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Time-Varying Pass-Through from Import Prices to Consumer Prices: Evidence from an Event Study with Real-Time Data

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Abstract

This paper analyzes the pass-through from import prices to CPI inflation in real time. Our strategy follows an event-study approach, which compares inflation forecasts before and after import price releases. Inflation forecasts are modelled using a dynamic factor procedure that relies on daily panels of Swiss data. We find strong evidence that monthly import price releases provide important information for CPI inflation forecasts and that the behavior of updated forecasts is consistent with a time-varying pass-through. The robustness of this latter result is underpinned in two ways: an alternative CPI measure that excludes price components subject to administered pricing and panels capturing different levels of information breadth. Besides implying a time-varying pass-through, our empirical findings cast doubt on a prominent role of sticky prices for the low pass-through findings.

Keywords: Common Factors, Pass-Through, Daily Panels
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Introduction

One research path taken to explain the reduced pass-through phenomena of the 1990s is to link the incomplete pass-through to the inflation regime.[1] Taylor (2000) initiated the discussion by arguing that the exchange rate pass-through into import prices matters only when there are persistent exchange rate changes. These tend to be muted in an environment where inflation is low and monetary policy is credible, because the pricing power of firms is diminished in a low inflation regime. Taylor's (2000) model attempts to capture the main unifying elements of an emerging literature that introduce nominal rigidities and market imperfections into a dynamic general equilibrium model with well-specified microfoundations.

This paper contributes in three ways to the recent literature by Taylor (2000), Devereux and Yetman (2002), and others that model endogenously the exchange rate pass-through to the monetary policy regime. First, the analysis presents a new estimation strategy that allows the pass-through to be interpreted in a time-varying manner. The empirical methodology is similar in spirit to event study procedures used in empirical finance, see

[1] See McCarthy (2000) for time series evidence. Bailliu and Fuji (2004), Choudhri and Hakura (2001), and Gagon and Ihrig (2004) provide cross-country analysis.

MacKinlay (1997) or Khotari and Warner (2005) for an overview. The time-varying estimation procedure allows us to determine whether changing pass-through estimates arise also for within a low-inflation regime. If large random fluctuations in the monthly pass-through estimates are observed in a low inflation regime, then this is inconsistent with Taylor's (2000) argument that firms will choose a higher frequency of price adjustment because of higher average inflation.

A second contribution is to consider the role of information breadth in pass-through estimates using real-time data. The estimation procedure based on dynamic common factors with daily panels is able to encompass alternative information sets that are consistent with CPI inflation, asset price inflation, and core inflation. Previous empirical studies highlighted particular variables at the quarterly or annual frequency. Our intention is to mimic actual data environments used by policymakers and with this understand the data panel's influence on the pass-through estimates and in the policy setting for inflation forecasts.

A third extension considers whether price stickiness is responsible for low pass-through estimates. The empirical analysis is carried out using the Consumer Price Index (CPI) and an adjusted price index defined as CPI minus administrative prices. The choice of the latter index is guided by the empirical evidence in Bils and Klenow (2004) on the frequency of price changes. The adjusted index is used as a robustness check to determine whether nominal price rigidity captured through administrative pricing has any bearing for the pass-through. The assumption of nominal price rigidities, say through Calvo (1983) or Taylor (1980) pricing behavior, is used by Devereux and Yetman (2002) to explain a regime dependent pass-through.[2]

The analysis examines the monthly information stemming from import price releases on inflation forecasts. The use of inflation forecasts in estimating the pass-through is motivated by theoretical models that link an endogenous pass-through to a forward-looking inflation equation. Because the focus is on import price releases, our measure of the pass-through is from import prices to consumer prices. The decision not to work with the traditional definition of the pass-through from exchange rates to import prices does not stem from the prior that the information content of import prices is superior to the exchange rate.[3] Rather the motivation rests on the fact that

[2]Price rigidity is frequently used in new open economy models, see Lane (2001). Specific examples include Chari *et al.* (1998) and Kollmann (1997).

[3]Most theoretical models give a simultaneous link between import and consumer prices. Bacchetta and van Wincoop (2003) and Engel (2002) are an exception.

the import price index is not subject to expectations biases as is the exchange rate. By examining the information content of import price releases, it is not necessary to worry about modelling and disentangling anticipatory effects.

The empirical strategy involves the following steps. The first step generates inflation forecasts based on daily panels that encompass real-time information from financial variables and data releases. The forecasting exercise relies on the dynamic common factor procedure by Forni *et al.* (2000) and builds on earlier work by Amstad and Fischer (2004, 2005). The next step constructs the forecast innovation stemming from the one-day difference in the inflation forecast before and after the monthly release in import prices. The last step tests whether the direction of the forecast innovations is consistent with the direction of the monthly changes in import prices.

The empirical analysis is conducted for Switzerland: a small open economy that devotes considerable attention to exchange rate fluctuations in its monetary policy decisions. The empirical sample is from 1993:5 to 2005:5. During this period, CPI inflation averaged below 1% and the nominal effective exchange rate fluctuated in the order of +/- 15%. These characteristics of low average inflation together with modest fluctuations in the exchange rate fit many OECD economies for the most recent decade.

The time-varying analysis on the information content of import price releases offers three new empirical findings. First, the pass-through from import prices to consumer prices is on average small - a result reconfirmed with real-time data. However, we find this holds only on average, because the pass-through estimates exhibit considerable time-varying behavior for a low inflation regime. Second, the pass-through estimates are highly dependent on the information breadth of the panels. The median estimate of the pass-through is largest for the narrowest information panel and smallest for the largest information panel. Third, the responses of rigid and more flexible price measures to import price information are statistically equivalent. This finding, at least for a low inflation regime, does not support the assumption of nominal frictions used frequently in new open economy models.

The paper is organized as follows. Section 1 discusses the data: the selected sample, the price indexes, and the daily panels used to generate the inflation forecasts. Section 2 first motivates the use of inflation forecasts in our estimation strategy. Next, it defines the empirical strategy to identify the monthly pass-through from import prices to CPI inflation. Section 3 presents the main empirical findings. Section 4 offers concluding remarks.

1. Real-Time Data Panels with Import Prices

This section describes the sample defining the low inflation regime, import prices, consumer price indexes, and four panels used to project the inflation forecasts. All economic series used to construct the panels are taken from the Swiss National Bank's (SNB) data bank. Appendix 1 discusses variable transformations.

The Sample

The panels, which are discussed separately below, are from 1993:5 to 2005:5. The empirical procedure requires a balanced panel at sample start but allows an unbalanced panel at sample end. This enables us to capture real-time information by using daily updated panels to estimate the pass-through. The starting date, 1993:5, is chosen for the following reasons. First, a large number of series do not go further back than 1990:1. Second, the date, 1993:5, coincides with a major revision in the CPI index and the beginning of the import price series. Third, the period 1990:1 to 1993:4 is excluded, because during this brief phase Swiss inflation averaged 5.5% and is not representative of the low inflation regime sought to test the responsiveness of inflation forecasts to information from import price releases.[4]

[4] Officially, the SNB does not recognize low or high inflation regimes. Structural break

The period 1993:5 to 2003:10 represents the estimation window used to generate the first inflation forecast. The forecasts based on daily panels before and after the release dates of the import prices begin 2003:12. The release dates for import prices for month t fall generally during the third week of month *t+1.* With this setup, the forecast innovations centered around 18 import price releases are examined for the period 2003:12 to 2005:5.

The limited number of import price releases considered in the analysis is restricted by the size of the real-time data set. The sample from 2003:12 to 2005:5 is representative of the post-1993 low inflation regime marked by no abrupt changes in Swiss monetary policy and moderate fluctuations in the Swiss franc.[5] Fischer (2002) offers a discussion of Swiss monetary and Swiss franc behavior covering the 1991-2002 period.[6]

Import Prices

tests on inflation persistence are, however, one means for identifying regime shifts. Tests of this sort by Levin and Piger (2002) find a break in Swiss CPI in the second quarter of 1993.

[5]Implicitly, we assume that changes in the composition of the import price index have no influence on the pass-through. Campa and Goldberg (2002) test this assumption for a longer sample.

[6]The Swiss franc floats freely and enters as an information variable in the SNB's inflation forecast.

The data block defining import prices are 16 price indexes: total imports, 12 components of finished products, agricultural goods, consumption goods, and semi-processeded goods. Agricultural products (2.52%) along with the 12 indexes of finished products (95.86%) make up 98.38% of the total import price index. Consumption and semi-process goods are alternative indexes to those defined by finished products and agricultural goods. They make up 53.87% of the total import price index. The remaining categories are excluded because of their short sample.

To understand how the pass-through behaves in a low inflation regime, Figure 1 depicts three indexes: the CPI, the total import price index, and nominal effective exchange rate (hereafter, the trade weighted index (TWI)). The series are normalized to unity for May 1993 and the TWI is inverted so that the increase in the inverse corresponds with an appreciation of the Swiss franc. Three features are noteworthy. First, while 70% of Swiss imports come from EU countries, it is not evident that the euro's introduction in 1999 had any profound bearing on the profile of the three series.[7] Second, the pass-

[7]The large import share from the euro area represents a drawback in using exchange rates as an information block in estimating the pass-through. If a country's trade patterns are highly concentrated with a single country or currency union, the sought after cross-sectional information is limited.

through between import prices and the TWI varies over time. From May 1993 to November 1996, import prices react marginally and with a lag to the 15% appreciation in the TWI. Thereafter from December 1996 to May 2000, the relationship appears to be tighter because the fluctuations of the two series move in sync. After June 2000, import prices do not react fully to the 10% appreciation in the TWI.

A third feature of Figure 1 is the non-existent pass-through between the TWI and the CPI: a static regression of the CPI on a constant and the TWI for 1993:5 to 2005:4 yields an insignificant coefficient of 0.037. The zero pass-through between the exchange rate and CPI inflation for select episodes reconfirms the empirical results of Cunningham and Haldane (2000) and underpins the theoretical assumption of pricing to market used by Betts and Devereux (1996) and others.

Figure 2 presents information on the monthly change in total import prices and CPI from 2003:11 to 2005:4. The transformed variables are 18 release dates to be analyzed in section 3. Figure 2 shows that the directional movements in the price indexes are tighter in log differences than in levels.[8]

[8]A simple OLS regression of the (ln) monthly difference in CPI on the (ln) monthly difference in the TWI yields an insignificant coefficient of 0.15 for this period.

