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The Relationship between Inflation Targeting and Exchange Rate Pass-Through in Turkey with a Model Averaging Approach

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ABSTRACT

The Relationship between Inflation Targeting and Exchange Rate Pass-Through in Turkey with a Model Averaging Approach

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Turkey, as an emerging economy, has a unique experience regarding to the relationship between the rate of inflation and the exchange rate. As opposed to developed countries, the effects of exchange rate fluctuations are felt significantly on inflation dynamics and these fluctuations also influence many other macroeconomic variables via different channels with different magnitudes in developing countries. Therefore, the main concern of the paper, which is to evaluate the exchange rate pass-through (ERPT), has an important role in the success of inflation targeting regime. Using correlation coefficients between exchange rates and inflation differentials, single equation regressions, vector auto-regressions (VAR) and Markov switching regression methods; the determinants of ERPT to producer and consumer prices are quantitatively analyzed between January 1986 and August 2013. Error correction models are used to estimate the exchange rate pass-through. According to the estimation results, it is found that, similar to other developing countries, there is a substantial degree of ERPT for Turkey the greater part of which is realized almost instantaneously. Comparing to the studies on industrial countries, it is found that ERPT is higher but there are additional transmission channels just like the other emerging economies. The higher degree of ERPT in Turkey is found in those studies conducted for industrialized countries implies that there are additional transmission channels for Turkey. ERPT for producer price-index-based inflation is found to be higher than for consumer-price-index-based inflation. We also found that the degree of ERPT increases as the data frequency falls. We also determined an asymmetry in pricing behavior: while exchange rates increase, this increase is passed on to prices, yet decreases in exchange rates. Estimation results also indicate that the main factors contributing to high pass-through are past currency crises and the high degree of openness of the economy. These factors are the basis for the indexation behavior of agents. Although, the aforementioned factors are the main determinants of the degree of exchange rate pass-through, the persistency and the volatility of exchange rates can significantly affect the short run dynamics of the pass-through. The results also imply that, even if the pass-through slows down due to changing pattern of exchange rates, in order to achieve a low and stable inflation in the long run, fundamental factors that exacerbate the link between exchange rates and prices should change. Another crucial point is that according to Markov switching regression results of ERPT coefficients of domestic prices, the exchange rate pass-through coefficients vary significantly between different states.

Key words: Monetary Policy, Inflation Targeting, Exchange Rate Pass-Through, Vector Autogression, Markov Switching Regression

JEL: C22, C87, E30, E31, E59

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1. A Brief Literature on Exchange Rate Pass Through

The literature of the ERPT essentially explains the interaction between exchange rates and import (and/or domestic) prices. Goldberg and Knetter (1997) described the ERPT from the stand point of developed countries as a percentage change in import prices in terms of local currency caused by a 1% change of exchange rates[5].

Taylor (2000) affirmed that a country which credibly keeps inflation stable at a low level can relatively be described with a low pass-through while the opposite is true for high inflationary environments.

It is common sense that the more open a country is the more the exchange rates movements will be reflected in CPI prices through import prices. However, Romer (1993) empirically demonstrates that there is a strong negative effect of openness on inflation. Together with the Taylor's hypothesis, Romer's evidence renders the relationship between the degree of pass-through and the openness to a blurry one.

Calvo and Reinhart (2002) affirm that countries which have a fear of volatility of exchange rates interfere with their exchange rates directly or have a tendency to change their interest rates after applying inflation targeting. Reyes (2004) affirms that decreasing pass-through is due to the interference of the Central Bank applying floating exchange rate regime to nominal exchange rate shocks in order to prevent damage to the inflation. Calvo (2006) claims that consistent interference with foreign currency sales overwhelm the excessive foreign exchange rate increases in the case

[5] See also Anderton (2003), Campa and Goldberg (2004), Campa et al. (2005), Gagnon and Ihrig (2004), Hahn (2003), Ihrig et al. (2006), and McCarthy (2000).

of inflation targeting and affirms that this will be effective in preventing the economy from sliding into instability.

Campa and Goldberg (2004) claimed that a positive but weak relationship existed between the degree of pass-through and the variabilities of inflation and exchange rates. Campa and Goldberg (2004) researched the pass-through from exchange rates to import prices in 25 OECD countries and estimated an average rate of pass-through to import prices at 0.46 in the short run and 0.64 in the long run. This also implies a pass-through to domestic and retail prices.

McCarthy (2000) discovered that the ERPT is higher in countries where import proportions of domestic consumptions are higher. Anaya (2000) showed that imports affect the domestic prices because imported goods constitute an important portion of consumer price baskets and are utilised as inputs in production especially in developing countries. The relatively high level of the indexation to the exchange rates (dollarization) also increases the degree of exchange rate pass-through in those countries. Reinhart et al., (2003) conclude that pass-through is significantly higher in highly dolarized economies. Levy-Yeyati (2006) stated that dollarization makes the money demand unstable, raises the risk of banking crises due to devaluation of the domestic currency, increases the speed and level of the ERPT and increases the fluctuations in the economic growth. Carranza et. al. (2009) analyze the effects of exchange rate depreciations on inflation using a panel of a hundred-plus countries with differing degrees of dollarization. Their results robustly support the intuition that large depreciations lead to lower pass-through coefficients compared to moderate depreciations and that this observation is more stressed the higher the degree of dollarization of the economy.

Mihaljek and Klau (2008) measured and compared the pass-through in developing countries and they reported that the estimate of ERPT to CPI inflation was 0.63 before 2003, and 0.42 thereafter for Turkey. Another finding they report about Turkey is the threshold effects that only changes in exchange rates exceeding 5% a quarter translate into significant changes inflation rates. They also affirmed an asymmetry in EPRT implying high coefficients in depreciations and lower coefficients in appreciations. Delatte and Lopez-Villavicencio (2012) also provides evidence that depreciations are passed through prices more than appreciations.

Civcir and Akçağlayan (2010), using a vector autoregression (VAR) model, show that there has been strong pass-through over the periods 1987:01–2001:12 and 2002:01–2009:05 in Turkey. Moreover, in the postcrisis period, exchange rate has been the main reaction variable for the Turkish Central Bank.

The empirical studies by Leith (1991), Garcia and Restrepo (2001), Belaisch (2003), Borensztein and De Gregorio (1999), Warjiyo and Hutabart (2002), Leigh and Rossi (2002) showed that foreign exchange rates and prices do not move together in short and medium terms, and that there are serious ERPT discrepencies between different countries.

Using a five-variate cointegrated VAR for each country and impulse responses derived from the vector error correction model, Beirne and Bijsterbosch (2011) show that ERPT to consumer prices averages about 0.6.

Brun-Aguerre, Fuertes and Phylaktis (2012) utilized a large sample of developed and emerging economies to investigate ERPT. Their panel models reveal that various economic aspects of the destination country can explain about one third of the total variation in pass-through elasticities and the remaining variation comes

largely in the form of unobserved country-specific effects. They also determine inflation, exchange rate volatility, openness and relative wealth to play a clear role as drivers of emerging markets pass-through whereas the output gap and protectionism appear influential more generally.

Shintani and Terada-Hagiwara (2013) investigate the relationship between the ERPT and inflation by estimating a nonlinear time series model. They end up with the result that declines in the ERPT during the 1980s and 1990s are associated with lowered inflation.

Taylor (2000) stated that the commitment to price stability of the inflation targeting (IT) strategy will decrease the pass-through and this will help keep inflation at lower levels. Gagnon and Ihrig (2004) affirmed that the level of pass-through is especially connected to the implementation of inflation targeting and to the changes in the monetary policy process. Reyes (2004) stated that the ERPT would decrease as the monetary policy regime becomes credible, inflation becomes more sustainable and the economy approaches to its long term potential growing trend.

In developing countries, the domestic prices seem to be very sensitive to any variation in nominal exchange rates as the markets are not developed enough. The determination of the ERPT which determines the real exchange rates in turn is important for the developing countries' monetary authorities because the adjustment pattern of the balance of payments depends on the real exchange rates. Hochreiter and Siklos (2002) emphasized that the “pass-through problem” will influence macro variables other than inflation when the relative prices are included in the analysis. Edwards (2006) draw attention to the importance of the effects of the real exchange rates to the country’s external balance, and the importance of determining the

secondary effects of nominal exchange rates to the total economic activities and to the balance sheets. Edwards (2006) affirmed that countries implementing IT, experienced a decrease in the degree of ERPT, but the decrease in the ERPT differs in terms of CPI and WPI inflation in most of these countries.

Reversing the traditional belief stating that compared to developed countries, the ERPT is always higher in developing countries, Ca'Zorzi et al. (2007) affirms that especially in countries where the inflation rate is at the single digit rates (ex. Asia, Latin America and Middle-Eastern European countries), the ERPT is low and not very different from that of the developing countries. Other than Argentina and Turkey, they found a strong positive relationship between the degree of ERPT and inflation rates according to Taylor's hypothesis.

It seems important to explore dynamics of exchange rate pass-through for evaluating monetary policy regulations and even the applicability of an exchange rate regime. In this context, Turkish economy, which has been implementing various monetary policies including IT, is like a laboratory to investigate the relationship between IT and ERPT to domestic prices due to its extraordinary and interesting inflation and exchange rate story. In this paper, we will try to make contributions to the academic efforts we cited above.

This paper consists of four sections. After this introductory section we will make some remarks on alternative methodologies that may be used to estimate ERPT coefficients for Turkey. Four of these methods are used to estimate the ERPT coefficients for Turkey spanning the period 1986-2013 in Section 3 and Section 4 presents our conclusions.

2. The Model

In spite of a variety of models to measure ERPT, a generic framework introduced by Goldberg and Knetter (1997) is

$$\Delta P_t = \alpha + \delta \Delta X_t + \gamma \Delta E_t + \psi \Delta Z_t + \varepsilon_t$$

where the dependent variable (P_t) is logarithmic first differences of consumer/producer price index, X_t is the primary control variable (e.g logs of lagged price deflators $\Sigma(\Delta P_{t-j})$[6]), E_t is the nominal exchange rate, and Z_t stands for a set of control variables. Most of the empirical literature focusing to measure pass-through exploits the same or a slightly different version of this equation. In this standard pass-through model, it is traditionally taken into account how changes in import prices in domestic currency are reflected in domestic prices. On the other hand, the effects of exchange rate and foreign price changes are usually lumped into a single variable. However, it is also possible to separate the impact of exchange rate and foreign changes measured in foreign currency on domestic inflation as in Mihaljek and Klau (2008).

Another type of method used to examine pass-through is vector autoregression analysis. In VAR models, classical explanatory variables for inflation are ordered in a distribution chain. Mc Carthy (2000) presents a widely employed version of this type of analysis.

To investigate the ERPT one may analyze the time-varying correlation coefficients between change in nominal exchange rate and the change in the differential between domestic and foreign inflations. These simple measures should

[6] Up to five lags of the dependent variable and of each explanatory variable are used in estimation depending on optimum lag selection criteria, but only one lag is specified in the model for the simplicity of the notation.

not be directly assessed as ERPT coefficients, yet as a proxy for the coefficients. We believe that they will at least reveal the direction of the changes in the degree ERPT.

In sum, four methods are mainly used to explore the ERPT pattern in Turkish economy. These are correlation coefficients, single regression models, VAR models, and Markov switching regressions. Markov switching regression is introduced first in this paper. Related explanations on the methods are made in following section.

3.1. The Data Description

All data have monthly frequency for the period 1986:01-2013:07 and are obtained from the databases of Turkish Statistical Institute, Central Bank of the Republic of Turkey and the Bank for International Settlements. The raw data is defined below. The base year for indexed variables is 2003. Related transformations are stated in the body of the text, where needed.

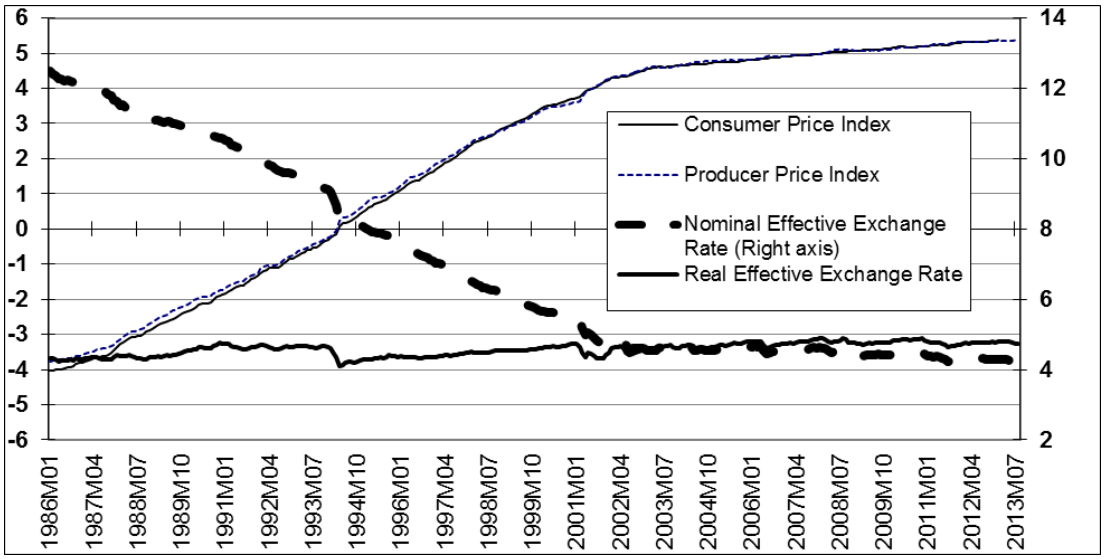
Data set used in the equations can be desctribed as Consumer Price Index (CPI), Producer Price Index (PPI), Energy Prices Index that is a part of PPI (EPI), Nominal Effective Exchange Rate[7] defined as foreign currency over Turkish lira **(**NEER), Broad definition of money supply including currency in circulation, demand and time deposits in billion Turkish Lira (M2), Manufacturing Industry Production Index (MIPI), Import Price Index (IPI), Spot Prices of Brent – Europe Crude Oil Prices in Dollars per Barrel from the Energy Information Agency (OIL), Dummy for April 1994 with value 1 in April 1994 and zero for other observations (D9404), Dummy for the period of stabilization program with value 1 from January 2000 to February 2001 and zero for other observations (D2000), Dummy for the low rate of inflation

[7] These weights indicates approximately foreign trade shares in terms of exchange rates. Decreases (increases) in the exchange rate show the depreciation (appreciation) of local currency.

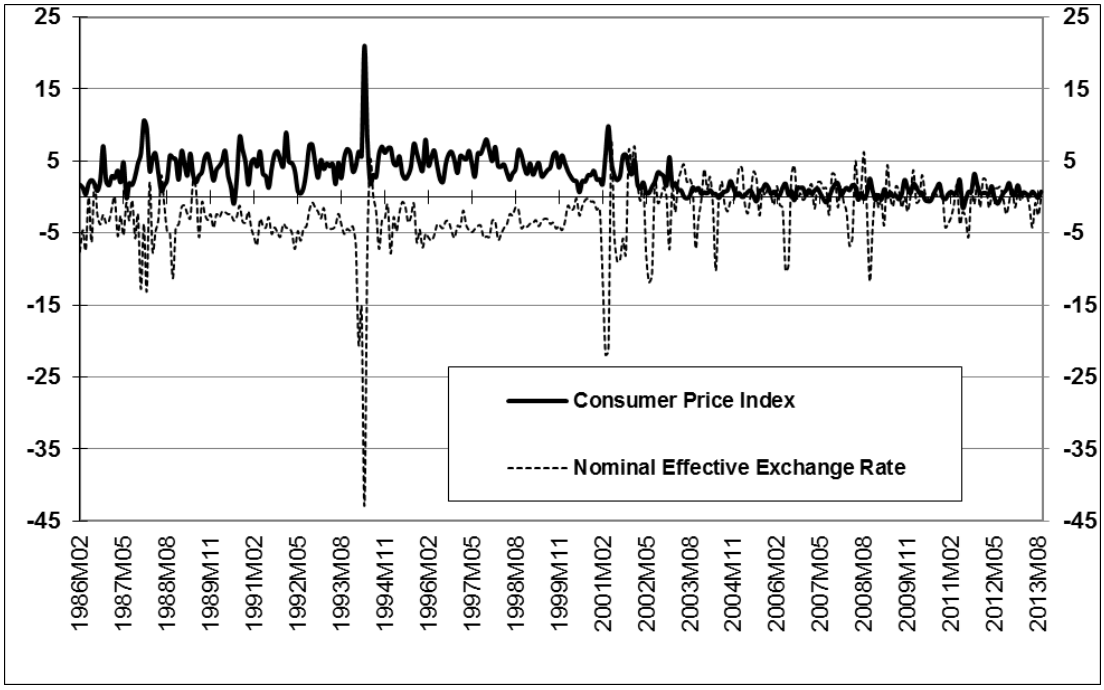
period with value 1 from April 2004 to August 2013 and zero for other observations (D0404). PPI, NEER, MIPI, EPI, IPI, OIL and M2 are I(1) variables. CPI is I(0), i.e. stationary.

