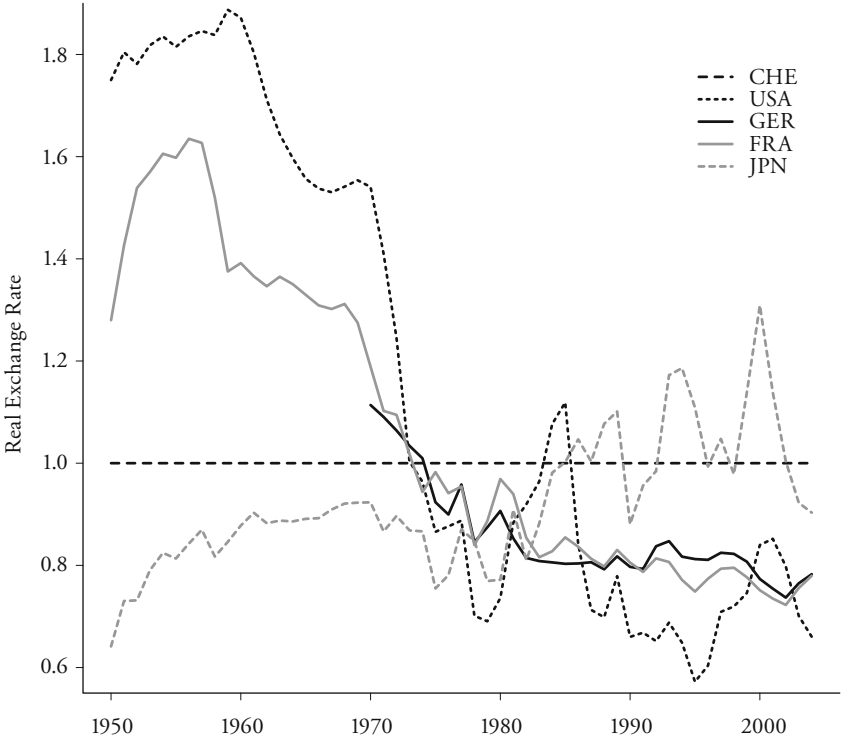
2. Stylized Facts

Determining relative price levels between countries is equivalent to the calculation of the real exchange rate. In the following, we define the real exchange rate Q as the relative price level of a foreign country compared to home's (e.g. Switzerland's), expressed in the same currency. Formally,

$$Q = \frac{EP^*}{P}, \tag{1}$$

where P^* and P is the price level in the foreign and in the home country, respectively, and E is the nominal exchange rate (defined as the price of the foreign currency in units of the domestic currency). Note that this definition follows the standard "inverse" definition of the nominal exchange rate: a decrease in Q implies a real appreciation of the domestic currency and thus a relative increase in domestic prices.

Figure 1: PPP Real Exchange Rates of Switzerland Towards Selected Countries, 1950–2004



Switzerland = 1, a value greater than 1 indicates a higher overall price level than Switzerland.
Source: Based on data from the Penn World Tables.