The Price Indexes

Two price indexes are used to generate the inflation forecasts for CPI and for CPI minus administered prices. The latter measure is motivated by our interest to determine if there are quantitative differences in pass-through behavior between a price measure that entails elements of price rigidity captured through administrative pricing in headline CPI inflation and the constructed measure that excludes those elements. The selection of the excluded items is based on the following criteria: 12 measures are recognized by Switzerland's statistical agency (BfS) to be subject to administrative pricing and four further series linked to public medical expenses were chosen by the authors following the empirical results of Bils and Klenow (2004).[9] The excluded components from the CPI basket are health care (medical care, drugs, hospital care, dental treatment, and total); public transport (train, public transport regional); leisure, activities, culture (cinema, radio and TV concessions,

[9]Bils and Klenow (2004) find that the frequency of price changes varies considerably across categories. They exploit this variation to ask how inflation for flexible price goods (goods with frequent changes in individual prices) differs from inflation for sticky price goods (those displaying infrequent price changes). In particular, they find that prices for medical and entertainment in the United States exhibit the most extreme form of price stickiness.

other services, sport and leisure activity, sporting event, theater and concert, and mountain railways and lifts); and education (continuing education and total education). The sum of the excluded elements have a weight of 20.87% when measured against the 2005 CPI basket.[10]

Figure 3 plots the CPI (p^s) and CPI minus administrative prices (p^f) for the full sample. Hereafter, the superscript s denotes sticky prices and f for flexible prices. The two series are normalized to unity at sample start. The two series move closely together with CPI minus administered prices exhibiting slightly greater fluctuations. Although the two series appear similar, Figure 4 shows for the sample from 2003:11 to 2005:4 that Δp^f is slightly more volatile (measured by the standard deviation 0.28 versus 0.20) than Δp^s. Bils and Klenow (2004) find that this property also holds for U.S. data.

The Data Panels

The analysis considers four panels, $\{P(1), \cdots, P(4)\}$, to project the CPI-inflation forecasts. The panels are constructed with the explicit intention where the narrowest panel, i.e., the least number of cross-sectional variables,

[10] In Bils and Klenow (2004), the 20% most sticky prices of the CPI change every 10 months or less frequent. However, the Bils and Klenow's BLS data suggests much more frequent price adjustment than has been found in other studies.

captures the largest possible pass-through responses for inflation forecasts. There are two considerations behind this conjecture. The first is due to data type: the narrow panel includes only price variables that are subject to some form of competitive pricing. Since CPI minus administrative prices in Figure 3 exhibits greater fluctuations, it is expected that inflation forecasts conditional on the narrower panel should react stronger to new information in import prices. The second motive concerns information breadth. It is most likely that large information sets contain overlapping information with respect to import price releases (i.e., real trade volume that is released one week prior to the import prices). This suggests that the impact of import prices on CPI inflation could be mitigated once larger information sets are considered. The broader panels, which attempt to replicate the data-rich environment that central bankers operate under, are composed of nominal variables subject to administrative and competitive price settings together with real and foreign variables.

Table 1 shows the breakdown of the 449 series, their frequency, and their transformations. There are 27 financial variables at the daily frequency and 422 nominal and real variables at the monthly frequency.[11] This data envi-

[11] The monthly series are generally not revised in Switzerland, apart from the monthly

ronment defines the largest information set of the four panels used to forecast inflation measured by CPI and CPI minus administrative prices. The first panel, labelled $P(1)$, has 177 price series. It includes the CPI index, 16 import price indexes, and CPI's subcomponents that are not subject to administrative pricing. The information space is constructed so that it is consistent with our CPI index that excludes non administrative prices.

The second panel, $P(2)$, captures the information space defined by the CPI and has 193 variables. More formally, $P(2)$ is $P(1)$ plus the 16 administrative components (i.e., rows 178 to 193 in Table 1). In terms of the inflation measures, the information space for $P(2)$ is consistent with the time series study by the BIS (2005). They examine the behavior of import price shocks on CPI inflation to make statements about the pass-through.

The third panel, $P(3)$, has 269 variables (i.e., rows 1 to 169 in Table 1). It is defined as $P(2)$ plus the nominal variables listed in Table 1. The inflation forecasts based on $P(3)$ may be viewed as a proxy for core inflation, because other nominal variables, such as money, credit, exchange rates, oil

credit and monetary aggregates. This has the advantage that our inflation forecasts are not seriously contaminated by revision errors. Vintage errors are a serious problem for select quarterly series in Switzerland.

prices, stock prices, and interest rates, are used to predict inflation. Apart from the exclusion of real-estate variables from $P(3)$, the estimated inflation measure may also be interpreted as in Goodhart and Hofmann (2000) as an index that captures inflationary pressures stemming from asset prices.

The fourth panel, $P(4)$, encompasses $P(3)$ plus the real elements in Table 1. Inflation forecasts based on this panel embody the widest concept of core inflation that is consistent with the Phillips curve. In this case, measures of real and nominal activity are used to predict inflation. Stock and Watson (1999), Christadoro *et al.* (2005), and Gosselin and Tkacz (2001) offer a similar interpretation of core inflation in motivating the inclusion of nominal, real, and foreign variables in their panels.

2. The Identification Scheme

The identification scheme to analyze the pass-through from import prices to CPI is similar to an event study approach used in empirical finance. These studies seek to measure the impact of an economic event (announcement, merger, macroeconomic news, etc.) on the value of firms. An important step in our identification scheme are inflation forecasts. The use of inflation forecasts instead of (actual) inflation to estimate the pass-through is motivated on several grounds. First, as mentioned in the introduction, the endogenous pass-through models of Taylor (2000) and Devereux and Yetman (2002) work with a forward-looking equation for inflation. Taylor (2000), in addition, emphasizes that the degree of pass-through is important for inflation forecasting. Thus, the intention is not to compare the weights between the import share with the common factor estimates, but to capture the second round effects stemming from import prices. Second, we want to understand in a real-time setting, what is the marginal contribution from the latest observation in import prices on the inflation dynamics. As in a VAR setup, if the inflation forecasts respond strongly to import prices, then this is consistent with a pass-through from import prices to consumer prices. Third, it should be recognized that one weakness of data reduction procedures by Stock and Watson (2002) and Forni *et al.* (2000) is that the estimated common factors are not interpretable. This forces the pass-through analysis to focus on whether new information influences the forecasts rather than the traditional route of identifying coefficients from regression equations. Below, the main steps of the estimation procedure are defined using the terminology of MacKinlay (1997).

Defining the Event: Import Price Releases

The monthly release of import prices is defined to be the event with the

pth event date $\tau_p = (j, t)$ corresponding to day j and month t in calendar time and $p = \{1, \cdots, 18\}$.[12] The structure of the daily panels allows us to examine the marginal contribution from 18 events on inflation forecasts conditional on panel $P(k)_{j,t}$ for $k = \{1, \cdots, 4\}$ at time (j, t). A one-day event window is used so that only information from import price releases is captured.[13]

The Forecasting Model and Estimation

The forecasting model relies on data reduction techniques that can handle daily panels.[14] To do this we follow the estimation procedures of Forni *et*

[12]Since we seek to replicate a real-time setting of daily sequential information flow with the focus on import price releases. Import price releases offer a natural event date whereas other variables used to calculate the pass-through, such as exchange rates, do not.

[13]Producer prices are released at the same time as are import prices, but this information is not included in our panel. Hence, we assume revision error (see footnote 9) and producer prices do not influence inflation forecasts. To check the latter claim, we estimated panel $P(4)$ with an additional 20 series for producers prices for the full sample and checked these forecasts against against those from $P(4)$. A test of independence could not be rejected when projecting on CPI inflation.

[14]Recent contributions by Evans (2005) and Giannone *et al.* (2005) are also concerned with real-time forecasting based on data releases. These papers focus on estimation for the current quarter ("nowcasts") instead of forecasts as we do. Our proposed procedure differs in that it works with daily panels and therefore the event window of the news component is time invariant. This allows us to distinguish between time and variable as

al. (2000), Christadoro *et al.* (2005), and Altissimo *et al.* (2001). We offer a descriptive outline of the estimation procedure and refer the reader to the individual papers for specific details.

As in Forni *et al*. (2000), we assume that the factor structure has N variables in the panel, $x_t = (x_{1,t}, x_{2,t}, \cdots, x_{N,t})'$. Further, we assume that the variables in x_t are measured with error and that they can be decomposed into the sum of two orthogonal components: the signal $x^*_{i,t}$ and the measurement error $e_{i,t}$

$$x_{i,t} \;=\; x^*_{i,t} + e_{i,t}, \tag{1}$$

where i denotes the N variables and t denotes time in months. Next, under suitable conditions on the variance-covariance matrix of the $x's$ defined in Forni *et al*. (2000), $x_{i,t}$ is specified as a generalized dynamic factor model:

$$x_{i,t} = \chi_{i,t} + \xi_{i,t} = b_{i1}(L)f_{1,t} + \cdots + b_{iq}(L)f_{q,t} + \xi_{i,t}, \tag{2}$$

where $\xi_{i,t}$ is the idiosyncratic component and $\chi_{i,t} = x_{i,t}$ - $\xi_{i,t}$ is the common component.[15] The latter consists of q dynamic common factors, $f_t = (f_{1,t}, \cdots, f_{q,t})'$, and $b_{ij}(L)$ is of order q.

possible sources of innovations.

[15]Hereafter, we refer to them as 'idiosyncratic' and 'common'. Note, the latter refers to the common component, χ_{it}, and not to the common factor, $f_t = (f_{1,t}, \cdots, f_{q,t})'$.

The estimation procedure for $\chi_{i,t+h|P(k)_{j,t}}$, the forecast of $\chi_{i,t}$ h periods ahead conditional on panel $P(k)$ for $k = 1$ to 4, follows Cristadoro *et al.* (2005). We begin with the estimation of the spectral density matrices of the common and the idiosyncratic using the method of dynamic principal components of Forni *et al.* (2000). Next, we use the variance-covariance matrices of the common and the idiosyncratic component implied by the spectrum in the first step to estimate the static factors by generalized principal components. As in Amstad and Fischer (2004), we work with two dynamic factors and twelve static factors.[16] In a further step, we estimate the common component at low frequency by using the static factors. This last step involves performing a projection of the common component at low frequency on the leads and lags of the estimated static factors.

To generate the forecasts, we apply the shifting procedure for the covariance matrix by Altissimo *et al.* (2001).[17] Altissimo *et al.* (2001) compute

[16]This has been tested in Amstad and Fischer (2004). Also many empirical studies find that two dynamic factors represent the panel's variance well. See Giannone and Lenza (2004) for savings and investment in OECD countries and Giannone *et al.* (2004) for the United States.

[17]Giannone *et al.* (2004) offer an alternative procedure for forecasts of the common component based on the Kalman filter.

values of $\chi_{i,t}$ in (2) h months ahead by individually shifting out each series in $x_{i,t}$ in a way that the most recent observation aligns h months ahead. Afterwards the generalized principal component is evaluated for the realigned $x_{i,t}$; see Appendix 2 for further discussion. A further important step in our forecasting procedure is to apply the band-pass filter before projecting. Our decision to work with the low frequency component with cutoff $2\pi/12$ introduces a smoothed common component.[18] For the forecasts, this implies that the noise component should not have a large influence on the forecasts. We therefore interpret changes to the updated forecast to be attributed to new information from the import price release and not to measurement error.[19]

Abnormal Forecast Innovations

We follow the terminology in the event study literature, which uses the term "abnormal returns" as its response measure to the examined event.

[18] Seasonality is a further motive for using the bandpass filter. Giannone *et al.* (2005) use de-seasonalized data, Evans (2005) does not address this issue. To avoid the end of sample problem for seasonal filtering for our forecasts, we apply the bandpass filter with $2\pi/12$. Amstad and Fischer (2004) have found that this strategy works well.