It is observed that when the characteristics of time series variables used in the model are analyzed with the unit root test, the level values of most of the variables' logarithms include unit roots. Accordingly, the first differences are taken logarithmically to solve the unit root problem. It came into use with 13 lags for every single ADF regression, so by using Schwarz knowledge criteria, we show the optimum lag figure for each variable in the related tables. It can be seen here that the test results are statistically significant in the level of 1%, 5% and 10%. In conclusion, there was no unit root problem in the unit root tests which are done after taking the logaritmic first differences of time series, in other words, since the series are stationary. variables are primary embedded, meaning I(1). On the other hand this finding is clearly visible in the variables logarithmic level and logarithmic first degree differential graphics (Graph 1, 2 and 3).

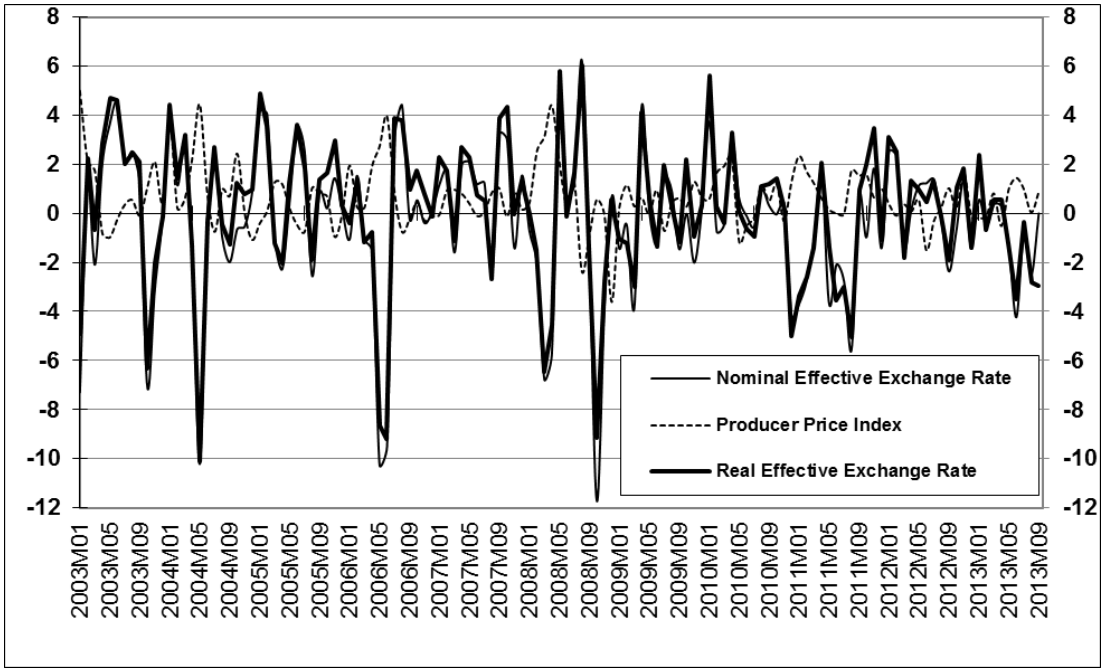
Graph 1. Consumer Prices, Wholesale Prices and Nominal Exchange Rate Indices (in natural logarithms, base period for all series 2003=100)



Graph 2. Consumer Prices and Nominal Effective Exchange Rate Indices (in logarithmic difference), 1986-2013



Graph 3. Producer Prices, Nominal and Real Effective Exchange Rate Indices (in logarithmic difference), 2003-2013



The group unit root test as per Levin, Lin and Chui, t* statistics are significant in terms of the general unit root test. According to Im, Perasan and Shin W-stat, ADF

– Fisher Chi – square and PP – Fisher Chi-square statistics, the null hypothesis of the individual unit root process existence is rejected at the 1%, 5% and 10% significancy levels. These results are also important for VAR analysis.

In countries with constant and high inflation, estimations made by using lower frequency data are not considered to be healthier than the monthly estimations. The financial decision units have very little information related to price conducts because of the ERPT's high level. Accordingly, for the inflation in terms of CPI and PPI, two different equations are estimated in this study with monthly, quarterly and yearly data.

3.2. Correlations Among Nominal Exchange Rates and Price Level Differential

After switching from fixed exchange rate regime to flexible exchange rate regime in the beginning of 1970's in the world, exchange rates became the focus and the interest of both economists and politicians. The importance of the real exchange rate which is calculated considering the inflation differences between countries and identified in the simplest term as an exchange rate, arises from being an indicator used with relation to the competitive power of a country's foreign trade. The importance in terms of the Central Bank is his influence on his balance sheets and accordingly the fact of following a sound monetary policy. In regard to this, developing countries' acquired experiences reveals that exchange rates are one of the fundamental political factors (Aşıkoğlu and Uçtum, 1992) when the liberalization occurs and structural adjustment programs are implemented.

In the phase of the nominal exchange rates quantitative explanation, many alternatives are being faced. In this context, the exchange rates are subject to be reviewed with expressions like "nominal" or "real" and also like "bilateral" or

"effective" for two or more countries involved. The multi-exchange rates are also called "effective exchange rates".

The most fundamental real exchange rate formula for two countries is stated as follows: Real exchange rate (RER) = (Domestic currency/ Domestic price index) / (Foreign currency/ Foreign price index) or with the RER symbol.

The NER here is bilateral nominal exchange rate, P^d is domestic index, P^f is foreign price index. Different RER measurements will come up in relation to every single measurement of those components (Marquez, 1992; Helmers, 1988). [8] (22)

One can define the RER as: $RER=NER*(P^f/P^d)$.

If the RER index gets higher, either the nominal exchange rate index, NER, must get higher or domestic price index, P^d, must increase at a lower rate than the foreign price index, P^f, does. Taking logarithms, it is easier to see the relationship:

$$\ln(RER)=\ln(NER)+\ln(P^f)-\ln(P^d)$$

RER	=	NER	P^f	P^d
Higher	→	Constant	Constant	Lower
Higher	→	**Higher**	Constant	Constant
Lower	→	Constant	Constant	Higher
Lower	→	**Lower**	Constant	Constant

Rearranging the logarithmic definition of real exchange rate yields the following equation:

$$\ln(NER)=\ln(RER)+\ln(P^d)-\ln(P^f).$$

We can write this in terms of changes as:

$$\Delta\ln(NER)=\Delta\ln(RER)+(\Delta\ln P^d-\Delta\ln P^f)$$
$$\Delta\ln(NER)=\Delta\ln(RER)+(\pi^d-\pi^f)$$

[8] See Erlat ve Arslaner (1997) for a detailed calculation methods and discussion of nominal and/or real effective exchange rates.

which shows decomposition of the changes in nominal exchange rates as the sum of the changes in real exchange rate and the inflation differential defined as domestic inflation rate minus foreign inflation.

The relationships exhibited in the table above may be written as in the table below with a, b and c representing the magnitudes of $\Delta(\ln NER)$, $\Delta(\ln RER)$ and $\pi^*=(\pi^d-\pi^f)$ respectively:

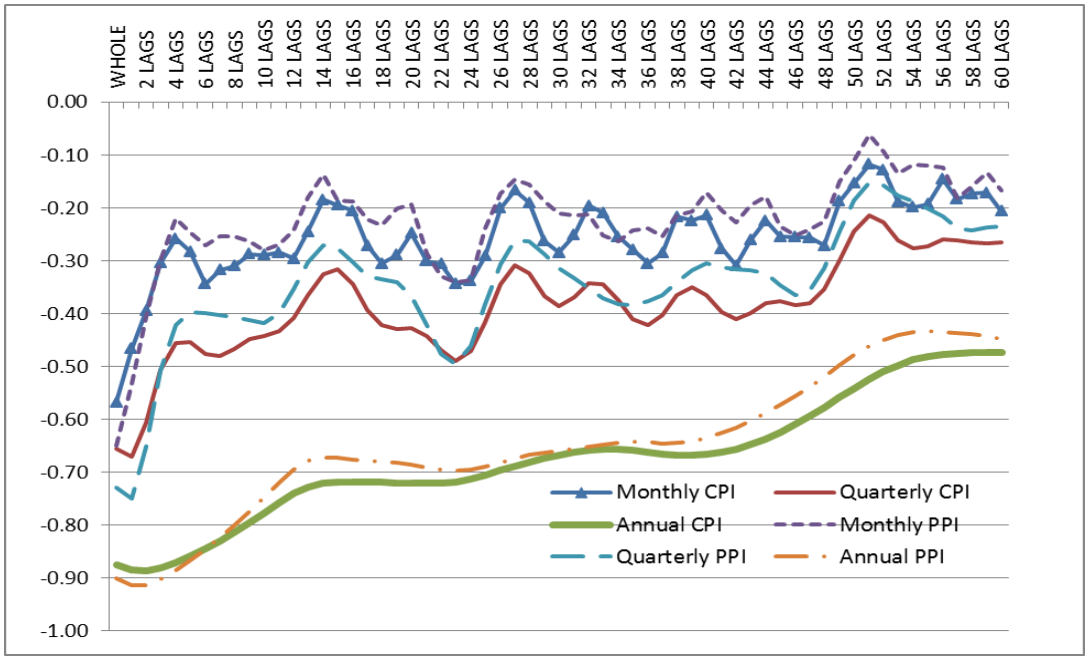
$\Delta\ln(NER)$	=	$\Delta\ln(RER)$	+	$(\Delta\ln P^d - \Delta\ln P^f)$	Result
a>0	→	b=a		zero	Zero pass-through
a>0	→	zero		c=a>0	Full pass-through
a>0	→	b>0 but b<a		c>0 but c<a	Partial pass-through

The simple relationships among these variables provide us an intuitive measure for ERPT which may be quantified using pairwise correlations of the related variables. When any change in the nominal exchange rate does not pass through to domestic prices, then it must be balanced through a parallel change in the real exchange rate. That is, there must be a high correlation between real and nominal exchange rates. In case of zero pass-through, this correlation is expected to be one. In case of complete pass-through, holding RER and foreign price level constant –this last condition falls since we integrated $\Delta\ln P^f$ in π^*- any change in NER is fully reflected to domestic price level.

A visual inspection of graphs of NER and π^* will give a rough idea on the existence and level of pass-through. The non-existence of pass-through implies that nominal exchange rates and the inflation differential should behave adversely. In case of full pass-through one should expect the reverse case.

Graph 1, 2 and 3 depicting the behaviors of NEER and π* indicates a high degree of pass-through without any quantitative analysis. The co-movement of NEER and π* is obvious for most periods.

Graph 4. Correlation Coefficients between Inflation, its Lags and Exchange Rate in Logarithmic Differences



The correlation coefficients between variables will indicate the numerical view of these movements. The correlation coefficient between NER and π* in logarithmic differences is so high between 57% and 90% for the whole sample period, 1986:01-2013:08. This strong correlation coefficient implies a very high degree of pass-through as in Table 1. As you can see from Graph 4, the degree of pass-through decreases if one period from the inflation is dropped. Magnitudes are also different depending on the usage of different periodicities in monthly frequencies.

Table 1. Averages of Correlation Coefficients Between Changes in the Prices and Nominal Effective Exchange Rate with Different Periodicities (Monthly Frequency Data)

	Whole Sample	Recursive Periods	Rolling Windows	Average
Monthly PPI	-0.6490	-0.5510	-0.5008	**-0.5670**
Monthly CPI	-0.5674	-0.5130	-0.3904	**-0.4902**
Quarterly PPI	-0.7293	-0.6259	-0.5307	**-0.6287**
Quarterly CPI	-0.6555	-0.5752	-0.4300	**-0.5535**
Annual PPI	-0.8998	-0.7370	-0.6005	**-0.7458**
Annual CPI	-0.8750	-0.7494	-0.5660	**-0.7301**
Average	-0.7293	-0.6253	-0.5031	**-0.6192**

The so-far reported result provides information on pass-through only on the average. To extract further information about the change of the degree of pass-through it seems reasonable to calculate the pairwise correlation coefficients among the variables for different subperiods. In order not to skip some intervals we decide to make this calculation in a running way, which is as rolling and recursive correlation coefficients. The results on these operations are reported in Appendix Graph 1. The averages of correlation coefficients from 272 five-year rolling periods are between 39% and 60% with different periodicities. Recursive calculations starting with period 1986:01-1990:12 and running up to 2008:08-2013:07 give relatively higher results, namely between 51% and 75%. For the whole sample, 1986-2013, average correlation coefficient has the highest value with 90 per cent (Table 1). All correlation coefficients are significant at any level.

The same observations apply in case of the behaviors of annual and quarterly changes in NER and π^* as in case of monthly changes. The unidirectional changes in NER and π^* are obvious, even more obvious than in case of monthly changes.

The correlation coefficient between NER and CPI-π^* in logarithmic 12-month differences is 75% on average with different periodicities. The same coefficient is 49% for monthly changes. This difference states that as the time span of the measurement increases we face higher degrees of pass-through. However it is also well observed that most of the pass-through effect takes place almost immediately.

To go further and obtain some more pieces of information from correlations, we again investigate rolling and recursive correlation coefficients. The results on these operations are reported and can be seen from Appendix Graph 1. The averages of correlation coefficients for 272 five-year rolling periods are 57% between NER and π^*. Recursive calculations give a slightly higher result on the average, 75%. These figures are again higher than month-on-month measurements.

Our analysis until this point is just giving a general information about the ERPT. For more detailed information, the dual correlation coefficients in between variables in different periods should be calculated. To not skip any interspace during the calculations, we obtain similar results when performing our calculation of finding the correlation coefficients of recursive and rolling sample models.

Nevertheless, the distributions of the correlation coefficients in rolling and recursive algorithms substantially differ. This is due to declining leverage effects of additional observations in recursive calculations that is higher in rolling case due to left out observations on the lower margin. This point makes rolling calculations more advantageous in evaluating the time track of the pass-through effect. However, it should kept in mind that a movement in the rolling correlations graph can be due to drop of an observation rather than due to the new observation.

Because the correlation coefficients' expansion of the recursive estimates is showing many similarities with the ordinary least squares (OLS) calculations, we think that it is appropriate to argue about the possible reasons for the evolution of EPRT in the next part.

The breaking points in the correlation graphs correspond to high devaluation (depreciation) of April 1994 (43%). Since the effect of April 1994 devaluation lasts until May 1999 in five-year rolling calculations we observe the relatively flat regions in the graphs. However, the depreciation of 23% in March 2001 seems to have a smaller effect on the correlation between exchange rate and inflation. Some rule of censoring the outliers may provide substantially different results for these periods. But this difference is not expected to alter the direction of the changes in the correlation coefficient. So, even in the existence of important outliers.

Evolution of the rolling and recursive correlation coefficients are very similar with rolling and recursive OLS estimates so we preferred to give the possible reasons on the evolution of the degree of pass-through on the subsection 3.3 below.

3.3. Regression Models Involving Exchange Rates As Explanatory Variables

There is a huge literature on the determinants of inflation. They mainly cover some demand and supply-side variables that put pressure on prices to move upwards. We considered and tried many of them and chose import prices, money supply (M2), output (manufacturing industry production), oil price as an external shock and energy prices along with the exchange rates. Although we have searched for interest rates, some measure of output gap, public deficits, and nominal wages as other

“information” that would help explain the inflationary process, we were not able to obtain any useful full sample series that help to explain the inflationary process.

We did not follow the way to choose any best-fitting model. Instead we tried various specifications to avoid a specification error. These equations are listed in the Appendix Table 1. What we have done with these computationally intensive figures is to use the average values for pass-through coefficients. These results are reported in Appendix Table 2 and Appendix 3 in detail.

Table 2 reports the summary results of the coefficients of nominal effective exchange rates obtained from the regressions of CPI- and PPI-based inflation on only current exchange rates (and other variables where applicable) including their lagged (first, second and fifth lags of) exchange rates.

The degree of pass-through has been estimated by three different ways. We run the regressions on whole period, recursive and rolling periods. The values for OLS, recursive and 5-year rolling estimates of the coefficients are reported Table 2 and Appendix Table 3 show the average of the coefficients for each individual equation. We also calculated the averages of the equations for the three methodologies separately.