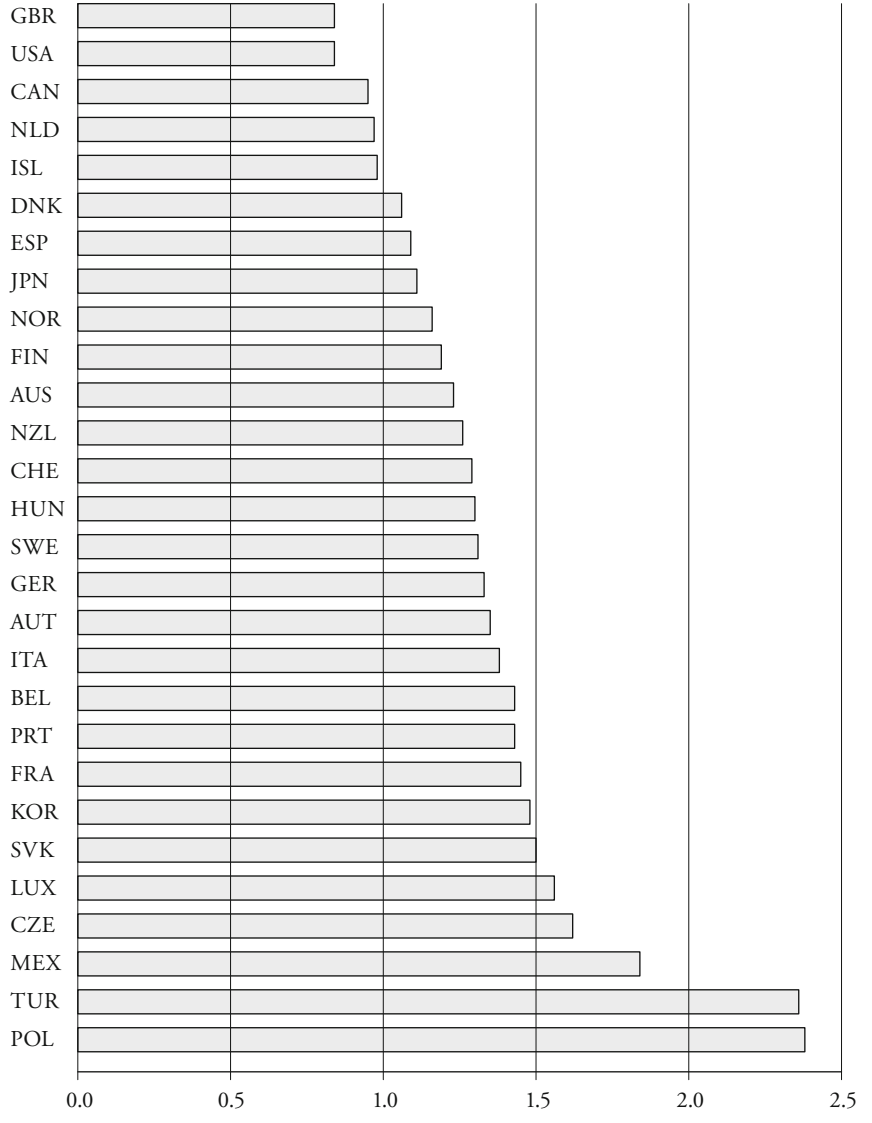
Figure 1 plots the Swiss real exchange rate from 1950 to 2004 relative to several countries. In the late seventies, there is a real appreciation of the Swiss franc towards its neighboring currencies and, extensively, between 1960 and 1980, towards the dollar. Overall, the picture suggests a real appreciation of the Swiss franc from 1960 to 2000, implying that, over the whole period, Swiss prices have increased substantially relative to foreign prices. The figure illustrates our first objection from above. If we want to explain – and possibly counteract – the relative increase in Swiss prices, we should not restrict the analysis to the last two decades. In fact, considerable appreciation took place in the late sixties and in the seventies.

A proximate reason for the steep real appreciation of the Swiss franc in the seventies can be found in the nominal appreciation in the early seventies when the fixed exchange rate system of Bretton Woods collapsed. Explanations of this sudden nominal appreciation of the Swiss franc usually refer to the safe-haven or the portfolio-diversification hypotheses (see e.g. Kugler and Weder, 2004 and 2005, and Scheller, 2005). In the long run, however, money is neutral. We would expect monetary effects to be reversed by adjustments in the price level, unless there are changes in the underlying determinants of the real exchange rate. We will discuss these real determinants in the next section.

Our second objection from above refers to the relative position of Switzerland's competition and regulation situation. Figure 2 illustrates a number of countries' product market regulation index (PMR) in 2008. The OECD's PMR is "a comprehensive and internationally-comparable set of indicators that measure the degree to which policies promote or inhibit competition in areas of the product market where competition is viable." (OECD, 2009; see also Wölfli, Wanner, Kozluk, and Nicoletti, 2009). It is based on a bottom-up approach that integrates a variety of qualitative data on laws and regulations from surveys in the OECD member countries that affect the degree of competition in various markets. Figure 2 shows that the UK and USA are the countries with the lowest degree of product market regulation, whereas Mexico, Turkey and Poland are the countries with the highest degree. Contrary to conventional wisdom, Switzerland's degree of regulation (CHE) is intermediate. According to the index, Switzerland has a lower degree of regulations than all its neighbors, Germany, Austria, Italy and France.