[19] Note that changes in forecasts due to estimation errors would be reflected in changing estimation parameters. As fixing parameters has little or no impact on our forecasts, estimation uncertainty should be low.

This is defined as the actual ex post return of the security over the event window minus the normal return, i.e., the return that would be expected if the event did not take place. Instead of returns, we work with inflation forecasts in order to capture the dynamics of the pass-through. Thus, to identify the influence of new information from monthly releases in import prices, a measure of (abnormal) forecast innovations for event date $\tau_p = (j, t)$ is needed. This is defined as the one-day difference in the h-period ahead forecasts of $\chi_{i,t+h}$ around the release dates of import prices. More specifically, $\epsilon_{\pi^s,t+h|P(k)_{j,t}}$ and $\epsilon_{\pi^f,t+h|P(k)_{j,t}}$ are innovations from the forecast for CPI ($\pi^s = \Delta p^s$) and CPI minus administrative prices ($\pi^f = \Delta p^f$) inflation with forecast horizon $t+h$ conditional on the daily information panel $P(k)_{j,t}$ before and after the release of import prices (for the month of $t-1$) on day j in month t:

$$\epsilon_{\pi^s,t+h|P(k)_{j,t}} = \chi_{\pi^s,t+h|P(k)_{j,t}} - \chi_{\pi^s,t+h|P(k)_{j-1,t}}, \tag{3}$$

$$\epsilon_{\pi^f,t+h|P(k)_{j,t}} = \chi_{\pi^f,t+h|P(k)_{j,t}} - \chi_{\pi^f,t+h|P(k)_{j-1,t}}. \tag{4}$$

In equations (3) and (4), import prices are released with a one-month delay and $P(k)_{j-1,t}$ refers to the data panel that does not include the import price release for month *t-1*, whereas the next day's panel $P(k)_{j,t}$ does. The forecast innovations are defined as the information attributed to the monthly release of import prices.

Definition of a Successful Event (direction of forecast innovation)

"Successful event" is a term used in the event study literature to refer to responses, which match a directional criteria without referring to the magnitude of the change. There is no established directional criteria of a successful pass-through event from import prices to inflation forecasts. We define the event to be a success if either

$$(\Delta p_{t-1}^{imp} > 0 \; and \; \epsilon_{\pi^s,t+h|P(k)_{j,t}} > 0) \quad or \quad (\Delta p_{t-1}^{imp} < 0 \; and \; \epsilon_{\pi^s,t+h|P(k)_{j,t}} < 0),$$

$$(\Delta p_{t-1}^{imp} > 0 \; and \; \epsilon_{\pi^f,t+h|P(k)_{j,t}} > 0) \quad or \quad (\Delta p_{t-1}^{imp} < 0 \; and \; \epsilon_{\pi^f,t+h|P(k)_{j,t}} < 0).$$

This says that the direction of the change in last month's (total) import prices, Δp_{t-1}^{imp}, and the direction of forecast innovations for π^s and π^f should be the same. The criteria do not establish the size of the pass-though.[20] The success criterion assumes that the direction of total import prices is representative for the 15 other import price indexes. To test for direction using $\pi = \{\pi^s, \pi^f\}$, we construct two indicator functions $I_t^{imp} = 1$ if Δp_{t-1}^{imp} > 0; else $I_t^{imp} =$ -1 and $I_t^{\pi} = 1$ if $\epsilon_{\pi,t+h|P(k)_{j,t}} > 0$; else $I_t^{\pi} =$ -1 and then test if $I_t^{\pi} = I_t^{imp}$ using a rank test.

[20] A simple point estimate is defined in the next section.

3. Import Price Releases and Inflation Forecasting

This section offers empirical results on the real-time informational contribution from import price releases on inflation forecasts. All forecasts have a horizon of up to 24-months, i.e., $h = \{1, 2, \cdots, 24\}$.[21] The process of smoothing the inflation forecast with the band pass filter reduces the contribution coming from random noise at the time of the import price release and at the same time biases downward our pass-through estimates.

The first part of the analysis establishes the main empirical properties of the abnormal forecast innovations. This includes the main empirical result; import prices offer valuable information for inflation forecasts.[22] Next, the estimates of a time-varying pass-through are presented. This is then followed by two robustness checks. The first determines the importance of the information breadth defined by the four panels and the second seeks to determine whether price rigidity captured through administrative price setting has any bearing on our results.

Properties of Abnormal Forecast Innovations

[21] The choice of $max_h = 24$ ensures that the maximum response of the inflation forecasts to monthly import prices falls well within the defined time horizon.

[22] Appendix 3 provides empirical evidence that the RMSEs of the forecasting models based on panels $P(1)$ to $P(4)$ are lower than a naive and AR(3) model.

The main properties of the forecast innovations for CPI inflation (π^s) and CPI minus administrative price inflation (π^f) are tabulated in Table 2. The first six rows offer information on the forecasts innovations, $\epsilon_{\pi,t+h|P(k)_{j,t}}$. Figure 5 reproduces much of this information for the four panels in that the maximum response to import prices releases (denoted as $max_t(max_h(|\epsilon_{\pi^*,t+h|Pj}|))$ in Table 2), minimum response (denoted $min_t(max_h(|\epsilon_{\pi^*,t+h|Pj}|))$ in Table 2) and average response (denoted by the bar-line in Figure 5) of the forecast innovations for CPI and for CPI without administered prices are presented. Several observations are noteworthy.

First, the monthly pass-through proxied by $\epsilon_{\pi,t+h|P(k)_{j,t}}$ is not zero; statistical evidence is provided below in Tables 3 and 4. Second, average peak size declines with the information breadth of the panel. The importance of the information from import price releases in the inflation forecast diminishes when large information sets are considered. This result is true for both inflation measures with CPI without administered prices reacting slightly stronger than CPI prices. A third observation concerns the large volatility of $\epsilon_{\pi,t+h|P(k)_{j,t}}$. The maximum amplitude for π^f based on the information set $P(2)$, for example, is 0.3720 versus a minimum of 0.0103. Both were at a time when CPI inflation was 0.9%.[23]

To test whether the direction of forecast innovations is compatible with the direction of the monthly change in total import prices a Wilcoxon rank test is presented in Table 2. The test under the null is that the monthly direction of Δp_{t-1}^{imp} and $\epsilon_{\pi,t+h|P(k)_{j,t}}$ are the same. The p-values of the rank test are presented in the row labelled *Direction*. The evidence finds that the direction is consistent for the information panels $P(1)$ and $P(2)$. The test clearly rejects the information set $P(4)$ for both inflation measures. For $P(3)$, the results are inconclusive. The null is rejected in the case of π^s but not for π^f. A potential explanation is that exchange rates, which are included in $P(3)$ but not in $P(2)$, have an impact on non administered prices but no influence on CPI prices. This means that $P(3)$ entails overlapping information with respect to import prices.

Tables 3 and 4 provide evidence on whether the populations generating the two forecasts are different from zero. Results from a Wilcoxon rank test (see Diebold and Mariano (1995) statistic for S_3) are presented for the stacked innovations and for the individual months. A p-value less than 0.05 is to be

[23]Estimation uncertainty can be considered as a minor reason for additional volatility in the pass-through estimates, see also footnote 17.

interpreted such that the distributions of the forecast innovations degenerate on zero. The evidence finds that the null hypothesis is rejected for almost all the innovations from the individual months and the stacked forecast innovations, except for π^f with panel $P(4)$.[24] We interpret the evidence as showing that inflation forecasts respond to information from monthly import price releases.

Pass-Through Estimates

Figure 6 presents a scatter plot of the monthly pass-through from import prices to inflation forecasts versus the time duration in the forecast innovations' peak, i.e., $f = g(max_h(|\epsilon_{\pi,t+h|P(k)_{j,t}}|))$. More precisely, the pass-through measure is defined as $max_h(|\epsilon_{\pi,t+h|P(k)_{j,t}}|) * I_t^{\pi}/\Delta p_{t-1}^{imp}$, where the indicator variable, I_t^{π}, preserves the sign of the forecast innovation (i.e., I_t^{π} = +1 if $\epsilon_{\pi,t+h|Pj} > 0$; otherwise I_t^{π} = -1). The displayed point estimates for the monthly pass-through are bounded between -1 and +1 and include

[24] Diebold and Mariano (1995) show in their Tables 5 and 6 that the Wilcoxon rank test holds up well even in in the presence of serial and contemporaneous correlation and smaller samples than ours. Our forecast innovations have 24 observations, are not highly serially correlated, and are symmetric in distribution. An alternative test, the sign test with slightly lower power, yielded similar results for the innovation's median being different from zero.

estimates for CPI and for CPI minus administrative prices conditional on our four panels.[25] The monthly pass-through estimates fluctuate strongly and are skewed to the left, whereas the lag length of the maximum response fluctuates less and are symmetrically distributed.[26] The former result underscores the view that pass-through estimates are not uniform. This result has been shown in Campa and Goldberg (2002), Choudhri and Hakura (2001), Devereux and Yetman (2002), and Goldberg and Knetter (1997). They find a high variance in the pass-through estimates across countries and industry, but no study has noted this for single country estimates for a low inflation regime.

The median size of the pass-through from import prices to CPI inflation is 0.13 (average is 0.11) and the median lag length is 9 months (average is 8.1 months).[27] If the Goldberg and Knetter (1997) proxy of 0.5 is acknowledged

[25] Roughly a quarter of the estimates fall outside the +1 to -1 range. This stems from the fact that the change in total import prices is close to zero.

[26] The level of skewness for the point estimates is significant at the 0.05% critical level with a statistic of -1.22. The skewness statistic for the lag length is 0.26 and is not significant.

[27] The median for the pass-through estimates conditional on panels $P(1)$ and $P(2)$ bounded between +1 and -1 is 0.32 and the median estimates conditional on $P(3)$ and $P(4)$ is 0.11.

as an acceptable pass-through estimate from exchange rates to import prices, then the median (time-varying) estimate for all panels of 0.13 is in line with the time series estimates for Switzerland found in Choudri and Hakara (2001), Gagnon and Ihrig (2004), and Stulz (2005). Their point estimate for the exchange rate pass-through to Swiss consumer prices for a sample period that includes the 1990s is 0.07.[28]

To understand further whether Taylor's (2000) claim that the pass-through is linked to inflation also holds in the short run for a low inflation regime, causality tests between the two variables were performed. Table 5 provides rudimentary evidence that annualized inflation, π_t does not Granger cause the 18 pass-through estimates from import prices to inflation. The tests, based on two lags, find that the null hypothesis of non causality is not rejected for each of the four panels. This result underpins the view that the time-varying behavior of our pass-through estimates are not explained by short-run movements in past inflation. The observation of a low first-order correlation for inflation (i.e., less than 10% for both inflation measures) is one explanation for the causality results and does not allow us to refute Taylor's

[28] Devereux and Yetman (2002) estimate the exchange rate pass-through for Switzerland to be 0.02.