According to results from three methods, most of the cases, the current and the first lag of nominal effective exchange rate (NEER) have highly significant coefficients. This conclusion, regardless of the coefficients, can almost be said to imply an instantaneous adjustment of prices to NEER changes.

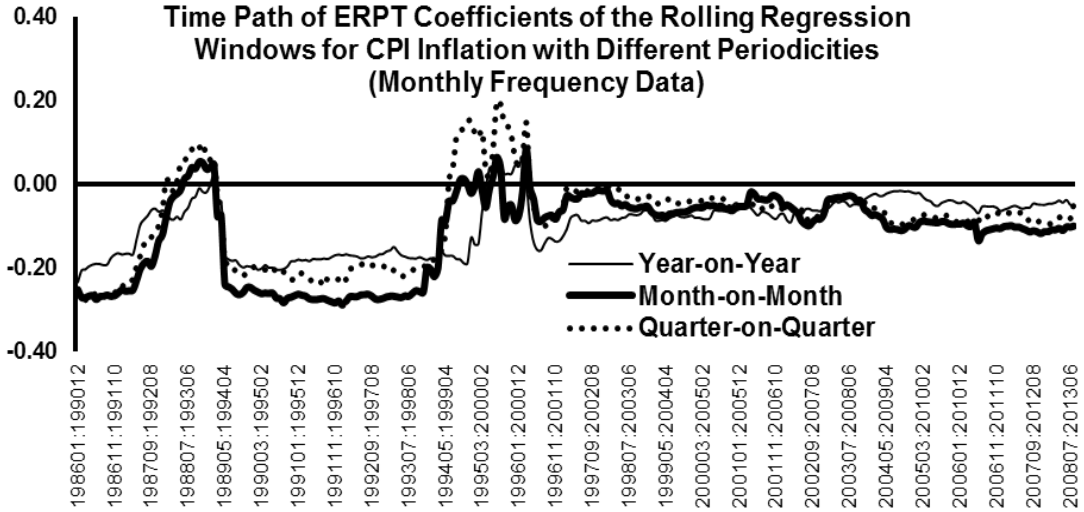
Table 2. ERPT Coefficients Obtained from Different Regressions of CPI and PPI-Inflation with All Specifications in Different Periodicities

Method	Periodicity	Inflation	Min	Max	Avg	Std
OLS	Monthly	CPI	-0.2118	-0.1398	**-0.1809**	0.0209
OLS	Monthly	PPI	-0.3051	-0.1701	**-0.2558**	0.0445
OLS	Quarterly	CPI	-0.1902	-0.0879	**-0.1522**	0.0282
OLS	Quarterly	PPI	-0.2974	-0.1030	**-0.2138**	0.0488
OLS	Yearly	CPI	-0.1874	-0.0659	**-0.1254**	0.0481
OLS	Yearly	PPI	-0.2919	-0.0755	**-0.1855**	0.0697
Recursive	Monthly	CPI	-0.2443	-0.1500	**-0.1920**	0.0297
Recursive	Monthly	PPI	-0.3010	-0.1673	**-0.2346**	0.0471
Recursive	Quarterly	CPI	-0.2100	-0.1192	**-0.1648**	0.0223
Recursive	Quarterly	PPI	-0.2952	-0.1168	**-0.2002**	0.0463
Recursive	Yearly	CPI	-0.2331	-0.0630	**-0.1397**	0.0619
Recursive	Yearly	PPI	-0.2986	-0.0439	**-0.1665**	0.0810
Rolling	Monthly	CPI	-0.1694	-0.0603	**-0.1182**	0.0403
Rolling	Monthly	PPI	-0.2472	-0.0823	**-0.1884**	0.0593
Rolling	Quarterly	CPI	-0.1440	-0.0004	**-0.0858**	0.0422
Rolling	Quarterly	PPI	-0.2366	-0.0474	**-0.1519**	0.0587
Rolling	Yearly	CPI	-0.1576	-0.0335	**-0.0955**	0.0332
Rolling	Yearly	PPI	-0.2638	-0.0365	**-0.1534**	0.0629
OLS Average			-0.3051	-0.0659	**-0.1856**	0.0172
Recursive Average			-0.3010	-0.0439	**-0.1830**	0.0214
Rolling Average			-0.2638	-0.0004	**-0.1322**	0.0123
Consumer Price Average			-0.2443	-0.0004	**-0.1394**	0.0132
Producer Price Average			-0.3051	-0.0365	**-0.1945**	0.0123
Monthly Average			-0.3051	-0.0603	**-0.1950**	0.0135
Quarterly Average			-0.2974	-0.0004	**-0.1615**	0.0135
Yearly Average			-0.2986	-0.0335	**-0.1443**	0.0168

However, the degree of the pass-through is far away from being complete for both of the inflation series. If needed to express with parameters results, the average monthly pass-through coefficients calculated with equations including the current exchange rates and their first, second and fifth lags are approximately 18.1% in CPI, 25.6% in PPI according to the ordinary least squares method and 19.2% and 11.8% in CPI, 23.5% and 18.8% in PPI according to recursive and rolling regression results

respectively. As for the average pass-through parameters calculated from equations in different periodicities is calculated as 19.5% monthly, 16.1% quarterly and 14.4% annually according to OLS, recursive and rolling sample models. In other words, the longer the time period interval, the lower the pass-through coefficients are obtained. Those results' standard deviation (between 1% to 6%) acquired from the rolling regressions is relatively low.

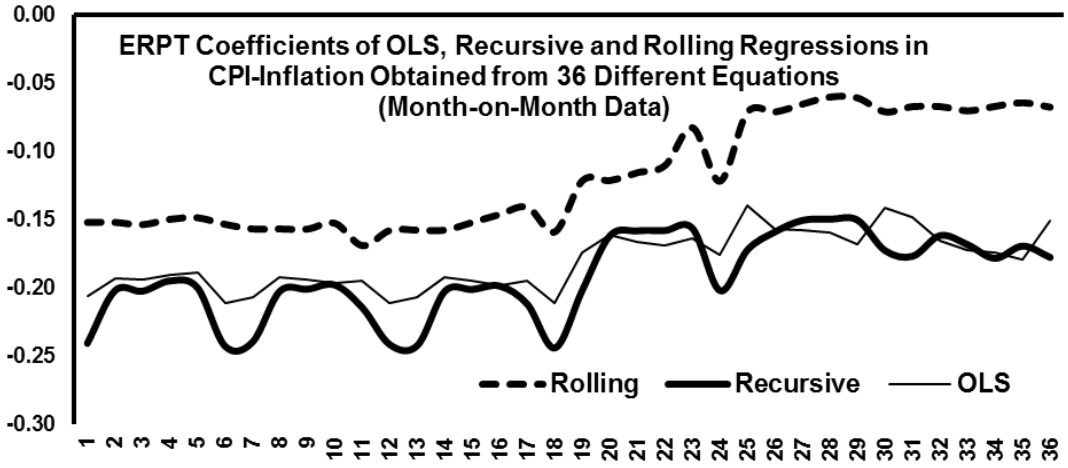
Graph 5. Time-varying Exchange Rate Pass-Through Coefficients Obtained from the Rolling Regression of Consumer Price Inflation with Different Periodicities



Accordingly and as expected, degree of the pass-through to PPI is higher than the CPI (about 20% compared to 14%). One of the possible reasons for this conclusion could be that the share of the domestically created value added in CPI is much higher than the PPI. When the import components are examined, we observe that the intermediate and capital goods corresponds to 88% of Turkey's total imports on average between 2000 and 2013. Another important result is the insignificance of the third and higher degree lags of exchange rate changes for the monthly data. This means economic agents consider only the current and last few months' NER changes.

Regarding the usage of different periodicities, estimations using data with lower frequencies will not yield healthier information than monthly data due to the fact that in a country where persistent and high inflation is given, degree of ERPT will be high and can give little insight about the pricing behavior of economic agents especially during the relatively high level of inflation periods. The summary and detailed results of these estimations are exhibited in Table 2, Graph 5, Appendix Table 2, 3 and Appendix Graph 2. One can expect that the measured degree of pass-through might be higher with year-on-year data than with monthly data. However, the higher the degree of exchange pass-through, the lower the periodicity.

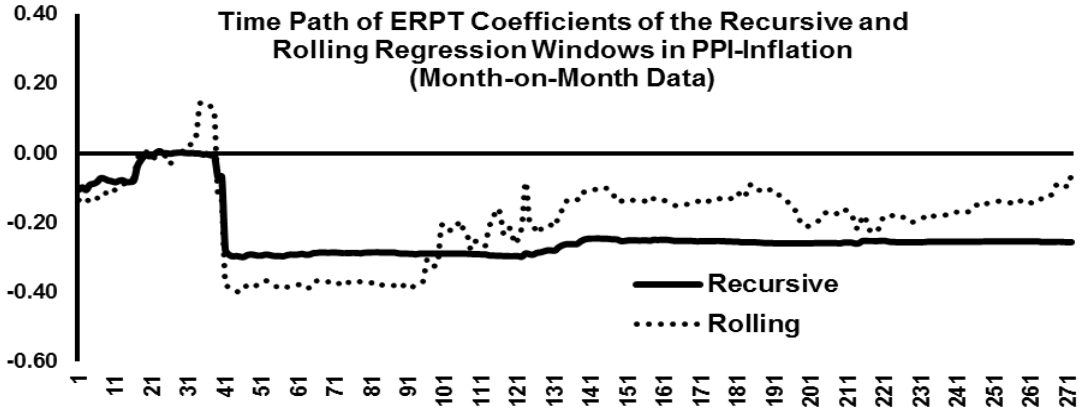
Graph 6. Exchange Rate Pass-Through Coefficients of Different Regression Methods in Consumer Prices Inflation with All Specifications



Figures in Tables 2 gives a brief idea of the degree of pass-through. However, it is stated in most of the empirical papers that the degree of ERPT can vary in time, so looking for the time-varying coefficients of the pass-through and the evolution of the degree of pass-through would provide valuable information. Actually, graphs of time-varying coefficients of pass-through seem to justify this argument as the coefficients differ substantially among the periods depending upon the usage of

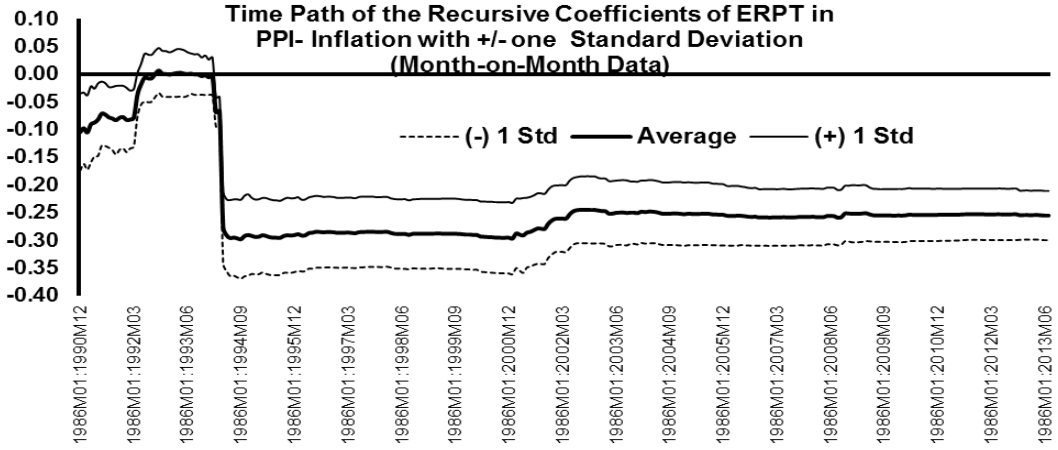
different periodicities, models and different dependent variable. These figures are indicated in Graphs from 5 to 9 and in Appendix Graph 2.

Graph 7. Time-varying Exchange Rate Pass-Through Coefficients of the Recursive and Rolling Regression Windows in Producer Prices Inflation

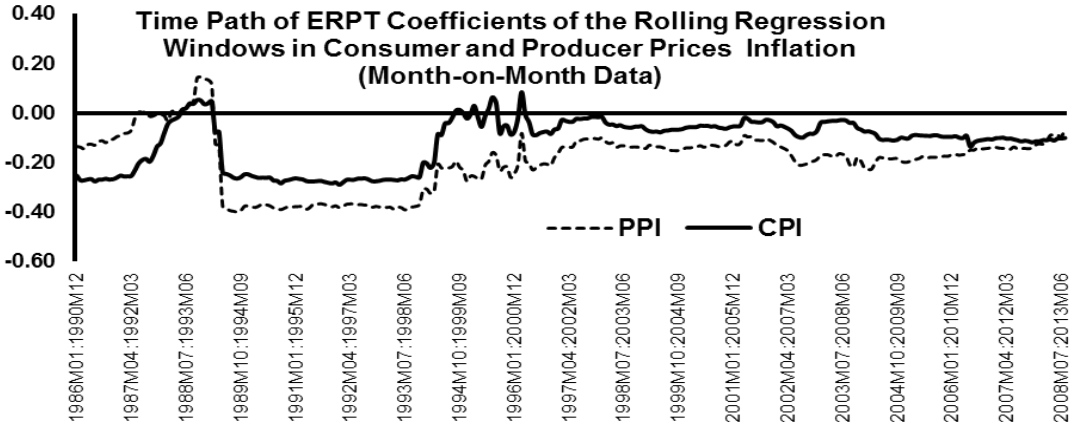


Important inflection points in the evolution of the degree of pass-through coincide with the changes in the exchange rate policy. Between the years 1989-1994 exchange rates were used as an (implicit) anchor to fight inflation. However, expansionary fiscal policies during that period became the dominant policy in affecting inflation. As it is seen from the graphs, through the year 2000, degree of pass-through is increasing.

Graph 8. Time-varying Exchange Rate Pass-Through Coefficients Obtained from the Recursive Regression in Producer Prices Inflation with +/- One Standard Deviation as Averages of all Specifications



Graph 9. Time-varying Exchange Rate Pass-Through Coefficients Obtained from the Rolling Regression in Consumer and Producer Prices Inflation as Averages of all Specifications



On the other hand, adapting to the new system in terms of pricing behavior has increased through the years whereas the depreciation rate of the TL slowed also through the year. This coincidence could also be a factor that makes the relation to seem strengthened.

In February and March 2001 degree of pass-through decreased mainly due to the fact that exchange rate over shot, prices could adjust with a lag to that (in a sense) unexpected jump and/or demand price relation did not justify such a profound price increase. Following March 2001 degree of pass-through has increased substantially. Almost uninterrupted depreciation process till November 2001 accompanied with surging inflation. Economic agents knew that the depreciation of the TL was permanent and did not need to wait for reflecting the changes in ER to prices.

In other words, adjusting of the incomes gradually gave room for agents to pass–through the ER changes to the prices. However when the changes in the exchange rates became volatile (beginning after November 2001) degree of pass-through decreased substantially. Asymmetric response to the changes in exchange rates and the uncertainty about the permanency of the movements in the exchange

rate possibly were the main actors that caused the pass-through to decline amid volatility environment.

Another point is the low degree of pass-through after 2001 crises compared to 1994-2000 period. The reasons for that event have been embraced to some degree with the above-mentioned reasons. Even though we consider the evolution of output gap has also played an important role, we could not find a significant relation between the price levels and the output gap. However, if the change in the output gap exceeds a certain level, it would certainly have effects on the inflation. By the 2001 crises output gap has widened considerably on the downside. We think that the absence of output gap in the regressions due to the classical criteria can be one of the most important factors accounting for the low pass-through after 2001 crises.

After "Exchange Rate-Based Stability Program", which was launched in 2000 and collapsed in 2001, in order to resolve the chronic inflation problem, Turkey adopted inflation targeting[9] as the new monetary policy strategy. Inflation targeting regime was first implemented "implicitly," allowing exchange rates to float freely in 2002. Thinking that the preconditions were not there yet for the regime planned to be implemented, preparatory steps were taken between 2002-2005 under the "implicit" inflation targeting. In 2006, "Inflation Targeting Regime" was launched explicitly, thinking that the ground is then ready. As a result, the proportional macroeconomic stability period has succeeded in Turkey after the adoption of an inflation targeting regime.

[9] See Arslaner (2000) and Arslaner (2009) for a detailed discussion on inflation targeting regime including the case of Turkey.

Two subgroups are reviewed to determine the differences between the exchange rate pass-through behaviors before and after the inflation targeting regime in Turkey. Starting from February 2001 crisis (the period after the passage to the freely floating exchange rate regime), when estimating again the model for the sub-sample 2003:3-2013:07, it could be seen that the coefficients of exchange rate pass-through have substantially decreased compared to the figures in 1986:01-2003:02, from 15.4% to 7.6% in CPI and from 22.0% to 15.2% in PPI as reported in Appendix Table 3.

