



Monthly pass-through ratios

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ABSTRACT

This paper estimates monthly pass-through ratios from import prices to consumer prices in real time. Conventional time series methods impose restrictions to generate exogenous shocks on exchange rates or import prices when estimating pass-through coefficients. Instead, our estimation strategy follows an event-study approach based on monthly releases in import prices. Projections from a dynamic common factor model with daily panels before and after monthly releases of import prices define the innovation for import prices. We apply our identification procedure to Swiss prices and find strong evidence that the median of the monthly pass-through ratio is around 0.3. Tests show that standard assumptions of non-real time data and limited information breath are critical for the pass-through estimates.

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1. Introduction

What is the monthly pass-through from exchange rates to consumer prices? It is commonly recognized that when estimating the responsiveness of domestic prices to foreign prices, the pass-through coefficient varies across countries and time.² The vast empirical literature on exchange rate pass-through, however, relies on time series or cross country analysis that assumes the constancy of estimated coefficients for select samples with the latest available data.³ Such analysis is useful for explaining the reduction in the average pass-through from high to low inflation regimes, but it offers little guidance how policymakers should act over different phases of the business cycle or respond to terms-of-trade shocks. Our aim is to mimic actual data environments used by policymakers in a real time setting and with this understand the dynamics of monthly estimates of the pass-through.

The paper's contribution is to present a new estimation strategy of the monthly pass-through based on data releases in import prices. The empirical methodology is similar in spirit to event study procedures used in empirical finance, see MacKinlay (1997) or Khotari and Warner (2005) for an overview. Our new measure of the monthly pass-through ratio is driven by new information from the monthly releases in import prices. The pass-through ratio is defined as the projection's innovation in the change of consumer prices divided by the projection's innovation in the change of import prices. The projections are estimated using dynamic common factor procedures conditional on daily panels before and after the monthly release of import prices.

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² See McCarthy (2007) for time series evidence. Bailliu and Fuji (2004), Choudri and Hakura (2006), and Gagnon and Ihrig (2004) provide cross-country analysis for different samples.

³ Exceptions are rolling regressions by Marazzi et al. (2005) and Bayesian techniques by Sekine (2006).

Exchange rate pass-through is traditionally defined as the responsiveness of domestic prices to exchange rate movements. Sekine (2006) notes that the pass-through literature has divided exchange rates' impact on domestic prices into two stages. The first stage is defined as the influence of exchange rate fluctuations on import prices and the second is the impact of import price movements on consumer prices. This paper focuses on the latter stage.⁴ Although our estimation procedure could be used for the first stage, our preference for examining the second stage is to define the event window as narrowly as possible around the release date of import prices. This event date allows us to construct an innovation conditional on new information from the monthly release of import prices at the aggregate and sectoral level.

Our empirical strategy differs from previous pass-through studies in three important respects. A first feature is that this study is the first to estimate the pass-through ratio using large data sets that are updated in response to real-time events. This line of research is not only relevant for policymakers, but it underscores the importance of information breadth and real-time settings when estimating the responsiveness of domestic prices to innovations in foreign prices.

A second feature of our estimation procedure concerns the specification of the innovation to foreign prices. The price innovations are defined as the news event arising from the monthly release in import prices. We set the event window to be one day so that the information innovation captures news only from the release of import prices. Previous event studies by Burstein et al. (2007) and Cunningham and Haldane (2002) use large exchange rate devaluations to define the exogenous shock to foreign prices. This is problematic in several respects. These event studies operate with a small number of observations. Further, their event windows span quarters rather than hours. Large event windows muddle the causal influences for domestic prices. Last, the above mentioned event studies assume that the change in the exchange rate is the shock itself. This assumption means that the anticipated change in the exchange rate is zero and that the exchange rate shock leaves all other variables unchanged.⁵

A third feature of our strategy is the use of common factor techniques by Forni et al. (2000). This dynamic estimation procedure allows us to incorporate jointly micro- and macroinformation from large data sets. More importantly, the data reduction technique generates a projection based on real-time data sets before the release of import prices. This anticipated component enables us to generate an innovation for import prices without having to impose any model-based restrictions.

The empirical application is for Swiss prices. The sample is from 1993:5 to 2008:4. During this period, annual inflation in the Consumer Price Index (CPI) averaged around 1% and the annual change in the nominal effective exchange rate was in the order of $\pm 15\%$. These characteristics of low average inflation together with modest fluctuations in the exchange rate fit many OECD economies for the most recent decade.

Our estimates of the monthly pass-through ratio offer a rich set of empirical results. First, the monthly estimates based on real-time data yield a median pass-through ratio of around 0.3. Second, the monthly pass-through ratios are dependent on the information breath of the panel and its real-time setting. Broader panels generate larger pass-through ratios than do smaller panels. Further, the volatility of monthly pass-through ratios is lower for real-time estimates than for conventional estimates that use non-real-time information sets. These results suggest that information settings assumed in (conventional) time series studies are too restrictive.

The paper is organized as follows. Section 2 defines the empirical strategy to identify the monthly pass-through from the annual change in import prices to the annual change in consumer prices. Section 3 discusses empirical issues concerning the selected sample and the daily panels. Section 4 presents the estimates of monthly pass-through ratios. Section 5 offers concluding remarks.

2. The identification scheme

The identification scheme to analyze the monthly estimate of the pass-through from import prices to CPI is similar to an event study approach used in empirical finance.⁶ The empirical strategy involves the following steps. The first step generates the projection for annual inflation in consumer and import prices conditional on information one day before the new data release of import prices. These projections are based on (daily updated) panels that encompass real-time information from financial variables and macroeconomic data releases. The projections are estimates from a dynamic common factor model following Forni et al. (2000) and follow earlier work by Amstad and Fischer (2009a, 2009b). The second step re-estimates the projections for consumer prices and import prices based on a new (updated) panel that includes sectoral and aggregate information from the import price release. The third step constructs the innovation as the one-day difference in the projections for consumer prices and import prices. The fourth step builds the monthly

⁴ Hereafter, when referring to pass-through, unless otherwise specified, we mean from import prices to consumer prices. While the academic literature has focused on the first stage, central banks relying on inflation forecasts to guide their policy settings are interested in the second stage. McCarthy (2007), Sekine (2006), and Stulz (2007) are examples of empirical studies that examine the second stage.

⁵ Macro-level studies by Shambaugh (2008) and McCarthy (2007) have tried to resolve the exogeneity problem by imposing short or long-run restrictions in a VAR setup. Micro-level studies for a particular sector or industry have had greater success in creating sufficient controls, but they lack the information breadth. See Mennon (1995) and Goldberg and Knetter (1997) for a review of micro-level studies.

⁶ There is a large event study literature aiming to assess the reaction of asset prices to macroeconomic news. See Almeida et al. (1998), Andersen et al. (2003), and Gürkaynak et al. (2005).

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