(2000) claim that the pass-through only matters when inflation is persistent for a high inflation regime.[29]

Price Rigidity

To determine whether price rigidity matters for our pass-through measure, two tests are conducted. The first compares whether the forecast innovations for CPI inflation, $\epsilon_{\pi^s,t+h|P(k)_{j,t}}$, and CPI non administrative inflation, $\epsilon_{\pi^f,t+h|P(k)_{j,t}}$, are equal. The second test considers the importance of the information sets in generating the forecast innovations. The tests seek to determine if $P(1)$, the panel without administered prices, behaves qualitatively different from broader panels, i.e., $P(2)$, $P(3)$, $P(4)$.

Table 6 provides p-values for the test under the null that the forecast innovations for π^s and π^f are equal: $\epsilon_{\pi^s,t+h|P(k)_{j,t}} = \epsilon_{\pi^f,t+h|P(k)_{j,t}}$. Four tests conditional on panels $\{P(1), \cdots, P(4)\}$ are performed. The evidence finds that the information from rigid prices through administrative price setting have no influence on the forecast innovations. The Wilcoxon-rank tests are unable to reject the null except for a handful of months. This result applies for all information sets $\{P(1), \cdots, P(4)\}$.

[29] In a similar manner, Campa and Goldberg (2002) argue that Taylor's (2000) argument carries weight only when inflation is high.

Next, the importance of the information sets in generating the forecast innovations is tested. To do this, rank tests with the null that $\epsilon_{\pi^s,t+h|P(k)} = \epsilon_{\pi^s,t+h|P(l)}$ and $\epsilon_{\pi^f,t+h|P(k)} = \epsilon_{\pi^f,t+h|P(l)}$ for $k \neq l$ are used. The p-values of the rank tests are given in Table 7 for π^f and Table 8 for π^s. The results find that the null $\epsilon_{\pi^s,t+h|P1} = \epsilon_{\pi^s,t+h|P2}$ and $\epsilon_{\pi^f,t+h|P1} = \epsilon_{\pi^f,t+h|P2}$ cannot be rejected, whereas the innovations generated from other panels are statistically different. The p-values are well above the critical level of 0.05% for $P(1)$ and $P(2)$. The null hypothesis of equality is only rejected for five isolated months. This result means that information from administrative prices does not improve the inflation forecasts: a result consistent with the evidence from Table 6.

4. Concluding Remarks

This paper presents a new empirical strategy to identify the pass-through from import prices to CPI inflation in real time. The time-dependent procedure has parallels to the event study framework used in empirical finance. An important step is the forecasting procedure based on daily panels. It relies on the data reduction techniques by Forni *et al.* (2000) and builds on earlier work by Amstad and Fischer (2004, 2005). The forecasting exercise centered around import price releases offers three new empirical findings.

First, the monthly pass-through is time varying even when controlling for a low inflation regime. Differences in the maximum and minimum response of the inflation forecasts to the data releases are observed. Although the point estimates reveal a relatively small (median) pass-through from import prices to consumer prices, the pass-through is found to be statistically different from zero. This result is underpinned by the directional evidence for prices. When new information in total import prices reflects a rise (fall) in foreign prices, this leads to an increase (decrease) in the revised inflation forecast.

Second, monthly releases in import prices are an important information source for inflation forecasts. The result is dependent on the information breadth of the daily panel; a feature that has not been examined in previous pass-through studies. The size and significance of the forecast innovation with respect to new information stemming from the monthly release of import prices is largest for the narrowest panel and smallest for the largest panel. In the latter case, estimates for a compatible measure of core inflation based on a data rich environment do not respond to import price releases. This result suggests that the additional variables in the larger panels are already capturing the information from import price releases.

Third, there is no difference in the innovations stemming from the CPI inflation forecasts before and after the release in import prices and in those innovations using the non administered CPI prices. If administered prices are recognized as a form of nominal rigidity, the empirical results do not support theoretical models based on Calvo (1983) pricing decisions.

The time-varying pass-through estimates need to be qualified, however. First, the estimates are for a limited sample and could also be country specific. Hence, more empirical work is needed for other countries. Second, the measure of non administered prices may be too narrow to make valid claims of price rigidity for non tradable goods. Burstein *et al.* (2005) argue that the traded goods component of the CPI is economically narrower than measured by statistical agencies. Despite these shortcomings, the identification of pass-through measures in real time offers new insights that cannot be analyzed with standard regression techniques.

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Appendix 1: Data Transformations

The decisions to transform the variables in the panels follow those taken in Amstad and Fischer (2005). First, no seasonal filtering is conducted because of its reliance on future information; this is not consistent with real-time forecasting. Amstad and Fischer (2004) demonstrate that seasonal adjustment can be treated through band-pass filtering. This overcomes the end-of-sample problem and the absence of seasonal revision allows us to interpret better the daily innovations in $\epsilon_{i,t+h|P(k)_{j,t}}$. Second, the daily panels are updated so that new information from the monthly releases are incorporated and new monthly averages are generated with the daily financial variables. The averaging of the daily information (i.e., opposed to using the latest daily observation as a proxy for the monthly observation) allows us to generate improved forecasts for our price variables based on real-time information without contaminating $\epsilon_{i,t+h|P(k)_{j,t}}$. Third, logarithms were taken for nonnegative series that were not in rates or in percentage units to account for possible heteroskedasticity. Fourth, the series were differenced if necessary to account for stochastic trends. Fifth, the series were taken in deviation from the mean and divided by their standard deviation to remove scalar effects.

Appendix 2: End of Sample Procedure

To consider the most recent information defined in terms of daily panels, we use a data set which is unbalanced at sample end. Therefore some series end in T, others in T + 1,..,T + w. To forecast with such an unbalanced panel, we use the method of Altissimo *et al.* (2001) and Christadoro *et al.* (2005) by reordering the variables $x_{i,t}$ in a way that

$$x^*_{i,t} = (x^1_{i,t}\ x^2_{i,t}\ ...\ x^w_{i,t})$$

where $x^j_{i,t}, j = 1, ..., w$ groups are variables with the same last available observation $T + j - 1$. The covariance matrix is then partitioned as follows

$$\widehat{\Gamma}^*(k) = \begin{pmatrix} \widehat{\Gamma}^{11}(k) & \widehat{\Gamma}^{12}(k) & . & \widehat{\Gamma}^{1w}(k) \\ \widehat{\Gamma}^{21}(k) & \widehat{\Gamma}^{22}(k) & . & \widehat{\Gamma}^{2w}(k) \\ . & . & . & . \\ \widehat{\Gamma}^{w1}(k) & \widehat{\Gamma}^{w2}(k) & . & \widehat{\Gamma}^{ww}(k) \end{pmatrix}$$

and accordingly for the covariance matrix of the common $\widehat{\Gamma}^*_\chi(k)$ and the covariance matrix of the idiosyncratic $\widehat{\Gamma}^*_\xi(k)$ as well.[30] After shifting the variables in such a way to retain, for each one of them, only the most updated observation, the generalized principal components is computed for the realigned vector $\widehat{\Gamma}^*_\xi(k)$ to get the forecasts. The final step is to restore the original alignment. The procedure is described in greater detail in Christadoro *et al.* (2005).

[30] $\widehat{\Gamma}^*_\xi(k)$ is diagonal and therefore the realigned $\widehat{\Gamma}^*_\xi(k)$ equals the original $\widehat{\Gamma}_\xi(k)$.

Appendix 3: Forecast Evaluation

Table A3 presents RMSEs for CPI forecasts from three different models: naive, AR(3), and our preferred dynamic common factor (DCF) model based on panels $P(1)$ to $P(4)$, denoted as DCF(P1) to DCF(P4) in Table A3. The naive and AR(3) models are simple benchmarks that are frequently able to outperform more sophisticated models over longer forecast periods. To determine how the information breath influences the DCF forecasts, the results for DCF(P1) to DCF(P4) are also considered. The naive forecasts keep the last observed CPI inflation rate constant over the forecast horizon, whereas the AR(3) forecasts are with-in-sample forecasts. The later forecasts work with forward information and thus assume a stronger information structure than the DCF forecasts, which are out-of-sample forecasts.

The rolling forecast period is from 2001:1 to 2003:10 and the estimates are based on information that begins in 1993:5. RMSEs, based on 34 observations, are calculated for four (cumulative) forecast horizons: 1 to 6 months ahead, 1 to 12 months ahead, 1 to 18 months ahead, and 1 to 24 months ahead. The results find that the DCF forecasts improve slightly as the size of the panel increases. Hence, our panels do not suffer from the Boivin and Ng (2005) critic that more variables do not necessarily improve the forecast. Over all horizons, the DCF forecasts outperform the AR(3) and naive forecasts.

Table A3: RMSEs for DCF Model versus Naive and AR Forecasts

forecast horizon	*Naive*	$AR(3)$	DCF(P1)	DCF(P2)	DCF(P3)	DCF(P4)
1 to 6 months	0.060008	0.054547	0.047659	0.042331	0.041040	0.032626
1 to 12 months	0.143551	0.097464	0.093667	0.085012	0.080808	0.064101
1 to 18 months	0.241008	0.144003	0.142446	0.133600	0.128032	0.110418
1 to 24 months	0.313176	0.187717	0.186807	0.178166	0.172916	0.155364

Table 1: Data Series, Periodicity and Transformation

***Data Panels* are defined as follows**

***P*(1)**	(domestic prices – non adm.)	rows 1 to 177
***P*(2)**	(domestic CPI prices)	rows 1 to 193
***P*(3)**	(prices plus financial var.)	rows 1 to 269
***P*(4)**	(prices plus real variables)	rows 1 to 449