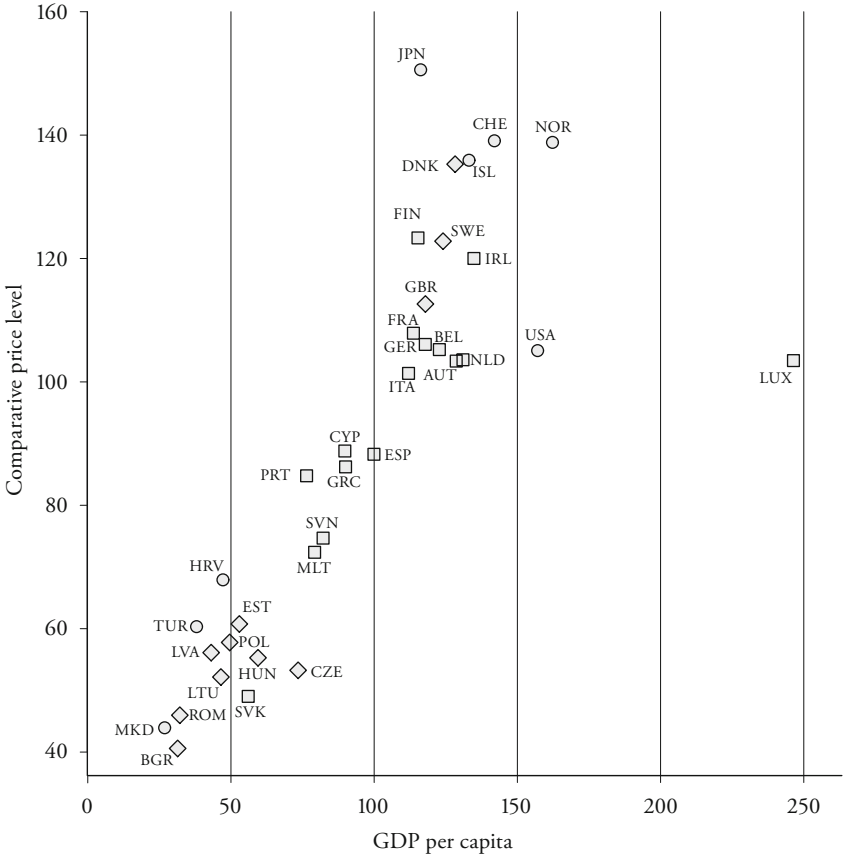
Figure 3 challenges the view of Switzerland as an outlier with respect to the price level, as it is also expressed in our third objection. The figure plots the price level index for a number of countries in relationship to the real GDP per capita. Generally, richer countries tend to have a higher price level. This correlation has been explained by Balassa (1964) and Samuelson (1964) as the result of productivity differences between tradable and non-tradable goods (see next section). Interestingly, Switzerland is located in the middle of the cloud and does not show special "anomalies" relative to the other countries. Luxembourg, on the other hand, is the true outlier and seems to be a rather improper role-model for Switzerland, contrary to the claim of SECO (2008, p. 8): "the example of Luxembourg shows that even with a high income a price level of that of neighboring countries is possible" (authors' translation). Also, it is difficult to detect an EU-effect in figure 3, as can be seen from the frames indicating Euro or EU membership. Altogether, the strong correlation between GDP-per-capita and the price level suggests an approach that explicitly takes into account the existence of

Figure 2: OECD Product Market Regulation Index



Scale 0 to 6, least to most restrictive.
Source: Based on data from Wölfli, Wanner, Kozluk and Nicoletti (2009).

Figure 3: Comparative Price Level and real GDP per Capita of Selected Countries



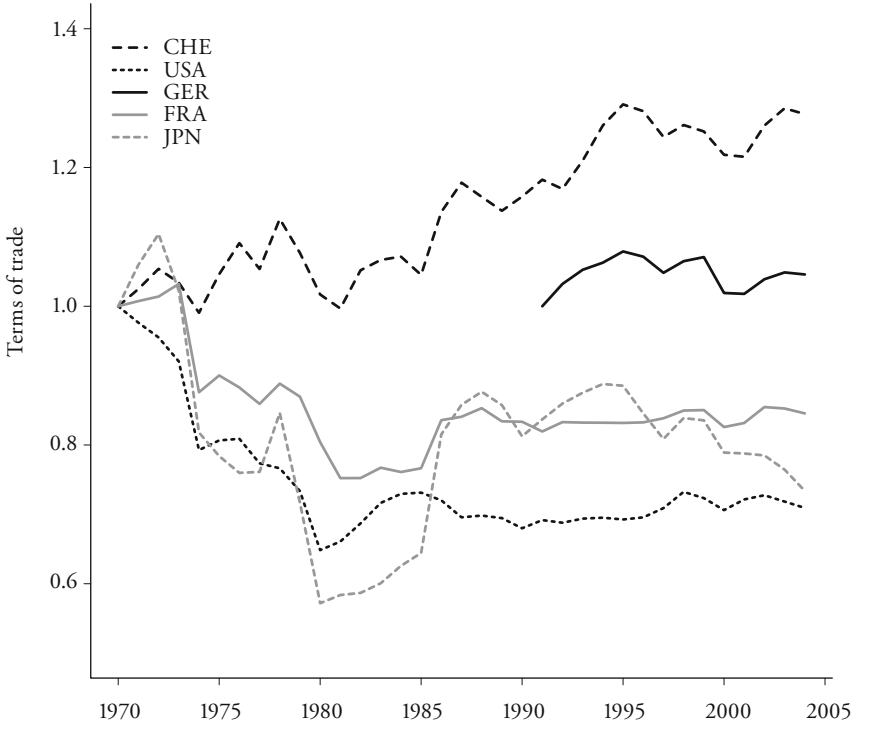
Averages from 1997 to 2007; EU27 = 100; a square indicates Euro and EU-membership, a diamond non-Euro EU-membership, a circle non-EU membership.
Source: Based on data from Eurostat.

non-tradable goods, or, more generally, the fact that many goods have a higher price in rich countries because those who produce these goods have to pay higher factor prices such as wages and rents.