3.4. Vector Autoregregressions of CPI and PPI-Inflation Involving Exchange Rates As Explanatory Variables

The variables used in some single equation regressions in method 2 are now brought together to construct some vector autoregregressions (VARs)[10]. The steps in applying this method are as following: firstly we determined the optimal lag lengths according to the Schwarz Information Criterion (SC), Hannan-Quinn Information Criterion (HQ), Akaike Information Criteria (AIC) and Final Prediction Error (FPE). According to AIC and FPE, optimal lag lengths in VAR analysis are used as 1 or 2 (Appendix Table 4). The smallest values for AIC and FPE are preferred for the sake of parsimony. Moreover, experimenting with different versions of the models, we got more reasonable results with smaller models. Secondly, we checked for Granger causalities in order to arrange the variables in a suitable ordering, i.e. from exogenous to endogenous, to calculate the impulse responses and variance decompositions.

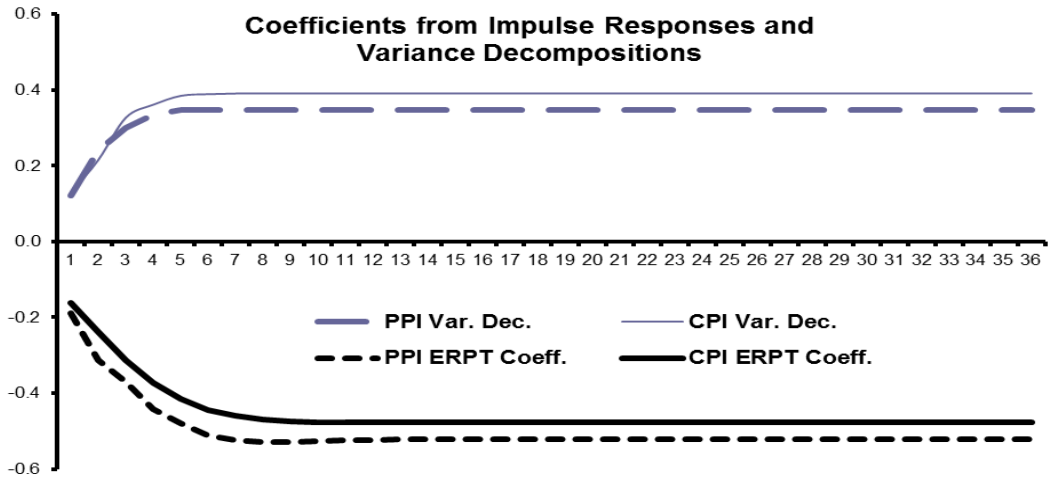
[10] See Alper (2003) and Arbatli (2003) for Turkish ERPT studies on VAR analysis.

When doing a sorting, according to the Granger causality test results (VAR Pairwise Granger Causality/lock Exogeneity Wald Tests), the variables are sorted from the minimal probability value to the maximum. Because of being concerned about the CPI and PPI in our study, the CPI and PPI variables are being placed in the last position. The import prices and money supply are the most exegeneous variables while the NEER and oil prices are the most endegenous ones. After estimating the equation, we looked at cumulative impulse responses and variance decompositions for relevant variables (for inflation series) covered in the model to assess the ERPT numerically. Cumulative impulse responses give the response of inflation rates to a shock given to the nominal exchange rate in succeeding periods. The ratio of the cumulative response of the related inflation series to the cumulative response of exchange rate is considered to represent the cumulative ERPT coefficient (See Appendix Table 7 and Appendix Graph 3). Similarly the portions of the forecast error variances of the related inflation series that is attributable to the changes in the exchange rates are interpreted as another representation of the ERPT effect.

We employed several specifications as in single equation models. Actually we have two main specifications with regard to varables included. The broader set of varaibles include money supply (M2), industrial production index (MIPI), nominal effective exchange rates (NEER), energy prices (EPI), import prices (IPI), oil prices (OIL), producer prices index (PPI), and consumer prices index (CPI). All variables are integrated of order one, i.e. I(1). We used all variables in logarithmic first diffences and employed VAR models with appropriate lag lengths. Second specification includes the important variables in determination of inflation rates, namely NEER and EPI along with the two inflation series.

The results on estimated pass-through coefficients and the ratio of the variation in inflation rates explained by exchange rate changes are given in Appendix Table 7. The same figures are also depicted in Graph 10.

Graph 10. Pass-Through Coefficients and Ratio of Variances Explained By Exchange Rate Changes for Producer and Consumer Prices Inflation



The common results for the VAR analysis can be stated as following. Firstly, the ERPT is higher to producer prices than to consumer prices in all cases, which is parallel to our OLS estimation results. Secondly, exchange rate shocks to domestic inflation are realized mostly in first five months and more than 55 percent of this effect occurs in first two months. Thirdly, according to the variance decomposition results of the VAR analysis, the ERPT coefficients acquired from the accumulated responses are lower, the completion of the pass-through effect by periods are occuring faster and it is much faster for PPI than for CPI. Fourthly, variance decomposition results are probably understating the role of exchange rate. This may be due to the orderings we choose and simultaneous interaction between prices and exchange rates, which we did not introduce into the model in a suitable way. A solution to this problem may be using different orderings and conciliate their results.

The CPI's NEER transition reactions are cumulatively seen (in Accumulated Response to Cholesky). When the NEER and CPI's cumulative responses are taken off, approximately 24 periods after, in other words 2 years later, the reaction disappears and the series reach the stability level. VAR decomposition and Impulse Response functions yielded higher pass-through coefficients than we acquired with OLS. According to Graph 10 and Appendix Table 7, ERPT coefficient to PPI and CPI are 0.52 and 0.48. Both results are higher than the maximum value of coefficients measured from OLS regressions.

Variance decomposition results showed that the most significant factors to affect inflation are exchange rates and energy prices along with past values of inflation. One of the variables that we could not find a significant effect on domestic inflation was the import prices index (in foreign currencies). Accordingly like expected, energy prices and exchange rates indexation is in question regarding the prices. One of the variables that doesn't have a highly significant relation with the domestic inflation is the import price index in terms of foreign currency unit. In literature the first and foremost important channel of ERPT is stated as the import prices. However, insignificant import price coefficient implies that, for Turkey case indexation and inflation expectation[11] channels are more important in ERPT to domestic inflation.

3.5. Markov Switching Regression Analysis

The Markov switching regression model extends the simple exogenous probability framework by specifying a first-order Markov process for the regime

[11] Based on the assumption of adaptive expectation.

probabilities. One can easily learn about how to describe the regime probability specification.

Implementation of regime switching models in economics goes back to Quandt (1958), Godlfeld and Quandt (1973). Hamilton's (1990) ground breaking work popularized Markov regime switching models in empirical economics.

Markov regime switching models assume that the observed changes in a variable between two consecutive periods are a random draw from two distributions. The unobserved state variable evolves according to Markov chain. Probability of switching from one state to another is called transition probability.

State variables (S_t) determine the distribution for the period. In a two-state case, when S_t =1 the observed changes is a random draw from: $y_t / s_t = 1 \sim N(\mu_1, \sigma^2{}_1)$

When S_t=2 from: $y_t / s_t = 2 \sim N(\mu_2, \sigma^2{}_2)$

Mean and the variance of the y_t depend on the state. Density of y_t is conditional on S_t and is as follows:

$$\left(f(y_t | s_t = i) =\right) \frac{1}{\sqrt{2\pi\sigma}} \exp\left(\frac{-(y_t - \mu_{st})}{2\sigma_{st}{}^2}\right)$$

$$cpi_{1t} = constant + \alpha_{11} cpi^e{}_t + \alpha_{12}\Delta neer_t + \alpha_{13}\Delta ms + \alpha_{14}\Delta mipi_t + \alpha_{15}\Delta ipi_t + \alpha_{16}\Delta epi_t + \alpha_{17}\Delta oil_t + \varepsilon_{1t}$$

$$cpi_{2t} = constant + \alpha_{21} cpi^e{}_t + \alpha_{22}\Delta neer_t + \alpha_{23}\Delta ms + \alpha_{24}\Delta mipi_t + \alpha_{25}\Delta ipi_t + \alpha_{26}\Delta epi_t + \alpha_{27}\Delta oil_t + \varepsilon_{2t}$$

The equation specification consists of a two-state Markov switching model with a single switching mean regressors nominal effective exchange rate and its first lag and the five non-switching regressors which are money supply, industrial production index, energy prices, import prices and oil prices. The error variance is

assumed to be common across the regimes. The only probability regressor is the intercept term since we have time-invariant regime transition probabilities.

Therefore, we have highly significant regime changes if we take the exchange rate and its first lag as switching regressors. There is a huge difference in terms of the magnitude of the pass-through coefficients between the states. More interestingly, the sign of the coefficient turn to positive in case of the first lag of nominal effective exchange rate. That is to say, the coefficients on the NEER(-1) both differ from zero with opposite (statistically significant) signs. As to the transition matrix parameters, we see that increases in the log exchange rate are associated with higher probabilities of being in the high exchange rate regime, lowering the transition probability out of State 1 and increasing the transition probability from State 2 into State 1.

Table 3. Two-State Markov Switching Regression Results

	NEER	**P-value**	**$NEER_{t-1}$**	**P-value**
State 1	-0.29	0.0000	-0.28	0.0001
State 2	-0.13	0.0004	0.07	0.0303

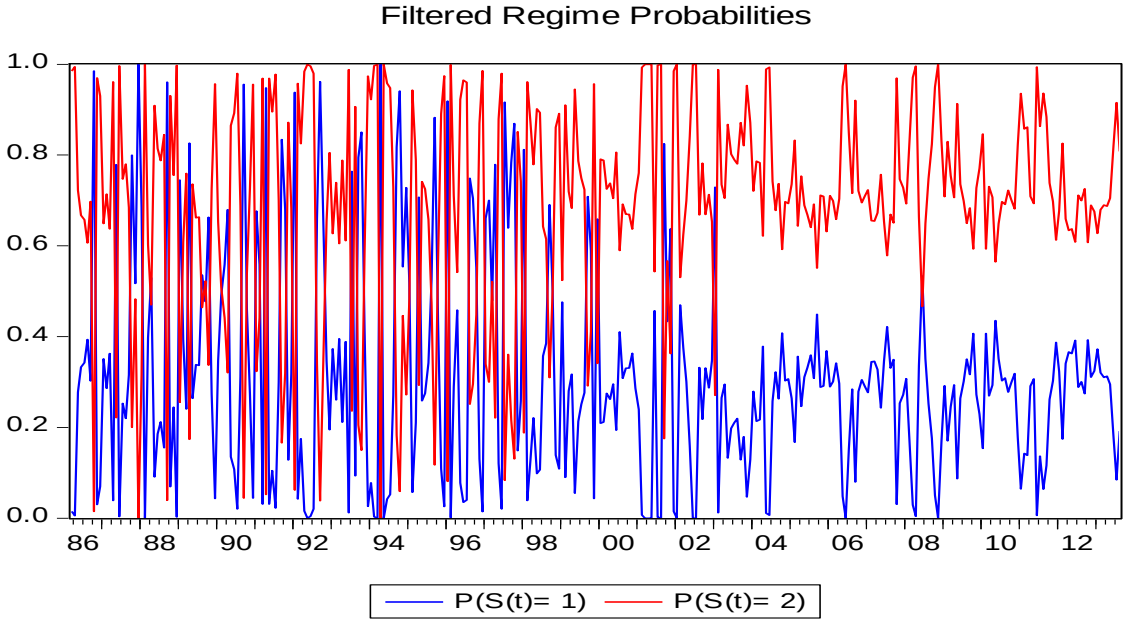
Dependent Variable: CPI
1986M03 2013M08 (330 after adjustments)

Lastly, we can also see the graphical results for both the first and the second regimes in a single graph together in Graph 11. It is also possible to see the filtered and full sample estimates of the probabilities of being in the two regimes saperately from Appendix Graph 4.

It is seen that the predicted probabilities of being in the low exchange rate pass-through state coincide nicely with the commonly employed definition of inflation targeting. One can also see the variation in the time-varying Markov transition

probabilities by examining graphs of the transition probabilities for each observation as shown in Appendix Graph 5.

Graph 11. Filtered Regime Probabilities of Two-State Markov Switching Regession



4. Conclusion

One differentiating feature of this study is that it draws attention to the fact that in Turkey just like other countries under inflation targeting regime, exchange rate does not appear in the monetary policy rule explicitly. This study discusses possible implications of this approach. One should stress that, contrary to developed countries, exchange rate fluctuations in developing countries affect various macroeconomic variables including inflation via different channels. Therefore, estimation of the determinants and dynamics of ERPT is of crucial importance for choosing the best monetary policy options and exchange rate regimes. In developing countries, exchange rate channel of the monetary transmission mechanism operates quite differently than developed countries. Ignoring this reality and adopting the developed

country models simply as they are would lead to serious problems or irregularities in economic and even the social fabric of a developing country.

Therefore, the main concern of this article is to evaluate exchange rate pass-through, which has an important role in the success of inflation targeting regime, creating a significant vulnerability especially in terms of developing countries. In Turkey, both theoretical and empirical studies showed that free floating exchange rates weakened the level of pass-through to some extent. However, this argument belonged to the period during which the Turkish lira was appreciated against main currencies. It is equally important to observe the relationship between exchange rates and price levels when it is depreciated in order to come to a meaningful conclusion about this issue. In fact appreciation and depreciation of a country's currency especially in developing countries accounts for a considerable part of inflation. In this regard, Central Bank of the Republic of Turkey associated the %65 of inflation to the appreciation of Turkish lira. Using the same approach it could easily be said that weak Turkish lira increases the rate of infltion and the appreciated TL has contributed significantly during the times of one digit inflation rates over the last decade.

The dimension of ERPT in Turkey should be evaluated both in terms of its level and its rate of change. Particularly in developing countries where inflation is high and volatile for an extended period of time, economic crisis has been experinced following the unsuccessful stability programs incorporating the fixed exchange rate rejimes. This created in turn a powerful indexation behaviour resulting from the uncertainty during those instable periods. Therefore, exchange rates became the main determinant of inflation expectations before adopting free floating exchange rate

regime. In existing situation pass-through materialized excessively at a high rates both in terms of level and rate of change of exchange rates before the adoption of free floating regime. As a result any change in exchange rates passed through to prices immediately without considering that the shocks are temporary or permanent. Besides automatic indexation behaviour were observed excessively high even in the sub-items of consumer price indexes such as non-tradable goods.

However, it is expected most likely that pass-through would decrease after the introduction of inflation targeting regime together with the free floating exchange rate regime (Başçı et al., 2008). As a matter of fact according to the recent academic studies about Turkey both the level and the rate of change of pass-through reduced (Kara et al., 2005). Following the free floating exchange rate regime it is stated that there was a noticable ease in the indexation behaviour in terms of non-tradables relative to tradables.

We used four methods to analyze the ERPT to domestic inflation in Turkey. In general, we found that the degree of ERPT to domestic inflation is high and greater part of the pass-through realize almost instantaneously.

One of the most important points we made in this paper is the difference of ERPT in high and persistent inflationary environment from low and stable inflationary environment. Measuring ERPT with 12 months differenced data in Turkey is like to measure ERPT for a country with low inflation with 120 months differenced data during higher inflationary periods. So, if we want to name something as an ERPT coefficient for Turkey this should be the coefficients of the very first lags of the exchange rate changes. However, beyond our expectations we could not find a significant relation even with the fifth lag of the changes in the

exchange rates according to our OLS estimates. On the other hand, Impulse Response functions also justified these results showing that all the effects of the exchange rate on domestic prices realized in the first eight months.

We also underlined the argument that the channels through which ERPT realizes is different in Turkey from industrialized countries. In industrialized countries ERPT has been realized mainly through the import prices. However, in Turkey ERPT occurs through indexation mechanisms, inflation expectations, and imported input prices.

Moreover, the progressive adjustments in income provide the economic units to pass-through, the changes in the exchange rates into prices. However, when the changes in exchange rates showed a successive upside and downside trend (starting from November 2001), the level of ERPT decreased significantly. The decrease in the level of ERPT in a floating regime would be explained most probably with the asymetric relationship between the exchange rate changes and prices, and the uncertainty of whether the shocks to the exchange rates are permanent or temporary in nature.