	Prices	**P**	**T**
1.	CPI: producer prices processing prod. total	m	2
2.	CPI: total supply index total	m	2
3.	CPI: consumer price index	m	2
4.	CPI: energy (fuel, electricity & gasoline)/total	m	2
5.	CPI: trimmed mean 70% (y-o-y)	m	2
	CPI-food & soft drinks		
6.	CPI: other vegetables	m	2
7.	CPI: other cereal products	m	2
8.	CPI: other milk	m	2
9.	CPI: other dairy products	m	2
10.	CPI: other meat	m	2
11.	CPI: real coffee	m	2
12.	CPI: bread	m	2
13.	CPI: butter	m	2
14.	CPI: long life bakery product	m	2
15.	CPI: eggs	m	2
16.	CPI: fancy cakes	m	2
17.	CPI: fresh fish	m	2
18.	CPI: frozen fish	m	2
19.	CPI: tinned fish	m	2
20.	CPI: meat products	m	2
21.	CPI: fresh and soft cheese	m	2
22.	CPI: fruit and vegetables juices	m	2
23.	CPI: fruit-vegetables	m	2
24.	CPI: poultry	m	2
25.	CPI: semi hard cheese	m	2
26.	CPI: hard cheese	m	2
27.	CPI: veal	m	2
28.	CPI: potatoes	m	2
29.	CPI: pastries	m	2
30.	CPI: cabbage vegetables	m	2
31.	CPI: jam, honey	m	2
32.	CPI: conserved fruits	m	2
33.	CPI: conserved vegetables	m	2
34.	CPI: finished foodstuffs	m	2
35.	CPI: instant coffee	m	2
36.	CPI: margarine, cooking fat	m	2
37.	CPI: flour	m	2
38.	CPI: nutrient juices	m	2
39.	CPI: natural mineral water	m	2
40.	CPI: cream	m	2
41.	CPI: rice	m	2
42.	CPI: beef	m	2
43.	CPI: salad	m	2
44.	CPI: sheepmeat	m	2
45.	CPI: chocolate	m	2
46.	CPI: pork	m	2
47.	CPI: ice cream	m	2
48.	CPI: soups, spicery	m	2
49.	CPI: soft drinks	m	2
50.	CPI: tea	m	2
51.	CPI: pastas	m	2
52.	CPI: total index	m	2
53.	CPI: full-cream milk	m	2
54.	CPI: sausages	m	2
55.	CPI: root vegetables	m	2
56.	CPI: sugar	m	2
57.	CPI: onions	m	2
	CPI-alcoholic drinks & tobacco		
58.	CPI: other tobacco products	m	2
59.	CPI: beer	m	2
60.	CPI: brandy, spirits	m	2
61.	CPI: liqueur	m	2
62.	CPI: foreign red wine	m	2
63.	CPI: domestic red wine	m	2
64.	CPI: total index	m	2
65.	CPI: foreign white wine	m	2
66.	CPI: domestic white wine	m	2
67.	CPI: cigarettes	m	2
	CPI-clothes & shoes		
68.	CPI: suits	m	2
69.	CPI: blouses, shirts	m	2
70.	CPI: ladies' shoes	m	2
71.	CPI: men' shoes	m	2
72.	CPI: trousers	m	2
73.	CPI: trousers	m	2
74.	CPI: trousers & skirts	m	2
75.	CPI: jackets	m	2
76.	CPI: skirts	m	2
77.	CPI: children's' shoes	m	2
78.	CPI: cloth redressing	m	2
79.	CPI: cloth material	m	2
80.	CPI: costumes, clothes	m	2
81.	CPI: coats	m	2
82	CPI: coats & jackets	m	2
83.	CPI: coats & jackets & vestons	m	2
84.	CPI: knitting wool	m	2
85.	CPI: shirts	m	2
86.	CPI: repair of shoes	m	2
87.	CPI: sportswear	m	2
88.	CPI: sportswear	m	2
89.	CPI: sportswear	m	2
90.	CPI: knitwear	m	2
91.	CPI: knitwear	m	2
92.	CPI: knitwear	m	2
93.	CPI: hosiery & underwear	m	2
94.	CPI: total	m	2
95.	CPI: cleaning & dry cleaning	m	2
96.	CPI: underwear	m	2
97.	CPI: underwear	m	2
	CPI-rent & energy		
98.	CPI: service and maintenance	m	2
99.	CPI: heating oil	m	2
100.	CPI: service and maintenance	m	2
101.	CPI: total	m	2
102.	CPI: rent	m	2
	CPI-household effects		
103.	CPI: bedclothes & white goods	m	2
104.	CPI: floor covering % carpet	m	2
105.	CPI: equipment tools	m	2
106.	CPI: crockery & cutlery	m	2
107.	CPI: electrical and non-ele. household app.	m	2
108.	CPI: tools, do-it-yourself, gardening tools	m	2
109.	CPI: small electrical household appliances	m	2

Table 1: (*continued*)

110.CPI: kitchen & garden	m	2
111.CPI: kitchen & cooking utensils	m	2
112.CPI: do-it-yourself & gardening tools	m	2
113.CPI: cleaning tools	m	2
114.CPI: sleeping utilities	m	2
115.CPI: other expendable goods	m	2
116.CPI: total	m	2
117.CPI: curtain	m	2
118.CPI: cleaning agents	m	2
119.CPI: habitation	m	2
CPI-traffic, public transport		
120.CPI: bicycles	m	2
121.CPI: motorbikes	m	2
122.CPI: new cars	m	2
123.CPI: tires	m	2
124.CPI: services & repairs	m	2
125.CPI: service utilities	m	2
126.CPI: total	m	2
127.CPI: fuel	m	2
CPI-news transport, communications		
128.CPI: news transport, communications	m	2
129.CPI: HiFi	m	2
130.CPI: recording utilities	m	2
131.CPI: books & pamphlets	m	2
132.CPI: office equipment	m	2
133.CPI: TV & video	m	2
134.CPI: photo, cinema & optical instruments	m	2
135.CPI: pets	m	2
136.CPI: leisure courses	m	2
137.CPI: package tour	m	2
138.CPI: plants	m	2
139.CPI: repair & installation	m	2
140.CPI: writing & drawing materials	m	2
141.CPI: toys & hobby tools	m	2
142.CPI: total	m	2
CPI-restaurants & hotels	**P**	**T**
143.CPI: beer	m	2
144.CPI: hotel business	m	2
145.CPI: coffee & tea	m	2
146.CPI: meals in restaurants and cafés	m	2
147.CPI: mineral water & soft drinks	m	2
148.CPI: other hotel business	m	2
149.CPI: spirits & alcoholic drinks	m	2
150.CPI: total	m	2
151.CPI: wine	m	2
CPI-other products & services	**P**	**T**
152.CPI: hairdresser	m	2
153.CPI: electrical equipment for personal hygiene	m	2
154.CPI: hair care products	m	2
155.CPI: skin care products & cosmetics	m	2
156.CPI: non-electrical equip. for personal hygiene	m	2
157.CPI: stationery for personal hygiene	m	2
158.CPI: first-aid	m	2
159.CPI: soap & bath additions	m	2
160.CPI: total	m	2
161.CPI: dental care	m	2
Import prices		
162.IP: agricultural Products	m	2
163.IP: food	m	2
164.IP: textile and Cloths	m	2
165.IP: wood Products	m	2
166.IP: paper products	m	2
167.IP: minerals and oil products	m	2
168.IP: rubber and synthetics	m	2
169.IP: glass, stone, other minerals	m	2
170.IP: metal Products	m	2
171.IP: machines	m	2
172.IP: office and IT products	m	2
173.IP: automobiles	m	2
174.IP: furniture	m	2
175.IP: semi-finished products	m	2
176.IP: processing production total	m	2
177.IP: total imports	m	2
P(1)		
CPI-Administered Prices		
178.CPI: mountain railway & ski lift	m	2
179.CPI: train	m	2
180.CPI: public transport (regional)	m	2
181.CPI: education, total	m	2
182.CPI: education, continuing education	m	2
183.CPI: medical care	m	2
184.CPI: drugs	m	2
185.CPI: hospital care	m	2
186.CPI: (medicine) total	m	2
187.CPI: dental treatment	m	2
188.CPI: cinema	m	2
189.CPI: radio & TV concession	m	2
190.CPI: sport & leisure activity	m	2
191.CPI: theatre & concert	m	2
192.CPI: (news and transport) other services	m	2
193.CPI: sporting event	m	2
P(2)		
Interest rates		
194.mortgage rate	m	1
195.savings deposits by cantonal banks	m	1
196.medium term bonds by cantonal banks	m	1
197.medium term bonds by big banks	m	1
198.transaction accounts, weighted interest rates	m	1
199.fixed-term deposits by big banks, 3 months	m	1
200.government bonds: 2 years	d	1
201.government bonds: 3 years	d	1
202.government bonds: 4 years	d	1
203.government bonds: 5 years	d	1
204.government bonds: 7 years	d	1
205.government bonds: 10 years	m	1
206.government bonds: 20 years	d	1
207.CHF-Libor:: 1 month	d	1
208.CHF-Libor:: 3 months	d	1
209.CHF-Libor:: 6 months	d	1
210.CHF-Libor:: 12 months	d	1
211.0-coupon: 1 year	m	1
212.0-coupon: 3 years	m	1
213.0-coupon: 6 years	m	1
214.0-coupon: 9 years	m	1
215.0-coupon: 15 years	m	1
216.0-coupon: 20 years	m	1
Exchange rates		
217.Swiss franc / US-dollar	m	2
218.Swiss franc / yen	m	2
219.Swiss franc / euro	m	2

Table 1: (*continued*)

220.	trade weighted nom. ex. rates, 24 trade partner	m	2
221.	trade weight. real CPI based ex. rates., 24 trade	m	2
222.	trade weight. nom. Ex. rates, 16 European trade	m	2
223.	trade weight. real ex. rates., 16 European trade	m	2
	Financial		
224.	banks, building credit	m	2
225.	mortgage credits	m	2
226.	other credits	m	2
227.	total credits	m	2
228.	all shares	m	2
229.	SPI (with reinvestments)	m	2
230	SPI: registered shares	m	2
231.	SPI: bearer share	m	2
232.	SPI: industry	m	2
233.	SPI: services	m	2
234.	SPI: banks	m	2
235.	SMI (without reinvestments)	m	2
236.	oil Brent	d	2
237.	raw material index HWWA	m	2
238.	gold / kg	d	2
	Money		
239.	currency in circulation	m	2
240.	sight deposits	m	2
241.	transaction accounts	m	2
242.	money supply M1	m	2
243.	savings deposits	m	2
244.	money supply M2	m	2
245.	time deposits	m	2
246.	money supply M3	m	2
247.	monetary base	m	2
	Foreign prices		
248.	USA: consumer prices	m	2
249.	USA: producer prices	m	2
250.	Japan: consumer prices	m	2
251.	Japan: import price	m	2
252.	Euro Area: consumer prices, EU harmonized	m	2
253.	Euro Area: producer prices	m	2
254.	GB: consumer prices	m	2
255.	GB: consumer prices, harmonized CPI	m	2
256.	France: consumer prices, EU harmonized	m	2
257.	Germany: import prices	m	2
	Foreign interest rates		
258.	USA: government bonds, long term	m	2
259.	USA: government bonds, short term	m	2
260.	Japan: government bonds	m	2
261.	GB: government bonds, long term	m	2
262.	GB: government bonds, short term	m	2
263.	France: government bonds, long term	m	2
264.	Germany: government bonds, long term	m	2
265.	Italy: government bonds, long term	m	2
266.	USA: Libor, 3 month	m	2
267.	Japan: Libor, 3 month	m	2
268.	GB: Libor, 3 month	m	2
269.	Euro Area: Libor, 3 month	m	2
	$F(3)$		
	External trade		
270.	raw materials & semi finished products: ex vol.	m	2
271.	raw mat. & semi finished products: ex. vol.	m	2
272.	raw materials & semi finished products: ex. Pr.	m	2
273.	raw materials & semi finished products: imp v.	m	2
274.	raw mat. & semi finished products: imp. vol.	m	2
275.	raw materials & semi finished products: imp. p.	m	2
276.	energy: export volume	m	2
277.	energy: export volume index	m	2
278.	energy: export price index	m	2
279.	energy: import volume	m	2
280.	energy: import volume index	m	2
281.	energy: import price index	m	2
282.	crude oil: export volume	m	2
283.	crude oil: export volume index	m	2
284.	crude oil: export price index	m	2
285.	motor fuel / gasoline: import volume	m	2
286.	motor fuel / gasoline: import volume index	m	2
287.	motor fuel / gasoline: import price index	m	2
288.	motor fuel (oil base): export volume	m	2
289.	motor fuel (oil base): export volume index	m	2
290.	motor fuel (oil base): export price index	m	2
291.	m. f. (bas. on nat. gas & hydro.): import vol.	m	2
292.	m. f. (bas. on nat. gas & hydro.): import vol	m	2
293.	m. f. (bas. on nat. gas & hydro.): import price	m	2
294.	fuel export price index:	m	2
295.	fuel (oil base): import volume	m	2
296.	fuel (oil base): import price index	m	2
297.	fuel (based on hard coal): export volume	m	2
298.	fuel (based on hard coal): export volume index	m	2
299.	fuel (based on hard coal): export price index	m	2
300.	capital goods: import volume	m	2
301.	capital goods: import volume index	m	2
302.	capital goods: import price index	m	2
303.	capital goods: export volume	m	2
304.	capital goods: export volume index	m	2
305.	capital goods: export price index	m	2
306.	machines & instruments: import volume	m	2
307.	machines & instruments: import volume index	m	2
308.	machines & instruments: export volume	m	2
309.	machines & instruments: export volume index	m	2
310.	utility vehicles: import volume	m	2
311.	utility vehicles: export volume	m	2
312.	construction items: import volume	m	2
313.	construction items: export volume	m	2
314.	consumer goods: import volume	m	2
315.	consumer goods: import volume index	m	2
316.	consumer goods: import price index	m	2
317.	consumer goods: export volume	m	2
318.	consumer goods: export volume index	m	2
319.	consumer goods: export price index	m	2
320.	consumer goods: food & luxury food, exp. vol.	m	2
321.	consumer goods: food & luxury food, exp. vol.	m	2
322.	consumer goods: food & luxury food, exp. Pr.	m	2
323.	consumer goods: food & luxury food, imp. vol.	m	2
324.	consumer goods: food & luxury food, imp. vol	m	2
325.	consumer goods: food & luxury food, imp. pr.	m	2
326.	other nondurable consumer goods: exp. vol.	m	2
327.	other nondurable consumer goods: exp. vol.	m	2
328.	other nondurable consumer goods: exp. price	m	2
329.	other nondurable consumer goods: import vol.e	m	2
330.	other nondurable consumer goods: import vol.	m	2
331.	other nondurable consumer goods: import pr.	m	2
332.	other nondurable consumer goods: export vol.	m	2
333.	durable consumer goods: export volume index	m	2
334.	durable consumer goods: export price index	m	2
335.	durable consumer goods: import volume	m	2
336.	durable consumer goods: import volume index	m	2