Besides the Balassa-Samuelson effect, there are a number of potential determinants of the real exchange rate. Improvements in the terms of trade have a similar effect on the price level as an increase in the productivity of the tradable sector, but its impact may be much more relevant in the Swiss case. Figure 4

shows that Switzerland's terms of trade have vastly improved since the seventies. There is no other country in the OECD with a similar improvement of the terms of trade. Thus, Switzerland may indeed be a special case regarding the long-term improvement of the terms of trade. This fact has been emphasized, among others, by Kohli (2004). Whereas Kohli argues that growth rates based on changes in GDP considerably underestimate the increase in the standard of living in countries like Switzerland, we will take the terms of trade into account when explaining changes in the price level.

Figure 4: Terms of Trade of Selected Countries, 1970–2004, 1970 = 100 (Germany: 1991 = 100)



Export prices divided by import prices.
Source: Based on data from the Penn World Tables.

3. The Determinants of the Real Exchange Rate

We use the definition of the real exchange rate, Q, from section 2 and assume that the price level, P, of a country is equal to a (geometrically) weighted average of the price of traded, P_T, and non-traded goods, P_N, where $1-s$ and s are the weights of the traded and non-traded goods, respectively. To simplify, we assume that the weights are identical in both countries. For the home country, the real exchange rate is thus equal to

$$Q = \frac{EP^*}{P} = \frac{EP^{*\,1-s}_{\;\;T} P^{*\,s}_{\;\;N}}{P^{1-s}_{T} P^{s}_{N}}. \tag{2}$$

A decrease in Q implies a relative decrease in the foreign price level, i.e. a real appreciation of the home country's currency. Factoring out P^*_T / P_T and collecting terms leads to:

$$Q = \left[\frac{EP^*_T}{P_T}\right]\left[\frac{P_T}{P_N}\frac{P^*_N}{P^*_T}\right]^s. \tag{3}$$

Note that the term in the first bracket is equal to 1 if absolute PPP holds for tradables. While this is a plausible assumption in the long-run, movements in the nominal exchange rate may lead to deviation from PPP in the short run. Thus, in the long run, the real exchange rate is affected by the relative prices of traded and non-traded goods in the home and the foreign country. If the relative price between non-traded and traded goods in the home country rises relative to the foreign country, the real exchange rate falls.

What factors may affect these relative prices? There is a large literature that discusses variables affecting the real exchange rate through their effects on the relative price of tradables and non-tradables. In the following, we discuss briefly each of the potential determinants of the relative prices and thus of the real exchange rate. We analyze the effects of two sets of variables. The first set includes the standard variables from the literature on the real exchange rate. It includes productivity differentials, terms of trade, current account imbalances and government expenditures. The second set, while rarely mentioned in the academic literature, is especially popular in the Swiss case. It includes competition-related variables of potential explanatory variables such as openness and regulations. We briefly sketch the effects, which could be precisely derived in a trade model with tradable and non-tradable goods.

Productivity Differential. An improvement of the productivity in the tradable sector relative to the non-tradable sector leads to an increase in wages in both sectors and thus to an increase in the prices in the non-tradable sector, as has been proposed by Balassa (1964) and Samuelson (1964).

Terms of Trade. An improvement of the terms of trade may be interpreted as a kind of technological progress in the export sector: it allows to increase the amount of imports received for a given amount of factor inputs in the export sector (De Gregorio and Wolf, 1994).

Government Expenditures. Government spending tends to fall more heavily on non-traded goods. Therefore, an increase in government spending positively affects the relative price of tradable and non-tradable goods and thus reduces the real exchange rate (Rogoff, 1996).

Current Account. Due to different consumption patterns between countries, net capital flows are likely to affect relative prices. A current account imbalance thus may have an effect on the real exchange rate, as has been argued, for instance, by Krugman (1990).

Openness. Openness may affect the real exchange rate through two channels: it potentially leads to stronger competition and generally lowers domestic prices, and it may accelerate the equalization of the prices for tradable goods, thereby speed up the adjustment process from PPP-deviations in the tradable sector.

Regulation. Regulations and a weak competition policy may have a negative impact on productivity in the non-tradable sector, or they may lead to higher mark-ups of firms. According to SECO (2008), both effects have a major impact on domestic prices and eventually lead to an appreciated real exchange rate.

4. Empirical Analysis

In this section we try to empirically asses the potential determinants of the real exchange rate, using panel data from 1970 to 2004 for 22 OECD countries. We first describe the methodology in section 4.1 and then the data in section 4.2; the results are given in subsection 4.3. Subsection 4.4 re-examines the case of Switzerland.