Another remarkable finding is that the level of ERPT was low after the 2001 crisis when compared to 1994-2000 period. The reasons mentioned above can also be acceptable to some extent for this finding. However, the development of the output gap had an important role in this result. The output gap will have an influence on inflation after surpassing a certain level. The output gap increased significantly together with the 2001 crisis. We could assert that nonexistence of output gap in regressions due to the classical criterias was one of the most important factors of the low ERPT in 2001 crisis. If February 2003 is taken as a break point defined in

multiple break tests (Appendix Table 5), the averages of 5-year rolling windows regressions give an interesting result. When the model was reestimated for the 2003:03-2013:07 sub sample i.e for the period of floating exchange rates, it was observed that pass-through parameters substantially decreased comparing to 1986:01-2003:02.

Markov Switching Regression results are striking. According to two-state Markov switching regression model, we have highly significant regime changes if we take the exchange rate and its first lag as switching regressors. There is a huge difference in terms of the magnitude of the pass-through coefficients across the states. More interestingly, the coefficients on the the first lag of nominal effective exchange rate both differ from zero with opposite (highly statistically significant) signs.

Evaluation of the pass-through coefficients implies that the degree of pass-through can vary depending on the prevailing exchange rate policy. However, weakening pass-through especially approximately eight months after the floating regime should be interpreted cautiously. First, when the volatility of exchange rates increased, asymmetric response to changes in exchange rate could artificially reduce degree of pass-through. Second, in floating regime it is difficult to separate the permanent and temporary parts of the exchange rates for economic agents. Last severe output gap, which we could not introduce to the equations due to the statistical criteria, probably affected the marks-up after the crises.

In conclusion, even though the inflation has deviated from its targeted level over the last decade, it is not credible to make a fundamental change in Turkey's macroeconomic political preferences at this stage. A proportional macroeconomic stability period has succeeded in Turkey after the adoption of the inflation targeting

regime since 2006. Although there could be risks of not achieving the targeted rate of inflation, it would be reasonable to keep adopting the IT regime due to the discipline achieved with this strategy in the economy. We believe in that there are many advantages for the Turkish economy to institutionalize credibility, transparency and accountability which are the main factors of inflation targeting strategy. However, taking into account the facts that high current account deficit has been one of the structural problems and developing countries' economic structures are totally different from the developed ones, highly flexible inflation targeting framework[12] seems to be compatible with Turkey's fundamental macroeconomic dynamics including the FX pass-through effects.

[12] The Central Bank of the Republic of Turkey has started to follow flexible inflation targeting regime since late 2010 by using unorthodox policies, including a range of interest rates and market interventions, with the primary objective of price stability while also taking measures to sustain financial stability. See Arslaner (2009) for detailed comments and disscussion for the recommendation about a more flexible IT framework.

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ANNEXES

Appendix Table 1. Single Equation Models for CPI and PPI Inflation[13]

1. c t $inf_{(t-1)}$ neer dummy9404 dummy2000 dummy0404

2. c t $inf_{(t-1)}$ neer dummy9404 dummy2000 dummy0404 seasonals

3. c t $inf_{(t-1)}$ neer $neer_{(t-1)}$ dummy9404 dummy2000 dummy0404 seasonals

4. c t $inf_{(t-1)}$ $inf_{(t-2)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ dummy9404 dummy2000 dummy0404 seasonals

5. c t $inf_{(t-1)}$ $inf_{(t-2)}$ $inf_{(t-3)}$ $inf_{(t-4)}$ $inf_{(t-5)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ $neer_{(t-3)}$ $neer_{(t-4)}$ $neer_{(t-5)}$ dummy9404 dummy2000 dummy0404 seasonals

6. c t $inf_{(t-1)}$ neer

7. c t $inf_{(t-1)}$ neer ms dummy9404 dummy2000 dummy0404

8. c t $inf_{(t-1)}$ neer ms dummy9404 dummy2000 dummy0404 seasonals

9. c t $inf_{(t-1)}$ neer $neer_{(t-1)}$ ms $ms_{(t-1)}$ dummy9404 dummy2000 dummy0404 seasonals

10. c t $inf_{(t-1)}$ $inf_{(t-2)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ ms $ms_{(t-1)}$ $ms_{(t-2)}$ dummy9404 dummy2000 dummy0404 seasonals

11. c t $inf_{(t-1)}$ $inf_{(t-2)}$ $inf_{(t-3)}$ $inf_{(t-4)}$ $inf_{(t-5)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ $neer_{(t-3)}$ $neer_{(t-4)}$ $neer_{(t-5)}$ ms $ms_{(t-1)}$ $ms_{(t-2)}$ $ms_{(t-3)}$ $ms_{(t-4)}$ $ms_{(t-5)}$ dummy9404 dummy2000 dummy0404 seasonals

12. c t $inf_{(t-1)}$ neer ms

13. c t $inf_{(t-1)}$ neer ms mipi dummy9404 dummy2000 dummy0404

14. c t $inf_{(t-1)}$ neer ms mipi dummy9404 dummy2000 dummy0404 seasonals

15. c t $inf_{(t-1)}$ neer $neer_{(t-1)}$ ms $ms_{(t-1)}$ mipi $mipi_{(t-1)}$ dummy9404 dummy2000 dummy0404 seasonals

16. c t $inf_{(t-1)}$ $inf_{(t-2)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ ms $ms_{(t-1)}$ $ms_{(t-2)}$ mipi $mipi_{(t-1)}$ $mipi_{(t-2)}$ dummy9404 dummy2000 dummy0404 seasonals

17. c t $inf_{(t-1)}$ $inf_{(t-2)}$ $inf_{(t-3)}$ $inf_{(t-4)}$ $inf_{(t-5)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ $neer_{(t-3)}$ $neer_{(t-4)}$ $neer_{(t-5)}$ ms $ms_{(t-1)}$ $ms_{(t-2)}$ $ms_{(t-3)}$ $ms_{(t-4)}$ $ms_{(t-5)}$ mipi $mipi_{(t-1)}$ $mipi_{(t-2)}$ $mipi_{(t-3)}$ $mipi_{(t-4)}$ $mipi_{(t-5)}$ dummy9404 dummy2000 dummy0404 seasonals

18. c t $inf_{(t-1)}$ neer ms mipi

19. c t $inf_{(t-1)}$ neer ms mipi epi dummy9404 dummy2000 dummy0404

20. c t $inf_{(t-1)}$ neer ms mipi epi dummy9404 dummy2000 dummy0404 seasonals

21. c t $inf_{(t-1)}$ neer $neer_{(t-1)}$ ms $ms_{(t-1)}$ mipi $mipi_{(t-1)}$ epi $epi_{(t-1)}$ dummy9404 dummy2000 dummy0404 seasonals

22. c t $inf_{(t-1)}$ $inf_{(t-2)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ ms $ms_{(t-1)}$ $ms_{(t-2)}$ mipi $mipi_{(t-1)}$ $mipi_{(t-2)}$ epi $epi_{(t-1)}$ $epi_{(t-2)}$ dummy9404 dummy2000 dummy0404 seasonals

23. c t $inf_{(t-1)}$ $inf_{(t-2)}$ $inf_{(t-3)}$ $inf_{(t-4)}$ $inf_{(t-5)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ $neer_{(t-3)}$ $neer_{(t-4)}$ $neer_{(t-5)}$ ms $ms_{(t-1)}$ $ms_{(t-2)}$ $ms_{(t-3)}$ $ms_{(t-4)}$ $ms_{(t-5)}$ mipi $mipi_{(t-1)}$ $mipi_{(t-2)}$ $mipi_{(t-3)}$ $mipi_{(t-4)}$ $mipi_{(t-5)}$ epi $epi_{(t-1)}$ $epi_{(t-2)}$ $epi_{(t-3)}$ $epi_{(t-4)}$ $epi_{(t-5)}$ dummy9404 dummy2000 dummy0404 seasonals

24. c t $inf_{(t-1)}$ neer ms mipi epi

25. c t $inf_{(t-1)}$ neer ms mipi epi ipi dummy9404 dummy2000 dummy0404

26. c t $inf_{(t-1)}$ neer ms mipi epi ipi dummy9404 dummy2000 dummy0404 seasonals

27. c t $inf_{(t-1)}$ neer $neer_{(t-1)}$ ms $ms_{(t-1)}$ mipi $mipi_{(t-1)}$ epi $epi_{(t-1)}$ ipi $ipi_{(t-1)}$ dummy9404 dummy2000 dummy0404 seasonals

28. c t $inf_{(t-1)}$ $inf_{(t-2)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ ms $ms_{(t-1)}$ $ms_{(t-2)}$ mipi $mipi_{(t-1)}$ $mipi_{(t-2)}$ epi $epi_{(t-1)}$ $epi_{(t-2)}$ ipi $ipi_{(t-1)}$ $ipi_{(t-2)}$ dummy9404 dummy2000 dummy0404 seasonals

29. c t $inf_{(t-1)}$ $inf_{(t-2)}$ $inf_{(t-3)}$ $inf_{(t-4)}$ $inf_{(t-5)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ $neer_{(t-3)}$ $neer_{(t-4)}$ $neer_{(t-5)}$ ms $ms_{(t-1)}$ $ms_{(t-2)}$ $ms_{(t-3)}$ $ms_{(t-4)}$ $ms_{(t-5)}$ mipi $mipi_{(t-1)}$ $mipi_{(t-2)}$ $mipi_{(t-3)}$ $mipi_{(t-4)}$ $mipi_{(t-5)}$ epi $epi_{(t-1)}$ $epi_{(t-2)}$ $epi_{(t-3)}$ $epi_{(t-4)}$ $epi_{(t-5)}$ ipi $ipi_{(t-1)}$ $ipi_{(t-2)}$ $ipi_{(t-3)}$ $ipi_{(t-4)}$ $ipi_{(t-5)}$ dummy9404 dummy2000 dummy0404 seasonals

30. c t $inf_{(t-1)}$ neer ms mipi epi ipi

31. c t $inf_{(t-1)}$ neer ms mipi epi ipi oil dummy9404 dummy2000 dummy0404

32. c t $inf_{(t-1)}$ neer ms mipi epi ipi oil dummy9404 dummy2000 dummy0404 seasonals

33. c t $inf_{(t-1)}$ neer $neer_{(t-1)}$ ms $ms_{(t-1)}$ mipi $mipi_{(t-1)}$ epi $epi_{(t-1)}$ ipi $ipi_{(t-1)}$ oil $oil_{(t-1)}$ dummy9404 dummy2000 dummy0404 seasonals

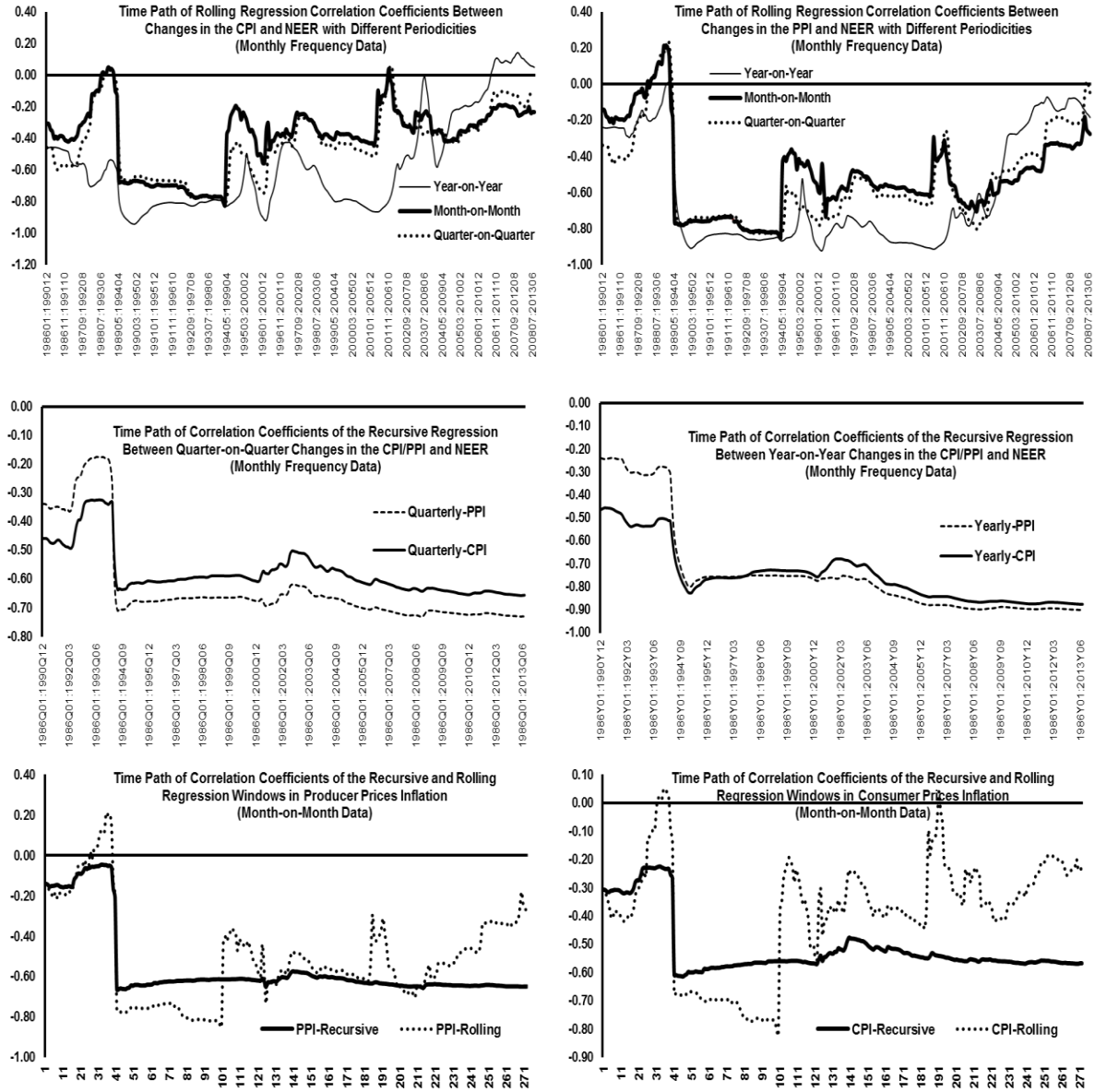
34. c t $inf_{(t-1)}$ $inf_{(t-2)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ ms $ms_{(t-1)}$ $ms_{(t-2)}$ mipi $mipi_{(t-1)}$ $mipi_{(t-2)}$ epi $epi_{(t-1)}$ $epi_{(t-2)}$ ipi $ipi_{(t-1)}$ $ipi_{(t-2)}$ oil $oil_{(t-1)}$ $oil_{(t-2)}$ dummy9404 dummy2000 dummy0404 seasonals

35. c t $inf_{(t-1)}$ $inf_{(t-2)}$ $inf_{(t-3)}$ $inf_{(t-4)}$ $inf_{(t-5)}$ neer $neer_{(t-1)}$ $neer_{(t-2)}$ $neer_{(t-3)}$ $neer_{(t-4)}$ $neer_{(t-5)}$ ms $ms_{(t-1)}$ $ms_{(t-2)}$ $ms_{(t-3)}$ $ms_{(t-4)}$ $ms_{(t-5)}$ mipi $mipi_{(t-1)}$ $mipi_{(t-2)}$ $mipi_{(t-3)}$ $mipi_{(t-4)}$ $mipi_{(t-5)}$ epi $epi_{(t-1)}$ $epi_{(t-2)}$ $epi_{(t-3)}$ $epi_{(t-4)}$ $epi_{(t-5)}$ ipi $ipi_{(t-1)}$ $ipi_{(t-2)}$ $ipi_{(t-3)}$ $ipi_{(t-4)}$ $ipi_{(t-5)}$ oil $oil_{(t-1)}$ $oil_{(t-2)}$ $oil_{(t-3)}$ $oil_{(t-4)}$ $oil_{(t-5)}$ dummy9404 dummy2000 dummy0404 seasonals

36. c t $inf_{(t-1)}$ neer ms mipi epi ipi oil

[13] The variable "inf" indicates both cpi-inflation and ppi-inflation in equations. c and t stand for constant and trend respectively. Trend is also used for all specifications whether the single equation is trend stationary or not.