Table 1: (*continued*)

337.durable consumer goods: import price index	m	2
338.precious metals & stones: export volume	m	2
339.precious metals & stones: import volume	m	2
340.art objects & antiques: export volume	m	2
341.art objects & antiques: import volume	m	2
342.total (without precious metals): export volume	m	2
343.total (without precious metals): export volume	m	2
344.total (without precious metals): export price	m	2
345.total (without precious metals): import volume	m	2
346.total (without precious metals): import volume	m	2
347.total (without precious metals): import price	m	2
348.total (with precious metals): export volume	m	2
349.total (with precious metals): total export value	m	2
350.total exports value FOB	m	2
351.total (with precious metals): total import vol.	m	2
352.total (with precious metals): total import value	m	2
Survey: real trade		
353.KOF-business barometer	m	0
354.turnover (y-o-y): unchanged	m	0
355.stock (y-o-y): unchanged	m	0
356.stock rating: unchanged	m	0
357.expected purchases: unchanged	m	0
358.expected turnover: unchanged	m	0
359.business sentiment: balance	m	0
360.expected turnover: balance	m	0
361.expected purchases: balance	m	0
362.stock: balance	m	0
363.stock (y-o-y): balance	m	0
364.turnover (y-o-y): balance	m	0
Survey: industry		
365.new orders (m-o-m): unchanged	m	0
366.new orders (y-o-y): unchanged	m	0
367.backlog of orders (m-o-m): unchanged	m	0
368.backlog of orders: unchanged	m	0
369.production (m-o-m): unchanged	m	0
370.production (y-o-y): unchanged	m	0
371.stock of inter. products (m-o-m): unchanged	m	0
372.stock of preliminary products: unchanged	m	0
373.stock of finished products (m-o-m): unchanged	m	0
374.stock of finished products: unchanged	m	0
375.expected new orders: unchanged	m	0
376.expected production: unchanged	m	0
377.planned purchase of inter. products: unchanged	m	0
378.new orders (m-o-m): balance	m	0
379.new orders (y-o-y): balance	m	0
380.backlog of orders (m-o-m): balance	m	0
381.backlog of orders: balance	m	0
382.production (m-o-m): balance	m	0
383.production (y-o-y): balance	m	0
384.stock of inter. products (m-o-m): balance	m	0
385.stock of preliminary products: balance	m	0
386.stock of finished products (m-o-m): balance	m	0
387.stock of finished products: balance	m	0
388.expected new orders: balance	m	0
389.scheduled production: balance	m	0
390.planned purchase of interm. products: balance	m	0
391.run of business	m	0
392.Firm plans (composite index)	m	0
Labor		
393.Manpower job offer index	m	2
394.persons in short working hours: women	m	2
395.persons in short working hours: men	m	2
396.persons in short working hours: women & men	m	2
397.unemployed persons: partly unemployed per.	m	2
398.unemployed persons: fullly unemployed per.	m	2
399.unemployed persons: total reg. unemployed	m	2
400.unemployed persons: women total	m	2
401.unemployed persons: men total	m	2
402.unemployment rate: unemployment rate	m	2
403.vacancies, job offers: full-time job offers, all	m	2
404.vacancies, job offers: part-time job offers, all	m	2
405.vacancies, job offers: total	m	2
406.job seekers: total	m	2
Demand		
407.consumption: new car registrations	m	0
408.consumption: overnight stays	m	0
409.consumption: total index, real	m	0
410.consumption: food & beverages, real	m	0
411.consumption: textiles & clothes, real	m	0
412.consumption: other, real	m	0
413.consumption: unadj. turno., retail, m-o-m, real	m	0
414.consumption: unadj. turno., food, m-o-m, real	m	0
415.consumption: unadj. turno., textiles, m-o-m, real	m	0
416.consumption: unadj. turno., other, m-o-m, real	m	0
417.consumption: adj. f. tra. day, retail, d-o-d, real	m	0
418.consumption: adj. f. tra. day, food, d-o-d, real	m	0
419.consumption: adj. f. tra. day, textiles, d-o-d, real	m	0
420.consumption: adj. f. tra. day, other, d-od, real	m	0
421.investments: utility vehicle registration	m	0
422.investments: imported capital goods	m	2
Foreign industrial production		
423.USA: industrial production, total, excl. const.	m	2
424.USA: industrial production, capacity utilization	m	2
425.Japan: industrial production, total	m	2
426.Japan: industrial production, capacity util.	m	2
427.Euro Area: industrial prod., total, excl. constr.	m	2
428.GB: industrial production, total, excl. constr.	m	2
429.France: industrial production, total, excl. constr.	m	2
430.Italy: industrial production, total, excl. constr.	m	2
Foreign labor market		
431.USA: labor force	m	2
432.USA: unemployment rate	m	2
433.USA: unemployed persons	m	2
434.USA: persons in employment	m	2
435.Japan: labor force	m	2
436.Japan: unemployed persons	m	2
437.Japan: unemployment rate	m	2
438.Japan: vacancies, job offers	m	2
439.Japan: hours worked in manufacturing	m	2
440.GB: persons in employment	m	2
441.GB: unemployed persons	m	2
442.GB: unemployment rate	m	2
443.France: unemployed persons	m	2
444.France: unemployment rate	m	2
445.France: vacancies, job offers	m	2
446.Germany: unemployed persons	m	2
447.Italy: unemployed persons	m	2
448.Italy: unemployment rate	m	2
449.Italy: persons in employment	m	2

P(4)

P=periodicity (m= monthly, d= daily)
T=transformation (0=original, 1=difference, 2=log difference)

Table 2: Properties of the Forecast Innovations for Panels $\{P(1), P(2), P(3), P(4)\}$

π^f (CPI w/o admin. prices)	$P(1)$	$P(2)$	$P(3)$	$P(4)$
$max_t(max_h(((\|\epsilon_{\pi^*,t+h\|Pj}\|))$	0.3074	0.3720	0.1568	0.1627
$min_t(max_h(\|\epsilon_{\pi^*,t+h\|Pj}\|))$	0.102	0.0103	0.0099	0.0039
$ave(max_h(\|\epsilon_{\pi^*,t+h\|Pj}\|))$	0.1374	0.1287	0.0575	0.0387
$std\ dev(max_h(\|\epsilon_{\pi^*,t+h\|Pj}\|))$	0.0927	0.1002	0.0510	0.0352
$ave(max_h(\|\epsilon_{\pi^*,t+h\|Pj}\| * I_t))$	0.0394	0.0390	0.0135	-0.0013
$std\ dev(max_h(\|\epsilon_{\pi^*,t+h\|Pj}\| * I_t))$	0.1641	0.1611	0.0768	0.0530
Direction	0.7468	0.7468	0.7529	0.0000*
π^s (CPI)	$P(1)$	$P(2)$	$P(3)$	$P(4)$
$max_t(max_h(\|\epsilon_{\pi,t+h\|Pj}\|))$	0.2329	0.2784	0.1297	0.1393
$min_t(max_h(\|\epsilon_{\pi,t+h\|Pj}\|))$	0.0117	0.0101	0.0083	0.0032
$ave(max_h(\|\epsilon_{\pi,t+h\|Pj}\|))$	0.1095	0.1094	0.0492	0.0314
$std\ dev(max_h(\|\epsilon_{\pi,t+h\|Pj}\|))$	0.0666	0.0838	0.0427	0.0301
$ave(max_h(\|\epsilon_{\pi,t+h\|Pj}\| * I_t))$	0.0266	0.0214	0.0097	-0.0000
$std\ dev(max_h(\|\epsilon_{\pi,t+h\|Pj}\| * I_t))$	0.1279	0.1385	0.0654	0.0442
Direction	0.7468	0.7468	0.0000*	0.0000*

Notes: See Table 1 for definitions of $P(1)$-$P(4)$. I_t^π is an indicator variable +1 if $\epsilon_{\pi,t+h|Pj} > 0$; otherwise -1. For $max_t(max_h(((|\epsilon_{\pi^*,t+h|Pj}|))$ $t = 1, \cdots, 18$ and $h = 1, \cdots, 24$. * denotes rejection at the 5% level. *Direction* is a sign test between import prices and the forecast innovations for π^s and π^f.