4.1 Methodology

We estimate a reduced form of the theoretical relationships mentioned in the previous section, linking the explanatory variables directly to the real exchange rate. As most of our time series are non-stationary, we estimate our baseline

specification in first differences by ordinary least squares. We calculate average changes over a period of three years, focusing on a medium-run relationship, while still preserving a large number of observations.

Our baseline model has the following structure:

$$\Delta \log(Q_{it}) = \beta_1 \Delta \log(\frac{\phi_{X\,it}}{\phi_{N\,it}}) + \beta_2 \Delta \log(P_{x\,it}) + \beta_3 \Delta \frac{G_{it}}{Y_{it}} + \beta_4 \Delta \frac{CA_{it}}{Y_{it}} + \\ + \beta_5 \Delta openc_{it} + \beta_6 \Delta reg_{it} + \\ + \alpha_t + \varepsilon_{it}. \tag{4}$$

The left hand variable, $\Delta\log(Q_{it})$, denotes percentage changes in the *effective* real exchange rate as commonly used in the literature. The subindex *i* refers to the country and *t* to time.

As mentioned above, we analyze the effects of two sets of variables. The first set includes the standard variables from the literature on real exchange rate: ϕ_{Xit} denotes labor productivity in the tradable sector, ϕ_{Nit} in the non-tradable sector; P_{xit} is the terms of trade, measured as the ratio of export and import prices; G_{it}/Y_{it} denotes the government share, CA_{it}/Y_{it} the current account ratio. Logs have been taken of the the first three variables; its first difference thus denotes a percentage change of the variable, while changes in G_{it}/Y_{it} and CA_{it}/Y_{it} are measured in percentage-points instead of percentage. From the theoretical literature mentioned in the previous section, we would expect ϕ_{Xit} to have a negative, ϕ_{Nit} a positive, P_{xit} a negative, CA_{it}/Y_{it} a positive and G_{it}/Y_{it} a negative impact on Q_{it}. Remember from section 2 that the real exchange rate is defined in an "inverse" way: an increase in Q_{it} is equivalent to a decrease in the price level. Finally, ε_{it} denotes the error term.

A second set of variables includes competition-related variables: $openc_{it}$ is the ratio of the sum of imports and exports of goods and services to GDP and reg_{it} is an index of product market regulation. Changes in both variables are measured in percentage-points. From theory, we would expect $openc_{it}$ to have a positive and reg_{it} to have a negative impact on Q_{it}.

We further include a time specific constant, α_t, to control for effects that are constant between countries, but not over time. The time specific constant neutralizes the effect of the reference country and makes the inclusion of values for the foreign country in equation (3) unnecessary. Also, the time specific constant allows us to control for additional time fixed effects (e.g. a commodity price shock) and thus reduces the omitted variable bias.

To check its robustness, we vary our baseline specification in several ways. First, we include country dummies, in order to control for time-invariant unobserved

effects. Second, we include changes in the nominal exchange rate $\Delta\log(E_{it})$, thereby addressing the problem that PPP may not hold in the mid-term and that both $\Delta\log(Q_{it})$ and $\Delta\log(P_{it})$ may be affected by a nominal shock, leading to correlation between the regressors and the error term. Third, as data on sector-specific labor productivity is poor and reduces the sample considerably, we also include an alternative measure, GDP per capita, as a measure for the productivity differential between the tradable and non-tradable sector. Forth, we vary the length of the periods in our estimations: in addition to the three-year averages of the baseline model, we estimate a model using one-, four- and five-year averages.

4.2 Data

Our data set includes 22 major OECD countries and covers the years from 1970 to 2004. Iceland and Luxembourg have been excluded, as well as the East European countries and Turkey and Mexico due to a lack of data or poor data quality. A full list of the countries is in the appendix.

Data on the effective exchange rate, the terms of trade and sectoral productivity have been taken from the OECD. In order to calculate labor productivity in both sectors, we define the tradable sector as industry only, while the non-tradable sector consists of all other activities, including financial services. Data on GDP per capita, the current account, the government share and openness have been taken from the *Penn World Tables*.

In addition to these standard variables, our analysis includes a product market regulation index, which is based on two indices by the OECD. The index by Nicoletti and Scarpetta (2001) measures product market regulation for 21 OECD countries between 1978 and 1998. The index by Wölfli, Wanner, Kozluk, and Nicoletti (2009) is based on a similar concept and covers all OECD countries between 1998 to 2008. For our analysis, we combined these two data sets by normalizing the first index to the second. As there is only one value for every five years, we linearly interpolate the missing values.