Appendix Graph 1. Correlation Coefficients between Changes in the CPI/PPI Differential and Nominal Effective Exchange Rates



Appendix Table 2. Exchange Rate Pass-Through Coefficients As Averages Over Time Within Different Specifications

#	Ordinary Least Square						Recursive Regression						5-Year Rolling Regression Windows					
of	Monthly		Quarterly		Yearly		Monthly		Quarterly		Yearly		Monthly		Quarterly		Yearly	
Eqns	**CPI**	**PPI**	**CPI**	**PPI**	**CPI**	**PPI**	**CPI**	**PPI**	**CPI**	**PPI**	**CPI**	**PPI**	**CPI**	**PPI**	**CPI**	**PPI**	**CPI**	**PPI**
1	-0.21	-0.30	-0.14	-0.22	-0.08	-0.14	-0.24	-0.29	-0.18	-0.23	-0.09	-0.14	-0.15	-0.24	-0.11	-0.20	-0.08	-0.13
2	-0.19	-0.29	-0.14	-0.22	-0.08	-0.14	-0.20	-0.27	-0.16	-0.23	-0.09	-0.14	-0.15	-0.24	-0.11	-0.20	-0.08	-0.13
3	-0.19	-0.28	-0.17	-0.27	-0.18	-0.29	-0.20	-0.26	-0.18	-0.25	-0.22	-0.29	-0.15	-0.24	-0.14	-0.24	-0.13	-0.24
4	-0.19	-0.29	-0.18	-0.25	-0.18	-0.27	-0.20	-0.26	-0.18	-0.22	-0.21	-0.26	-0.15	-0.23	-0.13	-0.19	-0.13	-0.23
5	-0.19	-0.30	-0.19	-0.29	-0.18	-0.29	-0.20	-0.28	-0.19	-0.27	-0.22	-0.28	-0.15	-0.23	-0.12	-0.18	-0.13	-0.23
6	-0.21	-0.30	-0.14	-0.22	-0.08	-0.14	-0.24	-0.29	-0.18	-0.23	-0.09	-0.14	-0.15	-0.24	-0.11	-0.20	-0.08	-0.14
7	-0.21	-0.30	-0.14	-0.22	-0.08	-0.14	-0.24	-0.29	-0.18	-0.22	-0.09	-0.14	-0.16	-0.25	-0.10	-0.19	-0.08	-0.13
8	-0.19	-0.29	-0.14	-0.22	-0.08	-0.14	-0.20	-0.27	-0.16	-0.22	-0.09	-0.14	-0.16	-0.25	-0.10	-0.19	-0.08	-0.13
9	-0.19	-0.28	-0.17	-0.27	-0.18	-0.29	-0.20	-0.26	-0.18	-0.24	-0.22	-0.29	-0.16	-0.24	-0.13	-0.22	-0.14	-0.24
10	-0.20	-0.29	-0.18	-0.25	-0.19	-0.28	-0.20	-0.27	-0.18	-0.22	-0.22	-0.27	-0.15	-0.24	-0.13	-0.20	-0.14	-0.24
11	-0.20	-0.30	-0.19	-0.29	-0.18	-0.29	-0.21	-0.30	-0.21	-0.29	-0.23	-0.30	-0.17	-0.25	-0.13	-0.21	-0.15	-0.25
12	-0.21	-0.30	-0.14	-0.22	-0.08	-0.14	-0.24	-0.29	-0.18	-0.22	-0.09	-0.14	-0.16	-0.25	-0.11	-0.19	-0.08	-0.13
13	-0.21	-0.30	-0.15	-0.22	-0.08	-0.15	-0.24	-0.29	-0.18	-0.22	-0.10	-0.15	-0.16	-0.24	-0.10	-0.19	-0.09	-0.14
14	-0.19	-0.29	-0.14	-0.23	-0.08	-0.15	-0.20	-0.27	-0.16	-0.22	-0.10	-0.15	-0.16	-0.24	-0.10	-0.19	-0.09	-0.14
15	-0.20	-0.29	-0.17	-0.27	-0.18	-0.29	-0.20	-0.26	-0.18	-0.24	-0.22	-0.29	-0.15	-0.24	-0.13	-0.22	-0.14	-0.24
16	-0.20	-0.30	-0.19	-0.25	-0.19	-0.28	-0.20	-0.27	-0.18	-0.23	-0.22	-0.27	-0.15	-0.23	-0.12	-0.20	-0.14	-0.24
17	-0.19	-0.31	-0.19	-0.30	-0.18	-0.29	-0.21	-0.30	-0.20	-0.30	-0.23	-0.30	-0.14	-0.23	-0.12	-0.19	-0.16	-0.26
18	-0.21	-0.30	-0.15	-0.22	-0.08	-0.15	-0.24	-0.29	-0.18	-0.22	-0.10	-0.15	-0.16	-0.25	-0.11	-0.19	-0.09	-0.15
19	-0.17	-0.24	-0.13	-0.20	-0.08	-0.14	-0.20	-0.22	-0.16	-0.19	-0.08	-0.13	-0.12	-0.19	-0.08	-0.16	-0.10	-0.14
20	-0.16	-0.24	-0.13	-0.21	-0.08	-0.14	-0.16	-0.21	-0.14	-0.19	-0.08	-0.13	-0.12	-0.19	-0.08	-0.16	-0.10	-0.14
21	-0.17	-0.24	-0.15	-0.23	-0.16	-0.25	-0.16	-0.20	-0.14	-0.20	-0.18	-0.22	-0.12	-0.19	-0.11	-0.19	-0.11	-0.19
22	-0.17	-0.25	-0.17	-0.22	-0.16	-0.23	-0.16	-0.21	-0.15	-0.18	-0.17	-0.20	-0.11	-0.18	-0.10	-0.17	-0.11	-0.19
23	-0.16	-0.26	-0.16	-0.25	-0.15	-0.24	-0.16	-0.23	-0.15	-0.22	-0.17	-0.20	-0.08	-0.17	-0.09	-0.15	-0.11	-0.20
24	-0.18	-0.24	-0.13	-0.20	-0.08	-0.14	-0.20	-0.22	-0.16	-0.19	-0.08	-0.13	-0.12	-0.19	-0.08	-0.16	-0.10	-0.14
25	-0.14	-0.17	-0.09	-0.10	-0.07	-0.08	-0.17	-0.17	-0.12	-0.12	-0.06	-0.05	-0.07	-0.11	-0.01	-0.05	-0.03	-0.04
26	-0.16	-0.19	-0.13	-0.14	-0.07	-0.08	-0.16	-0.17	-0.15	-0.15	-0.06	-0.04	-0.07	-0.11	-0.01	-0.05	-0.03	-0.04
27	-0.16	-0.20	-0.16	-0.18	-0.16	-0.17	-0.15	-0.18	-0.16	-0.16	-0.16	-0.15	-0.07	-0.10	-0.07	-0.07	-0.09	-0.09
28	-0.16	-0.21	-0.18	-0.18	-0.16	-0.18	-0.15	-0.18	-0.17	-0.16	-0.17	-0.16	-0.06	-0.10	-0.07	-0.09	-0.08	-0.10
29	-0.17	-0.22	-0.16	-0.20	-0.16	-0.18	-0.15	-0.18	-0.15	-0.16	-0.17	-0.13	-0.06	-0.08	-0.08	-0.09	-0.08	-0.11
30	-0.14	-0.17	-0.09	-0.11	-0.07	-0.08	-0.17	-0.17	-0.12	-0.12	-0.07	-0.05	-0.07	-0.11	-0.02	-0.05	-0.04	-0.04
31	-0.15	-0.19	-0.09	-0.13	-0.08	-0.12	-0.18	-0.17	-0.12	-0.12	-0.06	-0.05	-0.07	-0.13	0.00	-0.07	-0.04	-0.09
32	-0.17	-0.20	-0.15	-0.17	-0.08	-0.12	-0.16	-0.18	-0.16	-0.16	-0.06	-0.05	-0.07	-0.13	0.00	-0.07	-0.04	-0.09
33	-0.17	-0.22	-0.18	-0.20	-0.17	-0.19	-0.17	-0.19	-0.18	-0.17	-0.17	-0.15	-0.07	-0.12	-0.05	-0.09	-0.11	-0.13
34	-0.17	-0.23	-0.19	-0.20	-0.16	-0.19	-0.18	-0.19	-0.18	-0.16	-0.18	-0.16	-0.07	-0.12	-0.07	-0.10	-0.11	-0.13
35	-0.18	-0.24	-0.17	-0.22	-0.16	-0.19	-0.17	-0.20	-0.16	-0.17	-0.15	-0.10	-0.06	-0.10	-0.05	-0.09	-0.09	-0.16
36	-0.15	-0.19	-0.10	-0.13	-0.09	-0.11	-0.18	-0.17	-0.13	-0.13	-0.07	-0.05	-0.07	-0.13	0.00	-0.07	-0.05	-0.10
Min	-0.21	-0.31	-0.19	-0.30	-0.19	-0.29	-0.24	-0.30	-0.21	-0.30	-0.23	-0.30	-0.17	-0.25	-0.14	-0.24	-0.16	-0.26
Max	-0.14	-0.17	-0.09	-0.10	-0.07	-0.08	-0.15	-0.17	-0.12	-0.12	-0.06	-0.04	-0.06	-0.08	0.00	-0.05	-0.03	-0.04
Avg	**-0.18**	**-0.26**	**-0.15**	**-0.21**	**-0.13**	**-0.19**	**-0.19**	**-0.23**	**-0.16**	**-0.20**	**-0.14**	**-0.17**	**-0.12**	**-0.19**	**-0.09**	**-0.15**	**-0.10**	**-0.15**
Std	0.02	0.04	0.03	0.05	0.05	0.07	0.03	0.05	0.02	0.05	0.06	0.08	0.04	0.06	0.04	0.06	0.03	0.06

Appendix Table 3. Exchange Rate Pass-Through Coefficients As Averages Over Different Specifications Within Same Periods