Table 3: Rank Tests of the Forecast Innovations's Significance for π^f

	$P(1)$	$P(2)$	$P(3)$	$P(4)$
total	0.0000*	0.0000*	0.0056*	0.2572
Dec 03	0.0000*	0.0000*	0.0000*	0.2951
Jan 04	0.0353*	0.0353*	0.6045	0.0084*
Feb 04	0.0000*	1.0000	1.0000	0.0353*
Mar 04	0.0000*	0.0000*	1.0000	0.0000*
Apr 04	0.0000*	0.0000*	0.6045	0.1150
May 04	0.0000*	0.0000*	0.0000*	0.0353*
Jun 04	0.0000*	0.0000*	0.0016	0.0353*
Jul 04	0.0000*	0.0000*	0.0000*	0.0016
Aug 04	1.0000	0.0084*	0.0000*	0.0000*
Sep 04	0.0000*	0.0000*	0.0084*	0.0002*
Oct 04	0.0000*	0.0000*	0.2951	0.0000*
Nov 04	0.0000*	0.0000*	0.0000*	0.0000*
Dec 04	0.0000*	0.0002*	0.0084*	0.0016*
Jan 05	0.6045	0.0000*	0.0000*	0.0002*
Feb 05	0.0000*	0.0000*	0.0000*	0.0000*
Mar 05	0.0000*	0.0000*	0.0016*	0.0084*
Apr 05	0.6045	0.1150	0.0000*	0.0000*
May 05	0.0000*	0.0000*	0.0084*	0.0016*

Notes: Statistics are p-values from a Wilcoxon rank test for the null that the forecast innovations for π^f are insignificant. * denotes rejection of the null at the 5% critical level. See Table 1 for a description of $P(1)$-$P(4)$.

Table 4: Rank Tests of the Forecast Innovations's Significance for π^s

	$P(1)$	$P(2)$	$P(3)$	$P(4)$
total	0.0000*	0.0000*	0.0038*	0.0234*
Dec 03	0.0000*	0.0000*	0.0000*	0.2951
Jan 04	0.1150	0.0353*	0.6045*	0.2950
Feb 04	0.0000*	0.6045*	1.0000	0.0353*
Mar 04	0.0000*	0.0000*	1.0000	0.6044
Apr 04	0.0000*	0.0000*	0.6045*	0.2951
May 04	0.0000*	0.0000*	0.0000*	0.0000*
Jun 04	0.0000*	0.0000*	0.0084*	0.6045
Jul 04	0.0000*	0.0353*	0.0000*	0.1145
Aug 04	1.0000	0.0002*	0.0000*	0.0000*
Sep 04	0.0000*	0.0000*	0.0016*	0.0016*
Oct 04	0.0000*	0.0000*	0.6044	0.0000*
Nov 04	0.0000*	0.0000*	0.0000*	0.0000*
Dec 04	0.0000*	0.0002*	0.0353*	0.0084*
Jan 05	0.2951	0.0000*	0.0000*	0.0084*
Feb 05	0.0000*	0.0000*	0.0000*	0.0000*
Mar 05	0.0000*	0.0000*	0.0000*	0.0016*
Apr 05	0.0016*	0.0000*	0.0000*	0.0000*
May 05	0.0000*	0.0000*	0.0084*	0.0016*

Notes: Statistics are p-values from a Wilcoxon rank test for the null that the forecast innovations for π^s are insignificant. * denotes rejection of the null at the 5% critical level. See Table 1 for a description of $P(1)$-$P(4)$.

Table 5: Granger Non Causality Tests of Inflation on the Pass-Through

	$P(1)$	$P(2)$	$P(3)$	$P(4)$
CPI				
F-stat	0.2573	0.22221	0.04000	0.1228
p-value	0.7777	0.8043	0.9610	0.8857
CPI without Ad. Prices				
F-stat	0.3517	0.2794	0.1079	0.0523
p-value	0.7111	0.7615	0.8987	0.9493

Notes: The Granger regressions are with 2 lags for 16 observations.

Table 6: Rank Tests of the Forecast Innovations between π^f and π^s

	$P(1)$	$P(2)$	$P(3)$	$P(4)$
total	0.2078	0.3255	0.5136	0.3196
Dec 03	0.3808	0.0000*	0.0266*	0.0779
Jan 04	0.3274	0.6876	0.6725	0.1460
Feb 04	0.2240	0.7649	1.0000	0.8286
Mar 04	0.1460	0.1578	0.6876	0.0002*
Apr 04	0.1975	0.1768	1.0000	0.6725
May 04	0.1904	0.1147	0.0080*	0.8286
Jun 04	0.0466*	0.5990	0.2611	0.1195
Jul 04	0.1975	0.1404	0.2700	0.3921
Aug 04	0.7807	0.6876	0.7029	0.1578
Sep 04	0.7966	0.9753	0.4273	0.2700
Oct 04	0.0779	0.1245	0.2610	0.4394
Nov 04	0.0000*	0.0001*	0.3173	0.2122
Dec 04	0.1703	0.1975	0.8447	0.5848
Jan 05	0.5430	0.7182	0.0889	0.3376
Feb 05	0.5028	0.4037	0.4517	0.0215*
Mar 05	0.1703	0.1404	0.0744	1.0000
Apr 05	0.0240*	0.0000*	0.4037	0.1055
May 05	0.2700	0.1768	0.3173	0.9097

Notes: Statistics are p-values from a Wilcoxon rank test for the null: $\epsilon_{\pi^s,t+h|P(k)_{j,t}} = \epsilon_{\pi^f,t+h|P(k)_{j,t}}$.

* denotes rejection of the null at the 5% critical level. See Table 1 for a description of $P(1)$-$P(4)$.

Table 7: Rank Tests of the Forecast Innovations's for π^f based on Information Sets

	$P(1)$ vs $P(2)$	$P(1)$ vs $P(3)$	$P(1)$ vs $P(4)$	$P(3)$ vs $P(4)$
total	0.5407	0.0000*	0.0000*	0.0008*
Dec 03	0.0000*	0.0000*	0.0000*	0.0000*
Jan 04	0.0182*	0.0006*	0.0122*	0.5707
Feb 04	0.0009*	0.0002*	0.0328*	0.0008*
Mar 04	0.2122	0.0000*	0.0000*	0.0011*
Apr 04	0.2199	0.0000*	0.0000*	0.0779
May 04	0.0172*	0.0000*	0.0000*	0.8934
Jun 04	0.3922	0.0000*	0.0000*	0.0001*
Jul 04	0.4213	0.1640	0.0000*	0.0000*
Aug 04	0.3697	0.0004*	0.0444*	0.0154*
Sep 04	0.1768	0.0163*	0.0000*	0.0000*
Oct 04	1.0000	0.0000*	0.0019*	0.0004*
Nov 04	0.2567	0.0000*	0.0000*	0.0477*
Dec 04	0.5848	0.0029*	0.1245	0.0513
Jan 05	0.0010*	0.0001*	0.0650	0.0000*
Feb 05	0.2977	0.6575	0.2277	0.0001*
Mar 05	0.3588	0.0000*	0.0049*	0.0040*
Apr 05	0.0680	0.4642	0.7182	0.7029
May 05	0.1100	0.0081*	0.0001*	0.1100

Notes: Statistics are p-values from a Wilcoxon rank test for the null: $\epsilon_{\pi^f,t+h|P(k)} = \epsilon_{\pi^f,t+h|P(l)}$ for $k \neq l$.

* denotes rejection of the null at the 5% critical level. See Table 1 for a description of $P(1)$-$P(4)$.

Table 8: Rank Tests of the Forecast Innovations's for π^s based on Information Sets

	$P(1)$ vs $P(2)$	$P(2)$ vs $P(3)$	$P(2)$ vs $P(4)$	$P(3)$ vs $P(4)$
total	0.7416	0.0014*	0.0000*	0.0331*
Dec 03	0.1404	0.0000*	0.0000*	0.3273
Jan 04	0.0000*	0.6134	0.0000*	0.4095
Feb 04	0.7182	0.0190*	0.0076*	0.0000*
Mar 04	0.3377	0.0000*	0.0091*	0.0000*
Apr 04	0.0063*	0.0000*	0.0000*	0.0000*
May 04	0.5707	0.0000*	0.1147	0.0364*
Jun 04	0.3377	0.0000*	0.0109*	0.0680
Jul 04	0.8609	0.5707	0.0109*	0.0000*
Aug 04	0.2358	0.0000*	0.0000*	0.0002*
Sep 04	0.2440	0.0005*	0.0000*	0.0071*
Oct 04	0.3481	0.0002*	0.0001*	0.0000*
Nov 04	0.1975	0.0489*	0.0000*	0.0063*
Dec 04	0.0145*	0.0027*	0.0004*	0.5027
Jan 05	0.2358	0.6876	0.0002*	0.1055
Feb 05	0.2611	0.0122*	0.0000*	0.6876
Mar 05	0.0031*	0.0000*	0.0145*	0.0007*
Apr 05	0.0489*	0.0000*	0.0466*	0.8609
May 05	0.6576	0.0008*	0.0000*	0.0000*

Notes: Statistics are p-values from a Wilcoxon rank test for the null: $\epsilon_{\pi^s,t+h|P(k)} = \epsilon_{\pi^s,t+h|P(l)}$ for $k \neq l$.

* denotes rejection of the null at the 5% critical level. See Table 1 for a description of $P(1)$-$P(4)$.