4.3 Results

Table 1: Baseline Model

	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta(G_{it} / Y_{it})$	−0.226	−3.225*	−0.933	−1.435*	−1.798*	−2.164*
	(1.213)	(1.258)	(0.690)	(0.585)	(0.850)	(0.700)
$\Delta(CA_{it} / Y_{it})$	0.536	0.830*	0.573*	0.595*	0.835*	0.838*
	(0.445)	(0.367)	(0.278)	(0.214)	(0.327)	(0.223)
$\Delta\log(P_{xit})$	−0.553*	−0.722*	−0.790*	−0.605*	−0.968*	−0.741*
	(0.137)	(0.155)	(0.177)	(0.113)	(0.193)	(0.116)
$\Delta\log(\phi_{Xit})$	0.235	0.156				
	(0.139)	(0.143)				
$\Delta\log(\phi_{Nit})$	−0.132	−0.172				
	(0.171)	(0.175)				
$\Delta openc$	0.940*		0.691*	0.693*		
	(0.229)		(0.129)	(0.120)		
Δreg	0.043		0.034		0.027	
	(0.050)		(0.032)		(0.037)	
Time/Country f.e.	yes/no	yes/no	yes/no	yes/no	yes/no	yes/no
N	63	79	149	213	149	213
R^2	0.631	0.446	0.541	0.532	0.374	0.396

Dependent variable: ΔQ_{it}, OLS estimations, HAC-standard errors in parentheses, an asterisk indicates statistical significance at a 5% level.

The estimation of our baseline specification is reported in table 1. As the full estimation is based on a rather low number of observations, only the coefficients of the terms of trade and openness appear significant and have the expected sign in column (1). The coefficients on sectoral productivity are not significant, nor have they the expected signs. Dropping these two coefficients increases the sample size considerably. Therefore, in column (4), the share of government spending, the trade surplus, the terms of trade and openness are all significant and have the expected sign. An increase in openness by one percentage-point is associated with a real appreciation of about 0.7 percent; an increase in the terms of trade by one percent with a real appreciation of about 0.6 percent. An increase in the current account surplus (or a reduction in the deficit) by one percentage-point is associated with a depreciation of about 0.6 percent, while an increase in the government share by one percentage-point is associated with an appreciation by more than one percent.

Table 2: Alternative Specifications

	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta(G_{it} / Y_{it})$	−1.088	−1.219	−1.362*	−1.707*	−0.268	−1.412
	(1.185)	(0.738)	(0.639)	(0.586)	(1.182)	(0.881)
$\Delta(CA_{it} / Y_{it})$	0.218	0.822*	0.667*	0.270	0.518	0.469
	(0.484)	(0.306)	(0.187)	(0.177)	(0.444)	(0.272)
$\Delta\log(P_{xit})$	−0.555*	−0.855*	−0.631*	−0.412*	−0.532*	−0.793*
	(0.162)	(0.195)	(0.119)	(0.088)	(0.151)	(0.175)
$\Delta\log(\phi_{Xit})$	0.277					
	(0.181)					
$\Delta\log(\phi_{Nit})$	−0.278					
	(0.213)					
$\Delta openc$	0.869*	0.717*	0.711*	0.438*	0.916*	0.695*
	(0.232)	(0.152)	(0.133)	(0.104)	(0.206)	(0.121)
Δreg	0.051	0.051*			0.044	0.033
	(0.065)	(0.024)			(0.051)	(0.032)
$\Delta\log(E_{it})$				0.378*		
				(0.062)		
$\Delta\log(\phi_{Xit} / \phi_{Nit})$					0.217	
					(0.137)	
$\Delta\log(y_x)$						−0.191
						(0.191)
Time/Country f.e.	yes/yes	yes/yes	yes/yes	yes/no	yes/no	yes/no
N	63	149	213	213	63	149
R^2	0.721	0.639	0.622	0.707	0.626	0.546

Dependent variable: ΔQ_{it}, OLS estimations, HAC-standard errors in parentheses, an asterisk indicates statistical significance at a 5% level.

Table 2 reports additional estimations. The inclusion of country fixed effects in the first three columns of table 2 does not alter the results. Interestingly, the coefficient on the regulation index appears significant with the wrong sign in column (2). The inclusion of the nominal exchange rate (4) reduces the coefficient on the terms of trade and the current account, but leaves both effects significant (the latter at the 10% level). Finally, we use two alternative measures for productivity differentials, the ratio of the two productivities in column (5) and GDP per capita as a proxy in column (6). Both measurements fail to show significant results.

Table 3: Different Time Periods

	1y	3y	4y	5y
$\Delta(G_{it} / Y_{it})$	−0.964*	−1.432*	−1.134	−1.668*
	(0.352)	(0.585)	(0.764)	(0.751)
$\Delta(CA_{it} / Y_{it})$	0.621*	0.594*	0.613*	0.472
	(0.117)	(0.214)	(0.228)	(0.325)
$\Delta\log(P_{xit})$	−0.547*	−0.605*	−0.743*	−0.448*
	(0.067)	(0.113)	(0.125)	(0.189)
$\Delta openc$	0.674*	0.692*	0.555*	0.583*
	(0.060)	(0.120)	(0.133)	(0.165)
Time/Country f.e.	yes/no	yes/no	yes/no	yes/no
N	659	213	154	115
R^2	0.520	0.532	0.518	0.502

Dependent variable: ΔQ_{it}, OLS estimations, HAC-standard errors in parentheses, an asterisk indicates statistical significance at a 5% level.