			Recursive Regression									5-Year Rolling Regression Windows					
			Monthly		Quarterly		Yearly					Monthly		Quarterly		Yearly	
Recursive Samples			CPI	PPI	CPI	PPI	CPI	PPI	Rolling Samples			CPI	PPI	CPI	PPI	CPI	PPI
1	60	198601:199012	-0.2430	-0.1050	-0.2181	-0.1638	-0.2511	-0.1263	1	60	198601:199012	-0.2526	-0.1347	-0.2562	-0.1915	-0.2345	-0.1138
1	61	198601:199101	-0.2103	-0.0981	-0.2186	-0.1391	-0.1987	-0.1154	2	61	198602:199101	-0.2710	-0.1374	-0.2676	-0.1911	-0.2067	-0.1104
1	62	198601:199102	-0.2119	-0.1057	-0.2295	-0.1419	-0.2064	-0.1220	3	62	198603:199102	-0.2716	-0.1437	-0.2775	-0.1910	-0.2042	-0.1162
1	63	198601:199103	-0.1976	-0.0910	-0.2175	-0.1344	-0.2097	-0.1248	4	63	198604:199103	-0.2679	-0.1271	-0.2670	-0.1789	-0.1967	-0.1143
1	64	198601:199104	-0.1947	-0.0878	-0.2134	-0.1271	-0.1986	-0.1164	5	64	198605:199104	-0.2666	-0.1255	-0.2609	-0.1754	-0.1924	-0.1166
1	65	198601:199105	-0.1862	-0.0825	-0.2138	-0.1291	-0.1910	-0.1298	6	65	198606:199105	-0.2759	-0.1295	-0.2655	-0.1731	-0.1905	-0.1179
1	66	198601:199106	-0.1825	-0.0718	-0.2132	-0.1240	-0.1905	-0.1258	7	66	198607:199106	-0.2687	-0.1159	-0.2688	-0.1688	-0.1912	-0.1185
1	67	198601:199107	-0.1844	-0.0733	-0.2051	-0.1249	-0.1921	-0.1224	8	67	198608:199107	-0.2683	-0.1116	-0.2707	-0.1604	-0.1938	-0.1269
1	68	198601:199108	-0.1777	-0.0784	-0.2048	-0.1271	-0.1927	-0.1243	9	68	198609:199108	-0.2653	-0.1192	-0.2638	-0.1622	-0.1922	-0.1329
1	69	198601:199109	-0.1794	-0.0804	-0.2041	-0.1249	-0.1780	-0.1169	10	69	198610:199109	-0.2684	-0.1072	-0.2585	-0.1482	-0.1768	-0.1245
1	70	198601:199110	-0.1806	-0.0835	-0.2129	-0.1255	-0.1708	-0.0911	11	70	198611:199110	-0.2668	-0.1051	-0.2615	-0.1438	-0.1687	-0.1135
1	71	198601:199111	-0.1775	-0.0791	-0.2161	-0.1262	-0.1179	0.1056	12	71	198612:199111	-0.2605	-0.0947	-0.2427	-0.1294	-0.1652	-0.1055
1	72	198601:199112	-0.1772	-0.0778	-0.2096	-0.1196	-0.1510	-0.0642	13	72	198701:199112	-0.2526	-0.0914	-0.2426	-0.1248	-0.1684	-0.0994
1	73	198601:199201	-0.1810	-0.0832	-0.2113	-0.1225	-0.1691	-0.0987	14	73	198702:199201	-0.2560	-0.0820	-0.2452	-0.1314	-0.1666	-0.1014
1	74	198601:199202	-0.1792	-0.0822	-0.2117	-0.1220	-0.1788	-0.0997	15	74	198703:199202	-0.2551	-0.0802	-0.2370	-0.1264	-0.1666	-0.0954
1	75	198601:199203	-0.1787	-0.0790	-0.2110	-0.1206	-0.1776	-0.1041	16	75	198704:199203	-0.2534	-0.0676	-0.2263	-0.1175	-0.1684	-0.0903
1	76	198601:199204	-0.1594	-0.0378	-0.1867	-0.0773	-0.1443	-0.0663	17	76	198705:199204	-0.2297	-0.0187	-0.1960	-0.0566	-0.1315	-0.0423
1	77	198601:199205	-0.1483	-0.0191	-0.1706	-0.0457	-0.1346	-0.0496	18	77	198706:199205	-0.2028	0.0043	-0.1707	-0.0346	-0.0970	-0.0044
1	78	198601:199206	-0.1303	-0.0068	-0.1306	-0.0204	-0.1145	-0.0280	19	78	198707:199206	-0.1892	0.0022	-0.1448	-0.0224	-0.0850	0.0098
1	79	198601:199207	-0.1285	-0.0080	-0.1217	-0.0229	-0.1043	-0.0187	20	79	198708:199207	-0.1847	0.0040	-0.1276	-0.0107	-0.0753	0.0190
1	80	198601:199208	-0.1286	-0.0077	-0.1221	-0.0254	-0.1020	-0.0207	21	80	198709:199208	-0.1964	-0.0129	-0.1265	-0.0179	-0.0620	0.0221
1	81	198601:199209	-0.1161	0.0003	-0.1162	-0.0182	-0.1056	-0.0250	22	81	198710:199209	-0.1724	-0.0112	-0.1184	-0.0142	-0.0585	0.0206
1	82	198601:199210	-0.1095	0.0061	-0.1062	-0.0074	-0.1037	-0.0196	23	82	198711:199210	-0.1356	-0.0052	-0.0993	-0.0116	-0.0657	0.0180
1	83	198601:199211	-0.1109	0.0003	-0.0958	-0.0085	-0.1040	-0.0178	24	83	198712:199211	-0.1216	-0.0078	-0.0629	-0.0061	-0.0631	0.0221
1	84	198601:199212	-0.1136	-0.0001	-0.1003	-0.0107	-0.1071	-0.0201	25	84	198801:199212	-0.0804	-0.0099	0.0102	0.0260	-0.0671	0.0127
1	85	198601:199301	-0.1147	-0.0013	-0.1030	-0.0143	-0.1156	-0.0379	26	85	198802:199301	-0.0435	-0.0309	0.0042	0.0258	-0.0819	-0.0106
1	86	198601:199302	-0.1153	0.0003	-0.1011	-0.0119	-0.1136	-0.0432	27	86	198803:199302	-0.0295	0.0054	-0.0175	0.0322	-0.0850	-0.0082
1	87	198601:199303	-0.1146	0.0018	-0.0997	-0.0094	-0.1081	-0.0336	28	87	198804:199303	-0.0230	0.0076	0.0068	0.0431	-0.0778	0.0028
1	88	198601:199304	-0.1146	0.0022	-0.0997	-0.0096	-0.1080	-0.0329	29	88	198805:199304	-0.0129	0.0015	0.0498	0.0531	-0.0844	-0.0001
1	89	198601:199305	-0.1163	0.0008	-0.1013	-0.0095	-0.0947	-0.0114	30	89	198806:199305	0.0129	0.0171	0.0538	0.0898	-0.0665	0.0293
1	90	198601:199306	-0.1152	-0.0002	-0.1005	-0.0104	-0.0879	0.0001	31	90	198807:199306	0.0201	0.0186	0.0746	0.1064	-0.0562	0.0330
1	91	198601:199307	-0.1149	0.0006	-0.1033	-0.0160	-0.0764	0.0114	32	91	198808:199307	0.0399	0.0328	0.0834	0.1083	-0.0349	0.0430
1	92	198601:199308	-0.1161	-0.0011	-0.1041	-0.0168	-0.0777	0.0084	33	92	198809:199308	0.0371	0.0466	0.0748	0.1264	-0.0299	0.0329
1	93	198601:199309	-0.1171	-0.0011	-0.1065	-0.0181	-0.0743	0.0052	34	93	198810:199309	0.0532	0.1418	0.0856	0.1582	-0.0100	0.0408
1	94	198601:199310	-0.1189	-0.0038	-0.1096	-0.0197	-0.0742	0.0050	35	94	198811:199310	0.0513	0.1458	0.0978	0.1841	-0.0186	0.0396
1	95	198601:199311	-0.1174	-0.0024	-0.1088	-0.0188	-0.0710	0.0056	36	95	198812:199311	0.0359	0.1369	0.0641	0.2077	-0.0193	0.0045
1	96	198601:199312	-0.1186	-0.0060	-0.1155	-0.0289	-0.0746	0.0008	37	96	198901:199312	0.0395	0.1346	0.0585	0.2004	-0.0026	-0.0041
1	97	198601:199401	-0.1138	-0.0045	-0.1129	-0.0274	-0.0738	0.0012	38	97	198902:199401	0.0476	0.1171	0.0631	0.1865	0.0192	0.0102
1	98	198601:199402	-0.1187	-0.0694	-0.1061	-0.0440	-0.0781	-0.0267	39	98	198903:199402	-0.0776	-0.1241	-0.0244	0.0020	-0.0461	-0.0879
1	99	198601:199403	-0.1067	-0.0673	-0.0975	-0.0589	-0.0711	-0.0292	40	99	198904:199403	-0.0759	-0.1311	-0.0647	-0.0654	-0.0424	-0.0951
1	100	198601:199404	-0.2270	-0.2773	-0.1850	-0.2093	-0.1523	-0.1739	41	100	198905:199404	-0.2398	-0.3764	-0.1854	-0.2757	-0.1700	-0.2780
1	101	198601:199405	-0.2332	-0.2916	-0.1849	-0.2163	-0.1512	-0.1751	42	101	198906:199405	-0.2457	-0.3846	-0.1907	-0.2940	-0.1800	-0.2774
1	102	198601:199406	-0.2321	-0.2964	-0.1807	-0.2156	-0.1438	-0.1688	43	102	198907:199406	-0.2515	-0.3937	-0.1924	-0.2968	-0.1836	-0.2746
1	103	198601:199407	-0.2357	-0.2955	-0.1929	-0.2403	-0.1416	-0.1552	44	103	198908:199407	-0.2614	-0.3966	-0.2108	-0.3168	-0.1826	-0.2568
1	104	198601:199408	-0.2369	-0.2971	-0.1939	-0.2420	-0.1443	-0.1532	45	104	198909:199408	-0.2644	-0.3998	-0.2168	-0.3250	-0.1937	-0.2648
1	105	198601:199409	-0.2370	-0.2985	-0.1926	-0.2428	-0.1448	-0.1548	46	105	198910:199409	-0.2590	-0.3938	-0.2183	-0.3351	-0.1995	-0.2703
1	106	198601:199410	-0.2343	-0.2927	-0.1957	-0.2447	-0.1449	-0.1568	47	106	198911:199410	-0.2472	-0.3763	-0.2134	-0.3176	-0.1962	-0.2679
1	107	198601:199411	-0.2314	-0.2909	-0.1930	-0.2416	-0.1452	-0.1563	48	107	198912:199411	-0.2473	-0.3759	-0.2038	-0.2999	-0.1977	-0.2712
1	108	198601:199412	-0.2309	-0.2925	-0.1883	-0.2377	-0.1485	-0.1610	49	108	199001:199412	-0.2540	-0.3790	-0.1977	-0.2892	-0.1978	-0.2644
1	109	198601:199501	-0.2317	-0.2944	-0.1898	-0.2388	-0.1517	-0.1639	50	109	199002:199501	-0.2582	-0.3808	-0.1987	-0.2893	-0.2049	-0.2689
1	110	198601:199502	-0.2319	-0.2940	-0.1915	-0.2416	-0.1467	-0.1598	51	110	199003:199502	-0.2619	-0.3747	-0.2023	-0.2812	-0.2016	-0.2657
1	111	198601:199503	-0.2313	-0.2913	-0.1907	-0.2397	-0.1452	-0.1569	52	111	199004:199503	-0.2605	-0.3668	-0.2049	-0.2765	-0.1937	-0.2564
1	112	198601:199504	-0.2313	-0.2925	-0.1913	-0.2404	-0.1628	-0.1886	53	112	199005:199504	-0.2616	-0.3703	-0.2042	-0.2755	-0.2001	-0.2682
1	113	198601:199505	-0.2318	-0.2947	-0.1909	-0.2409	-0.1632	-0.1892	54	113	199006:199505	-0.2604	-0.3746	-0.1981	-0.2697	-0.2000	-0.2695
1	114	198601:199506	-0.2324	-0.2957	-0.1910	-0.2411	-0.1626	-0.1869	55	114	199007:199506	-0.2726	-0.3839	-0.2123	-0.2802	-0.2047	-0.2736
1	115	198601:199507	-0.2324	-0.2959	-0.1913	-0.2413	-0.1628	-0.1872	56	115	199008:199507	-0.2739	-0.3867	-0.2065	-0.2707	-0.2050	-0.2778
1	116	198601:199508	-0.2328	-0.2960	-0.1923	-0.2427	-0.1638	-0.1883	57	116	199009:199508	-0.2837	-0.3900	-0.2101	-0.2707	-0.2031	-0.2723
1	117	198601:199509	-0.2280	-0.2925	-0.1913	-0.2412	-0.1589	-0.1838	58	117	199010:199509	-0.2732	-0.3839	-0.2227	-0.2945	-0.1971	-0.2688
1	118	198601:199510	-0.2271	-0.2912	-0.1910	-0.2422	-0.1587	-0.1837	59	118	199011:199510	-0.2705	-0.3788	-0.2279	-0.2996	-0.1851	-0.2340
1	119	198601:199511	-0.2260	-0.2920	-0.1905	-0.2423	-0.1593	-0.1907	60	119	199012:199511	-0.2666	-0.3793	-0.2270	-0.3039	-0.1844	-0.2366
1	120	198601:199512	-0.2251	-0.2910	-0.1868	-0.2396	-0.1571	-0.1885	61	120	199101:199512	-0.2633	-0.3780	-0.2142	-0.2915	-0.1805	-0.2304
1	121	198601:199601	-0.2244	-0.2894	-0.1855	-0.2375	-0.1554	-0.1878	62	121	199102:199601	-0.2659	-0.3772	-0.2138	-0.2866	-0.1827	-0.2370
1	122	198601:199602	-0.2262	-0.2919	-0.1882	-0.2412	-0.1576	-0.1904	63	122	199103:199602	-0.2680	-0.3777	-0.2243	-0.2972	-0.1813	-0.2451
1	123	198601:199603	-0.2258	-0.2914	-0.1887	-0.2407	-0.1576	-0.1901	64	123	199104:199603	-0.2745	-0.3884	-0.2281	-0.3017	-0.1841	-0.2539
1	124	198601:199604	-0.2275	-0.2873	-0.1899	-0.2399	-0.1596	-0.1889	65	124	199105:199604	-0.2761	-0.3802	-0.2329	-0.3012	-0.1791	-0.2362
1	125	198601:199605	-0.2273	-0.2866	-0.1896	-0.2401	-0.1598	-0.1894	66	125	199106:199605	-0.2760	-0.3667	-0.2384	-0.3104	-0.1800	-0.2299
1	126	198601:199606	-0.2268	-0.2851	-0.1889	-0.2394	-0.1592	-0.1904	67	126	199107:199606	-0.2745	-0.3675	-0.2377	-0.3092	-0.1800	-0.2327
1	127	198601:199607	-0.2268	-0.2853	-0.1875	-0.2349	-0.1596	-0.1905	68	127	199108:199607	-0.2738	-0.3661	-0.2190	-0.2851	-0.1780	-0.2324
1	128	198601:199608	-0.2273	-0.2860	-0.1877	-0.2357	-0.1593	-0.1904	69	128	199109:199608	-0.2781	-0.3692	-0.2304	-0.2995	-0.1792	-0.2336
1	129	198601:199609	-0.2271	-0.2856	-0.1882	-0.2363	-0.1565	-0.1910	70	129	199110:199609	-0.2815	-0.3755	-0.2295	-0.3076	-0.1748	-0.2295

Appendix Table 3. Exchange Rate Pass-Through Coefficients As Averages Over Different Specifications Within Same Periods (Contunied)

			Recursive Regression									5-Year Rolling Regression Windows					
			Monthly		Quarterly		Yearly					Monthly		Quarterly		Yearly	
Recursive Samples			CPI	PPI	CPI	PPI	CPI	PPI	Rolling Samples			CPI	PPI	CPI	PPI	CPI	PPI
1	130	198601:199610	-0.2272	-0.2855	-0.1879	-0.2365	-0.1563	-0.1915	71	130	199111:199610	-0.2841	-0.3789	-0.2271	-0.3055	-0.1701	-0.2310
1	131	198601:199611	-0.2271	-0.2860	-0.1880	-0.2361	-0.1565	-0.1917	72	131	199112:199611	-0.2798	-0.3745	-0.2285	-0.3053	-0.1684	-0.2380
1	132	198601:199612	-0.2281	-0.2870	-0.1884	-0.2365	-0.1569	-0.1920	73	132	199201:199612	-0.2893	-0.3821	-0.2387	-0.3166	-0.1705	-0.2422
1	133	198601:199701	-0.2280	-0.2870	-0.1881	-0.2362	-0.1563	-0.1916	74	133	199202:199701	-0.2802	-0.3768	-0.2274	-0.2964	-0.1678	-0.2400
1	134	198601:199702	-0.2267	-0.2868	-0.1862	-0.2368	-0.1560	-0.1913	75	134	199203:199702	-0.2692	-0.3683	-0.2043	-0.2833	-0.1705	-0.2439
1	135	198601:199703	-0.2262	-0.2864	-0.1841	-0.2358	-0.1563	-0.1921	76	135	199204:199703	-0.2691	-0.3669	-0.2012	-0.2803	-0.1714	-0.2514
1	136	198601:199704	-0.2263	-0.2870	-0.1838	-0.2360	-0.1569	-0.1910	77	136	199205:199704	-0.2693	-0.3667	-0.1995	-0.2681	-0.1731	-0.2590
1	137	198601:199705	-0.2265	-0.2876	-0.1838	-0.2358	-0.1573	-0.1917	78	137	199206:199705	-0.2650	-0.3703	-0.1924	-0.2841	-0.1779	-0.2607
1	138	198601:199706	-0.2266	-0.2858	-0.1837	-0.2348	-0.1576	-0.1923	79	138	199207:199706	-0.2646	-0.3692	-0.1919	-0.2791	-0.1769	-0.2539
1	139	198601:199707	-0.2259	-0.2855	-0.1839	-0.2351	-0.1582	-0.1932	80	139	199208:199707	-0.2634	-0.3718	-0.1981	-0.2860	-0.1728	-0.2507
1	140	198601:199708	-0.2260	-0.2852	-0.1844	-0.2352	-0.1577	-0.1922	81	140	199209:199708	-0.2681	-0.3726	-0.1944	-0.2877	-0.1752	-0.2550
1	141	198601:199709	-0.2258	-0.2851	-0.1839	-0.2347	-0.1572	-0.1918	82	141	199210:199709	-0.2751	-0.3804	-0.1944	-0.2887	-0.1736	-0.2480
1	142	198601:199710	-0.2260	-0.2851	-0.1837	-0.2344	-0.1572	-0.1920	83	142	199211:199710	-0.2757	-0.3768	-0.1982	-0.2916	-0.1680	-0.2467
1	143	198601:199711	-0.2263	-0.2855	-0.1840	-0.2350	-0.1561	-0.1920	84	143	199212:199711	-0.2735	-0.3792	-0.1987	-0.2994	-0.1672	-0.2527
1	144	198601:199712	-0.2263	-0.2857	-0.1834	-0.2349	-0.1557	-0.1924	85	144	199301:199712	-0.2698	-0.3780	-0.1935	-0.3011	-0.1610	-0.2482
1	145	198601:199801	-0.2258	-0.2852	-0.1828	-0.2342	-0.1556	-0.1926	86	145	199302:199801	-0.2682	-0.3809	-0.2036	-0.3051	-0.1583	-0.2378
1	146	198601:199802	-0.2254	-0.2852	-0.1827	-0.2343	-0.1551	-0.1924	87	146	199303:199802	-0.2684	-0.3803	-0.2064	-0.2982	-0.1503	-0.2423
1	147	198601:199803	-0.2263	-0.2872	-0.1836	-0.2366	-0.1554	-0.1934	88	147	199304:199803	-0.2700	-0.3882	-0.2120	-0.3035	-0.1609	-0.2560
1	148	198601:199804	-0.2281	-0.2887	-0.1859	-0.2394	-0.1565	-0.1938	89	148	199305:199804	-0.2715	-0.3800	-0.2213	-0.3118	-0.1702	-0.2680
1	149	198601:199805	-0.2273	-0.2890	-0.1860	-0.2394	-0.1564	-0.1942	90	149	199306:199805	-0.2674	-0.3819	-0.2173	-0.3117	-0.1732	-0.2736
1	150	198601:199806	-0.2277	-0.2891	-0.1856	-0.2393	-0.1563	-0.1942	91	150	199307:199806	-0.2685	-0.3907	-0.2131	-0.3112	-0.1768	-0.2821
1	151	198601:199807	-0.2277	-0.2891	-0.1856	-0.2394	-0.1559	-0.1942	92	151	199308:199807	-0.2617	-0.3851	-0.2064	-0.3134	-0.1773	-0.2872
1	152	198601:199808	-0.2279	-0.2907	-0.1853	-0.2405	-0.1565	-0.1951	93	152	199309:199808	-0.2548	-0.3794	-0.2015	-0.3167	-0.1781	-0.2916
1	153	198601:199809	-0.2266	-0.2888	-0.1847	-0.2395	-0.1561	-0.1945	94	153	199310:199809	-0.2574	-0.3767	-0.2007	-0.3139	-0.1748	-0.2901
1	154	198601:199810	-0.2264	-0.2888	-0.1840	-0.2396	-0.1565	-0.1950	95	154	199311:199810	-0.2586	-0.3688	-0.1977	-0.3048	-0.1784	-0.2993
1	155	198601:199811	-0.2264	-0.2887	-0.1841	-0.2396	-0.1559	-0.1945	96	155	199312:199811	-0.2002	-0.3077	-0.1940	-0.2871	-0.1815	-0.2952
1	156	198601:199812	-0.2264	-0.2887	-0.1837	-0.2391	-0.1546	-0.1932	97	156	199401:199812	-0.2033	-0.3073	-0.1931	-0.2892	-0.1771	-0.2904
1	157	198601:199901	-0.2264	-0.2887	-0.1837	-0.2392	-0.1542	-0.1927	98	157	199402:199901	-0.2214	-0.3245	-0.1782	-0.2818	-0.1782	-0.2893
1	158	198601:199902	-0.2270	-0.2887	-0.1837	-0.2391	-0.1538	-0.1920	99	158	199403:199902	-0.2005	-0.3167	-0.1699	-0.2633	-0.1755	-0.2779
1	159	198601:199903	-0.2264	-0.2884	-0.1834	-0.2389	-0.1539	-0.1923	100	159	199404:199903	-0.0856	-0.2074	-0.1559	-0.2626	-0.1629	-0.2631
1	160	198601:199904	-0.2262	-0.2882	-0.1834	-0.2384	-0.1538	-0.1920	101	160	199405:199904	-0.0891	-0.2215	-0.1210	-0.2666	-0.1708	-0.2674
1	161	198601:199905	-0.2260	-0.2884	-0.1834	-0.2383	-0.1539	-0.1924	102	161	199406:199905	-0.0415	-0.2212	0.0109	-0.2035	-0.1715	-0.2730
1	162	198601:199906	-0.2268	-0.2885	-0.1839	-0.2385	-0.1537	-0.1924	103	162	199407:199906	-0.0400	-0.2212	0.0369	-0.1686	-0.1716	-0.2751
1	163	198601:199907	-0.2270	-0.2887	-0.1844	-0.2386	-0.1537	-0.1924	104	163	199408:199907	-0.0174	-0.2158	0.1121	-0.1239	-0.1791	-0.2863
1	164	198601:199908	-0.2270	-0.2886	-0.1847	-0.2386	-0.1535	-0.1925	105	164	199409:199908	0.0102	-0.1946	0.1232	-0.1095	-0.1802	-0.3006
1	165	198601:199909	-0.2269	-0.2887	-0.1845	-0.2390	-0.1531	-0.1924	106	165	199410:199909	0.0131	-0.2189	0.1371	-0.1175	-0.1891	-0.3106
1	166	198601:199910	-0.2269	-0.2890	-0.1845	-0.2390	-0.1528	-0.1922	107	166	199411:199910	0.0000	-0.2328	0.1520	-0.1386	-0.1898	-0.3171
1	167	198601:199911	-0.2275	-0.2895	-0.1849	-0.2394	-0.1533	-0.1930	108	167	199412:199911	-0.0220	-0.2754	0.1493	-0.1788	-0.1283	-0.2807
1	168	198601:199912	-0.2280	-0.2901	-0.1848	-0.2395	-0.1526	-0.1920	109	168	199501:199912	-0.0051	-0.2545	0.1229	-0.2196	-0.1445	-0.3134
1	169	198601:200001	-0.2280	-0.2902	-0.1849	-0.2394	-0.1534	-0.1917	110	169	199502:200001	0.0298	-0.2555	0.1126	-0.2160	-0.1428	-0.3038
1	170	198601:200002	-0.2283	-0.2908	-0.1849	-0.2392	-0.1529	-0.1923	111	170	199503:200002	-0.0157	-0.2649	0.1276	-0.1528	-0.0654	-0.2197
1	171	198601:200003	-0.2303	-0.2907	-0.1891	-0.2422	-0.1545	-0.1917	112	171	199504:200003	-0.0555	-0.2658	0.0328	-0.2194	-0.0080	-0.1421
1	172	198601:200004	-0.2346	-0.2936	-0.1930	-0.2452	-0.1558	-0.1922	113	172	199505:200004	-0.0119	-0.2109	0.0146	-0.2042	0.0370	-0.1082
1	173	198601:200005	-0.2348	-0.2941	-0.1936	-0.2455	-0.1556	-0.1920	114	173	199506:200005	0.0186	-0.1947	0.0853	-0.1322	0.0437	-0.1016
1	174	198601:200006	-0.2354	-0.2946	-0.1943	-0.2468	-0.1573	-0.1929	115	174	199507:200006	0.0644	-0.1591	0.1993	-0.0866	0.0440	-0.1040
1	175	198601:200007	-0.2353	-0.2948	-0.1936	-0.2466	-0.1581	-0.1936	116	175	199508:200007	0.0418	-0.1708	0.1922	-0.1030	0.0531	-0.1099
1	176	198601:200008	-0.2362	-0.2955	-0.1939	-0.2472	-0.1594	-0.1935	117	176	199509:200008	-0.0810	-0.2327	0.1469	-0.1437	0.0251	-0.1349
1	177	198601:200009	-0.2382	-0.2957	-0.1952	-0.2467	-0.1615	-0.1947	118	177	199510:200009	-0.0539	-0.2188	0.1387	-0.1307	0.0251	-0.1231
1	178	198601:200010	-0.2399	-0.2960	-0.1975	-0.2468	-0.1628	-0.1943	119	178	199511:200010	-0.0505	-0.2172	0.1147	-0.1319	0.0249	-0.1325
1	179	198601:200011	-0.2392	-0.2959	-0.1976	-0.2466	-0.1625	-0.1939	120	179	199512:200011	-0.0871	-0.2601	0.0608	-0.1663	0.0451	-0.1275
1	180	198601:200012	-0.2392	-0.2959	-0.1976	-0.2468	-0.1630	-0.1950	121	180	199601:200012	-0.0750	-0.2441	0.0437	-0.1444	0.0419	-0.1453
1	181	198601:200101	-0.2408	-0.2973	-0.1980	-0.2471	-0.1633	-0.1952	122	181	199602:200101	-0.0180	-0.2083	0.0634	-0.1306	0.0611	-0.1391
1	182	198601:200102	-0.2305	-0.2881	-0.1918	-0.2426	-0.1600	-0.1939	123	182	199603:200102	0.0847	-0.0819	0.1479	-0.0802	0.0053	-0.1473
1	183	198601:200103	-0.2201	-0.2903	-0.1855	-0.2439	-0.1585	-0.1960	124	183	199604:200103	-0.0061	-0.1927	-0.0060	-0.1666	-0.0878	-0.2212
1	184	198601:200104	-0.2189	-0.2916	-0.1829	-0.2466	-0.1611	-0.2006	125	184	199605:200104	-0.0352	-0.2011	-0.0526	-0.1839	-0.1381	-0.2581
1	185	198601:200105	-0.2143	-0.2867	-0.1821	-0.2450	-0.1589	-0.1972	126	185	199606:200105	-0.0858	-0.2296	-0.0836	-0.1890	-0.1572	-0.2659
1	186	198601:200106	-0.2134	-0.2851	-0.1816	-0.2452	-0.1589	-0.1976	127	186	199607:200106	-0.0889	-0.2201	-0.1018	-0.1969	-0.1586	-0.2599
1	187	198601:200107	-0.2103	-0.2820	-0.1826	-0.2469	-0.1581	-0.1978	128	187	199608:200107	-0.0801	-0.2103	-0.1033	-0.2063	-0.1419	-0.2525
1	188	198601:200108	-0.2076	-0.2792	-0.1763	-0.2402	-0.1558	-0.1968	129	188	199609:200108	-0.0762	-0.2049	-0.0819	-0.1811	-0.1289	-0.2377
1	189	198601:200109	-0.2080	-0.2794	-0.1759	-0.2396	-0.1550	-0.1963	130	189	199610:200109	-0.0744	-0.2067	-0.0813	-0.1813	-0.1312	-0.2406
1	190	198601:200110	-0.2076	-0.2799	-0.1753	-0.2393	-0.1540	-0.1961	131	190	199611:200110	-0.0841	-0.2114	-0.0855	-0.1829	-0.1374	-0.2401
1	191	198601:200111	-0.2023	-0.2704	-0.1738	-0.2360	-0.1532	-0.1940	132	191	199612:200111	-0.0659	-0.1797	-0.0639	-0.1595	-0.1359	-0.2318
1	192	198601:200112	-0.1994	-0.2647	-0.1719	-0.2310	-0.1522	-0.1918	133	192	199701:200112	-0.0620	-0.1624	-0.0516	-0.1317	-0.1249	-0.2188
1	193	198601:200201	-0.1926	-0.2615	-0.1631	-0.2229	-0.1498	-0.1897	134	193	199702:200201	-0.0278	-0.1388	-0.0088	-0.0824	-0.1082	-0.2099
1	194	198601:200202	-0.1935	-0.2613	-0.1625	-0.2212	-0.1472	-0.1848	135	194	199703:200202	-0.0310	-0.1375	-0.0129	-0.0756	-0.0818	-0.1689
1	195	198601:200203	-0.1943	-0.2611	-0.1626	-0.2207	-0.1470	-0.1856	136	195	199704:200203	-0.0351	-0.1369	-0.0149	-0.0728	-0.0749	-0.1710
1	196	198601:200204	-0.1951	-0.2612	-0.1641	-0.2203	-0.1487	-0.1876	137	196	199705:200204	-0.0347	-0.1365	-0.0184	-0.0785	-0.0742	-0.1741
1	197	198601:200205	-0.1894	-0.2535	-0.1629	-0.2184	-0.1440	-0.1840	138	197	199706:200205	-0.0228	-0.1128	-0.0183	-0.0682	-0.0874	-0.1730
1	198	198601:200206	-0.1845	-0.2481	-0.1607	-0.2145	-0.1436	-0.1844	139	198	199707:200206	-0.0240	-0.1118	-0.0203	-0.0679	-0.0875	-0.1789
1	199	198601:200207	-0.1819	-0.2460	-0.1540	-0.2072	-0.1436	-0.1855	140	199	199708:200207	-0.0217	-0.1053	-0.0143	-0.0624	-0.0933	-0.1717