Figure 1: Swiss Prices 1993:5 to 2005:4

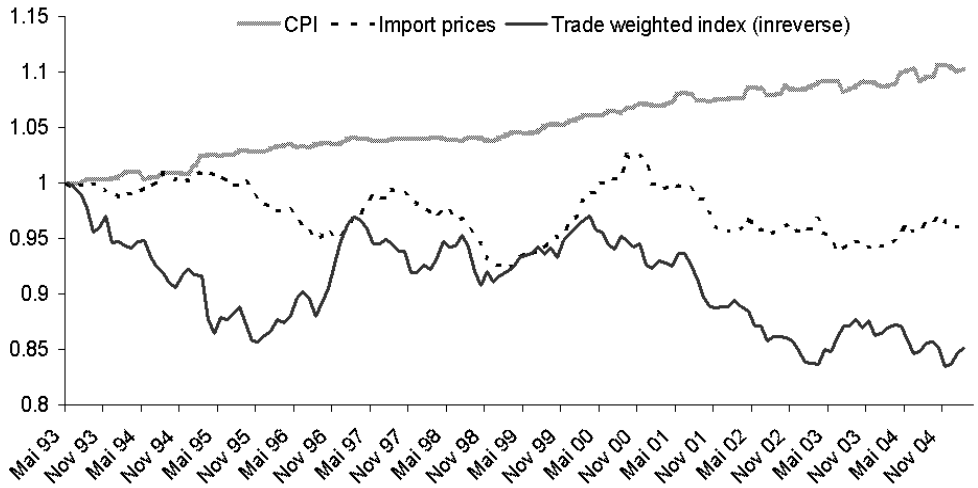


Figure 2: Swiss Monthly Inflation 2003:11 to 2005:4

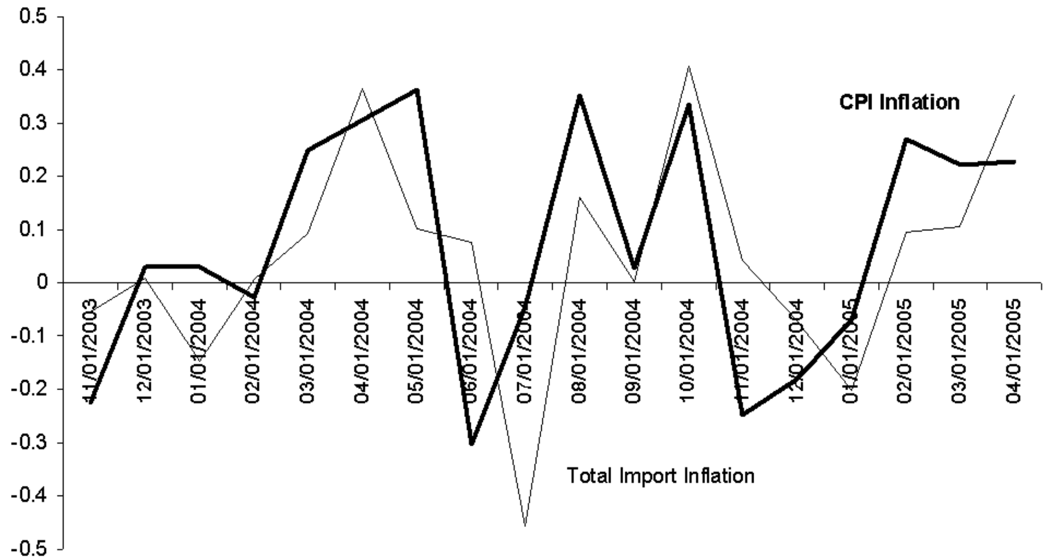


Figure 3: CPI and CPI minus Administered Prices

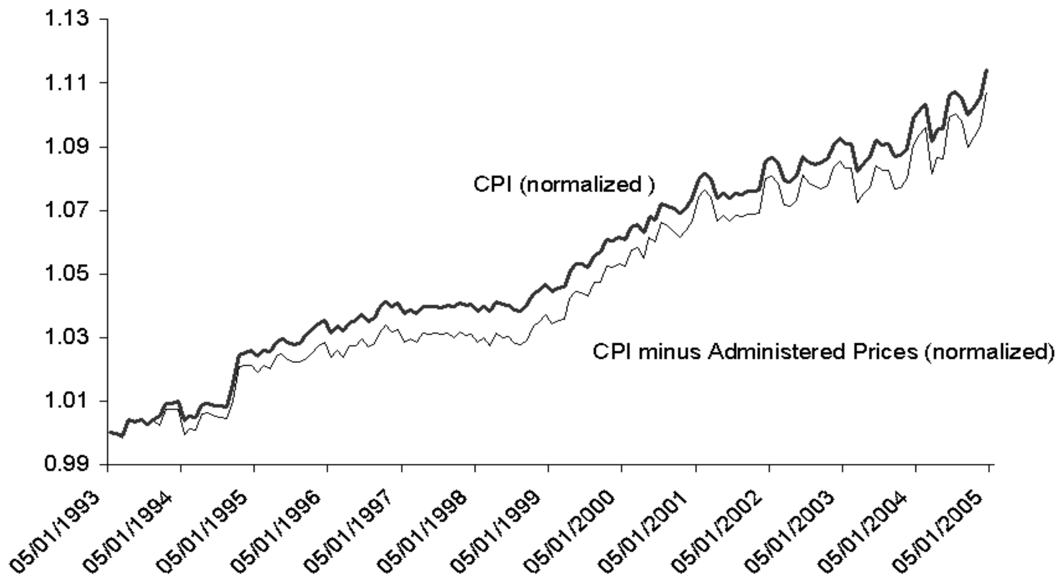


Figure 4: Monthly Inflation (2003:11 to 2005:4)

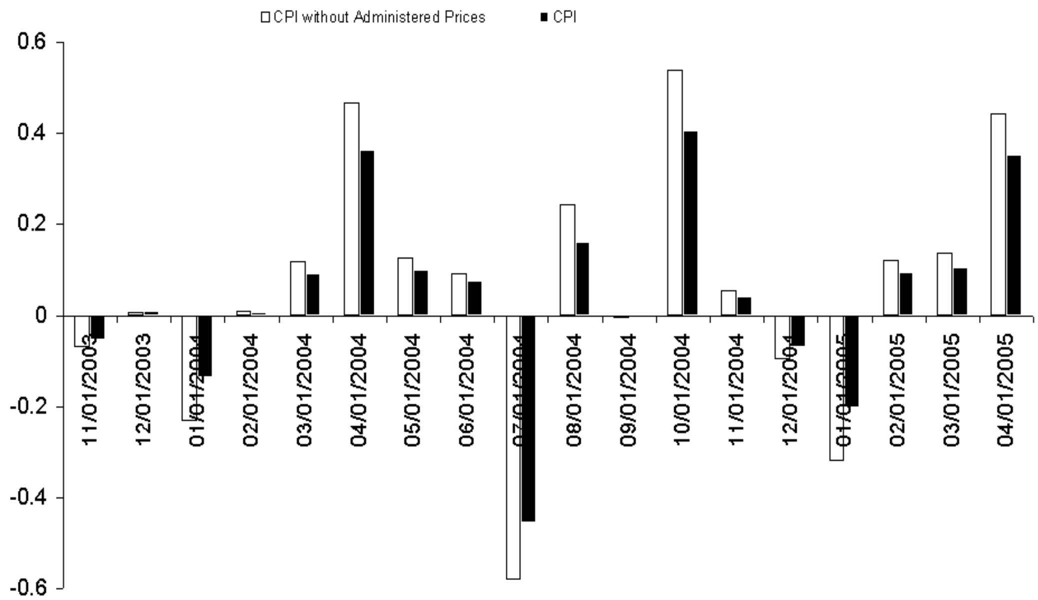
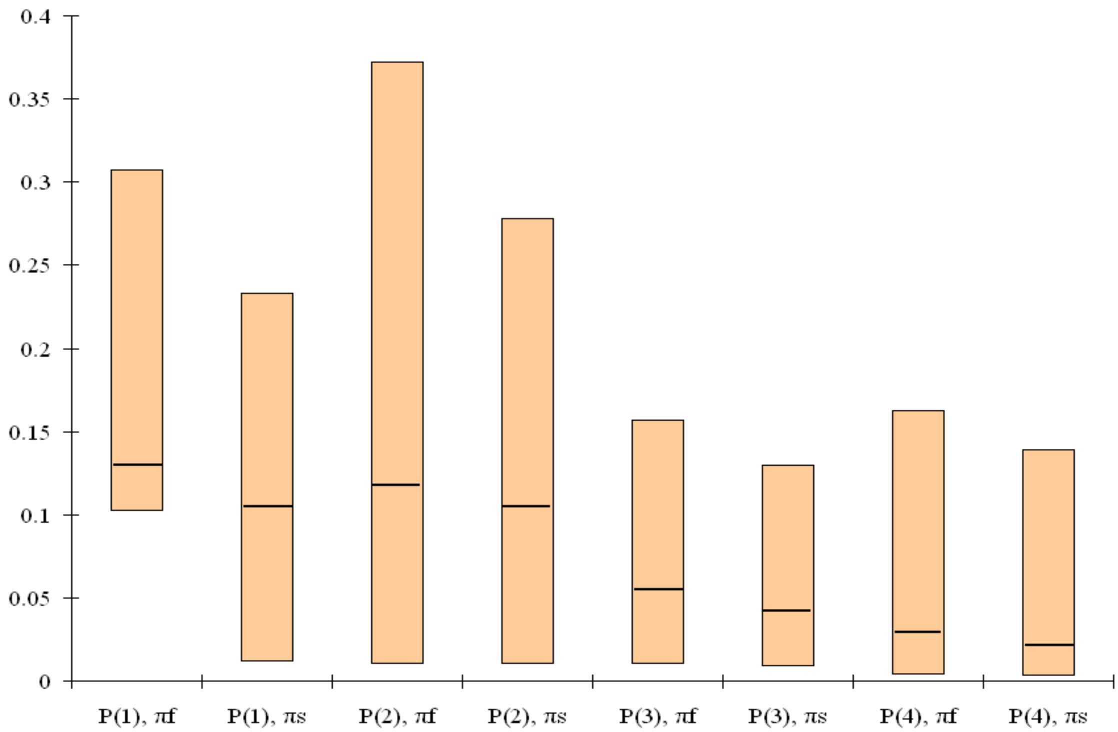


Figure 5:

Max, Min, and Ave Forecast Innovations for π^f (CPI w/o admin. prices) and π^s (CPI)



Notes: Box upper bound = max of innovation, box lower bound = min of innovation, black line within the box = average of innovations. Figures taken from Table 2.

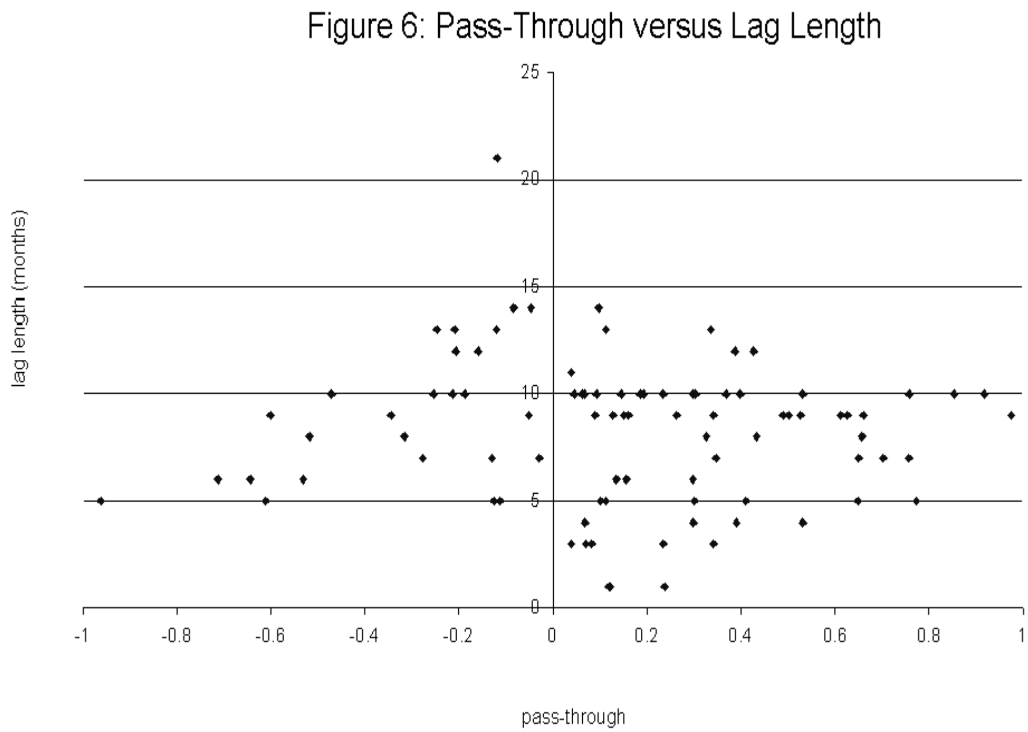


Figure 6: Pass-Through versus Lag Length
lag length (months)
pass-through
25
20
15
10
5
0
-1
-0.8
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1

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