In order to further examine the robustness of these results, we repeat the estimations with averages over alternative period-lengths. Table 3 shows the reduced baseline specification for one-, three-, four- and five-year averages. The government share, the current account, the terms of trade and openness have similar coefficients for all lengths.

Overall, we can not find empirical support for the Balassa-Samuelson productivity effect. The difficulty to find a such an effect is shared with others (e.g. Chinn and Johnston, 1996; De Broeck and Sløk, 2006; for Switzerland see Kohli and Natal, 2008; and Griffoli, Meyer, Natal, and Zanetti, 2008,). It contrasts to the positive findings of Hsieh (1982) or De Gregorio and Wolf (1994). On the other hand, we find strong support for a terms of trade effect, in accordance with the literature (e.g. De Gregorio and Wolf, 1994). Demand side explanations like a current account surplus or the government share show mixed results. While the current account surplus has a significant and robust effect, the coefficients on the government share vary strongly among the specifications. This, too, is in line with the empirical literature (e.g. De Gregorio and Wolf, 1994; Ricci, Milesi-Ferretti, and Lee, 2008).

We extend the existing literature by including competition related factors. As for openness, we find a strong correlation between changes in openness and changes in the real exchange rate in all specifications. However, our data does

not support the regulation hypothesis: changes in regulations do, overall, not have a significant impact on the real exchange rate.

4.4 Switzerland, again

With the estimations at hand, we now reconsider the case of Switzerland's real appreciation. Figure 5 shows the actual and predicted values of Switzerland's real exchange movements over time. The predictions are based on estimation (4) in table 1, which includes the current account, government spending, the terms of trade and openness as explanatory variables. In order to be consistent with the time fixed effects of estimation (4), both the changes in the real exchange rate and the changes in the explanatory variables have been adjusted by the mean changes in the corresponding values of all countries for each point in time. Thus, both the actual and the predicted values should be interpreted as deviations from the OECD average.

Overall, the model captures the rough movements over time reasonably well: in accordance with actual data, the model predicts a strong relative appreciation during the seventies, a relative depreciation during the early eighties, a relative appreciation in the early nineties, and another short relative depreciation by the end of the decade. On the other hand, the model underestimates the strong real appreciation in the early seventies. On various occasions, it also fails to predict the exact timing of relative appreciations and depreciations.

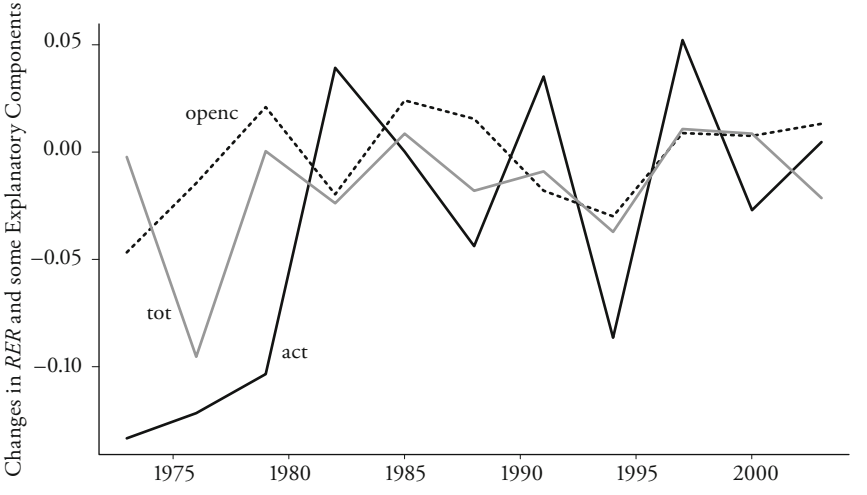
We can decompose the predicted values in the contribution of each explanatory variable, as it is shown in figure 6. The graph shows the contributions of the terms of trade and openness to the fluctuations of the real exchange rate. Both variables substantially contribute to explaining the exchange rate movements. On the other hand, changes in the governmental share and the current account are relatively small, and so is their impact on the real exchange rate. Therefore, by only using openness and the terms of trade, we have a reasonably good explanation for the major movements in Switzerland's real exchange rate.

What is the impact of regulation on Switzerland's real exchange rate? In our estimations, we could not find a significant relationship between regulation data and the real exchange rate. That is why we relied on estimation (4) in the previous predictions. But even if we would have found such a relationship, it would hardly contribute to an explanation of the real exchange rate appreciation, as the relative changes in Switzerland's product market index over time turn out not to be exceptional.

Figure 5: Actual and Predicted Changes in Switzerland's Real Exchange Rate, 1971 to 2004

Predicted values are based on estimation (4) in table 1; actual and predicted values are demeaned by the OECD average (Actual values: $\Delta Q_{\mathrm{CHE}t} - \overline{\Delta Q_t}$, predicted values: $\beta[\Delta X_{\mathrm{CHE}t} - \overline{\Delta X_t}]$).

Figure 6: Terms of Trade and Openness as Explanatory Components of Switzerland's Real Exchange Rate, 1971 to 2004



Predicted components are based on estimation (4) in table 1; actual and predicted values are demeaned by the OECD average (Actual values: $\Delta Q_{\mathrm{CHE}t} - \overline{\Delta Q_t}$, predicted values: $\beta[\Delta X_{\mathrm{CHE}t} - \overline{\Delta X_t}]$).

5. Conclusion

This article analyzes the determinants of Switzerland's high level of prices. We discuss several potential explanatory variables: terms of trade, government expenditures, current account, productivity differentials, openness, regulations and competition.

The relevance of the first three factors is strongly supported by our empirical analysis with data based on 22 countries over a period from 1970 to 2004. However, no support could be found regarding the predicted relationship between relative productivity of the two sectors and the real exchange rate. The empirical analysis also shows that an increase in the degree of openness regarding international trade in goods and services affects the real exchange rate in the expected positive direction, whereas changes in the degree of regulations do not seem to have any explanatory power. With respect to the Swiss case, changes in the terms of trade, openness, the government expenditures and the current account seem to explain the major changes in Switzerland's real exchange rate reasonably well.

This result, combined with the stylized facts shown in this paper, is helpful in assessing the discussion about the "Swiss price island". It is often argued that high prices in Switzerland are mainly due to a lack of competition, particularly in the non-tradable sector, caused by inefficient regulations and a weak competition policy. In addition, high prices in Switzerland are believed to be a recent phenomena – one that arose ten to twenty years ago.

Our analysis questions these beliefs. First, the relative increase in prices in Switzerland seems to be a phenomenon that goes back to the seventies and is, in particular, connected to the introduction of flexible exchange rates in the beginning of the decade. Second, the long-term (and *per se* beneficial) improvement of the terms of trade seems to be an important force behind the real appreciation. Terms of trade movements, however, are subject to world demand and supply movements and largely behind the reach of a small country's policy. Third, there is little evidence of a strong impact of regulations on the real exchange rate. Neither are we able to find a relationship between regulations and the real exchange rate, nor is the evolution of Switzerland's regulatory environment exceptional.

We consider this article as a starting point for a more thorough analysis of the reasons for differences and changes in the price level of Switzerland and other countries. Future work should include a precise derivation of the theoretical hypotheses sketched in this paper. Also, the use of a model that allows for international trade in intermediates or "middle products" along the lines of Sanyal and Jones (1982) would be desirable. Empirically, the analysis should move beyond the exploration of a reduced-form relationship between the real exchange

rate and its determinants. For a deeper analysis, future work needs to address the relationship between the determinants and the intermediate variables, such a employment and wages, more directly. Finally, the empirical analysis should include finer measures of competition and regulation, and eventually make use of disaggregated data.

Data Appendix

Country List
United States, Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Korea, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

Data Sources
Effective nominal exchange rate, consumer price index, terms of trade: OECD Economic Outlook: Annual and quarterly data Vol 2008 release 02 (sourceoecd.org). *Sectoral value added, employment:* OECD Annual National Accounts – Main aggregates Vol 2008 release 01; OECD Annual National Accounts – Population and Employment Vol 2008 release 01 (sourceoecd.org). *GDP-per-capita, current account, government share, openness:* Version 6.2, Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.2, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, September 2006 (http://pwt.econ.upenn.edu/php_ site/pwt_index.php). *Competition:* 1978 to 1998, Nicoletti and Scarpetta (2001); 1998 to 2008, Wölfli, Wanner, Kozluk, and Nicoletti (2009).

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SUMMARY

This article challenges the view that a lack of competition and a high level of regulations are the main causes of Switzerland's high prices. First, we point out a number of stylized facts which are inconsistent with this popular view. Second, we econometrically asses the "competition-regulation hypothesis" together with the well-established determinants from the real exchange rate literature in a panel of 22 OECD countries from 1970 to 2004. We find that changes in the terms of trade and the degree of openness, and to a minor extent in government expenditures and the current account, explain the movements in the Swiss real exchange rate reasonably well over the last 35 years. Changes in regulations and competition as well as in relative productivities perform poorly as explanatory variables.