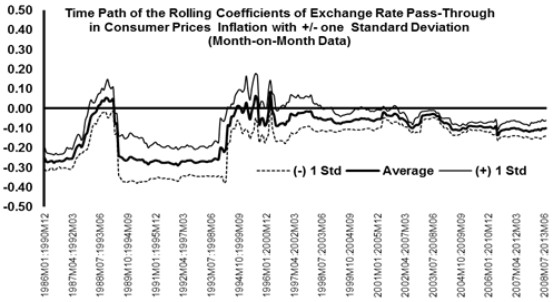
Appendix Table 3. Exchange Rate Pass-Through Coefficients As Averages Over Different Specifications Within Same Periods (Contunied)

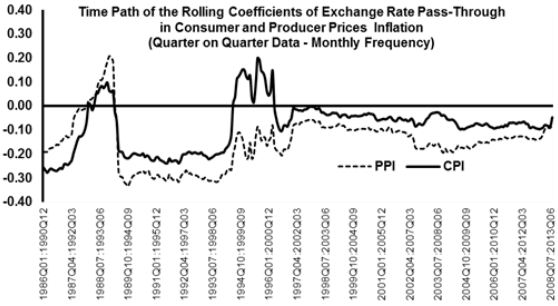
			Recursive Regression									5-Year Rolling Regression Windows					
			Monthly		Quarterly		Yearly					Monthly		Quarterly		Yearly	
Recursive Samples			CPI	PPI	CPI	PPI	CPI	PPI	Rolling Samples			CPI	PPI	CPI	PPI	CPI	PPI
1	200	198601:200208	-0.1807	-0.2453	-0.1535	-0.2066	-0.1422	-0.1840	141	200	199709:200208	-0.0215	-0.1044	-0.0136	-0.0614	-0.0870	-0.1618
1	201	198601:200209	-0.1810	-0.2454	-0.1543	-0.2072	-0.1423	-0.1843	142	201	199710:200209	-0.0157	-0.1042	-0.0079	-0.0583	-0.0882	-0.1642
1	202	198601:200210	-0.1815	-0.2452	-0.1540	-0.2064	-0.1420	-0.1838	143	202	199711:200210	-0.0150	-0.1024	-0.0016	-0.0570	-0.0857	-0.1638
1	203	198601:200211	-0.1809	-0.2456	-0.1539	-0.2064	-0.1419	-0.1833	144	203	199712:200211	-0.0165	-0.1052	-0.0036	-0.0573	-0.0811	-0.1559
1	204	198601:200212	-0.1813	-0.2456	-0.1540	-0.2062	-0.1416	-0.1835	145	204	199801:200212	-0.0147	-0.1003	-0.0020	-0.0601	-0.0797	-0.1532
1	205	198601:200301	-0.1838	-0.2466	-0.1555	-0.2070	-0.1411	-0.1845	146	205	199802:200301	-0.0380	-0.1150	-0.0120	-0.0699	-0.0860	-0.1533
1	206	198601:200302	-0.1857	-0.2476	-0.1558	-0.2072	-0.1412	-0.1849	147	206	199803:200302	-0.0465	-0.1230	-0.0119	-0.0699	-0.0837	-0.1436
1	207	198601:200303	-0.1860	-0.2479	-0.1558	-0.2074	-0.1413	-0.1849	148	207	199804:200303	-0.0457	-0.1197	-0.0107	-0.0644	-0.0857	-0.1448
1	208	198601:200304	-0.1886	-0.2525	-0.1606	-0.2126	-0.1408	-0.1846	149	208	199805:200304	-0.0521	-0.1374	-0.0262	-0.0874	-0.0806	-0.1376
1	209	198601:200305	-0.1879	-0.2522	-0.1603	-0.2130	-0.1383	-0.1822	150	209	199806:200305	-0.0487	-0.1325	-0.0269	-0.0877	-0.0792	-0.1292
1	210	198601:200306	-0.1875	-0.2507	-0.1596	-0.2120	-0.1361	-0.1789	151	210	199807:200306	-0.0553	-0.1319	-0.0327	-0.0903	-0.0720	-0.1141
1	211	198601:200307	-0.1880	-0.2503	-0.1596	-0.2115	-0.1350	-0.1774	152	211	199808:200307	-0.0577	-0.1341	-0.0372	-0.0906	-0.0727	-0.1121
1	212	198601:200308	-0.1882	-0.2502	-0.1596	-0.2108	-0.1353	-0.1782	153	212	199809:200308	-0.0588	-0.1374	-0.0370	-0.0887	-0.0743	-0.1122
1	213	198601:200309	-0.1886	-0.2510	-0.1594	-0.2108	-0.1352	-0.1784	154	213	199810:200309	-0.0551	-0.1364	-0.0341	-0.0902	-0.0719	-0.1060
1	214	198601:200310	-0.1854	-0.2505	-0.1589	-0.2111	-0.1355	-0.1799	155	214	199811:200310	-0.0546	-0.1377	-0.0279	-0.0863	-0.0633	-0.0980
1	215	198601:200311	-0.1856	-0.2505	-0.1588	-0.2111	-0.1353	-0.1808	156	215	199812:200311	-0.0529	-0.1378	-0.0300	-0.0839	-0.0629	-0.0905
1	216	198601:200312	-0.1862	-0.2514	-0.1581	-0.2109	-0.1354	-0.1811	157	216	199901:200312	-0.0656	-0.1432	-0.0295	-0.0836	-0.0629	-0.0911
1	217	198601:200401	-0.1881	-0.2487	-0.1594	-0.2098	-0.1378	-0.1796	158	217	199902:200401	-0.0729	-0.1297	-0.0377	-0.0762	-0.0854	-0.0946
1	218	198601:200402	-0.1880	-0.2495	-0.1596	-0.2101	-0.1379	-0.1799	159	218	199903:200402	-0.0757	-0.1349	-0.0471	-0.0742	-0.0876	-0.0968
1	219	198601:200403	-0.1873	-0.2488	-0.1588	-0.2084	-0.1377	-0.1794	160	219	199904:200403	-0.0741	-0.1358	-0.0383	-0.0820	-0.0856	-0.0992
1	220	198601:200404	-0.1874	-0.2487	-0.1588	-0.2084	-0.1378	-0.1795	161	220	199905:200404	-0.0777	-0.1364	-0.0367	-0.0819	-0.0876	-0.0987
1	221	198601:200405	-0.1863	-0.2492	-0.1581	-0.2099	-0.1370	-0.1792	162	221	199906:200405	-0.0714	-0.1409	-0.0370	-0.0933	-0.0811	-0.0949
1	222	198601:200406	-0.1843	-0.2509	-0.1574	-0.2096	-0.1370	-0.1809	163	222	199907:200406	-0.0703	-0.1467	-0.0459	-0.1007	-0.0774	-0.0977
1	223	198601:200407	-0.1830	-0.2525	-0.1568	-0.2095	-0.1365	-0.1821	164	223	199908:200407	-0.0675	-0.1509	-0.0481	-0.0980	-0.0739	-0.1019
1	224	198601:200408	-0.1829	-0.2525	-0.1563	-0.2107	-0.1364	-0.1823	165	224	199909:200408	-0.0670	-0.1514	-0.0416	-0.0992	-0.0783	-0.1045
1	225	198601:200409	-0.1829	-0.2525	-0.1556	-0.2107	-0.1362	-0.1822	166	225	199910:200409	-0.0671	-0.1513	-0.0422	-0.1004	-0.0795	-0.1068
1	226	198601:200410	-0.1824	-0.2519	-0.1556	-0.2107	-0.1348	-0.1818	167	226	199911:200410	-0.0648	-0.1470	-0.0405	-0.1012	-0.0777	-0.1103
1	227	198601:200411	-0.1824	-0.2521	-0.1555	-0.2114	-0.1347	-0.1822	168	227	199912:200411	-0.0591	-0.1407	-0.0422	-0.0974	-0.0752	-0.1148
1	228	198601:200412	-0.1825	-0.2526	-0.1555	-0.2113	-0.1347	-0.1824	169	228	200001:200412	-0.0562	-0.1407	-0.0426	-0.0960	-0.0808	-0.1165
1	229	198601:200501	-0.1827	-0.2534	-0.1558	-0.2123	-0.1346	-0.1831	170	229	200002:200501	-0.0560	-0.1383	-0.0411	-0.0960	-0.0801	-0.1328
1	230	198601:200502	-0.1822	-0.2525	-0.1557	-0.2119	-0.1345	-0.1830	171	230	200003:200502	-0.0562	-0.1368	-0.0389	-0.0947	-0.0831	-0.1301
1	231	198601:200503	-0.1821	-0.2527	-0.1557	-0.2115	-0.1343	-0.1830	172	231	200004:200503	-0.0501	-0.1316	-0.0339	-0.0952	-0.0844	-0.1287
1	232	198601:200504	-0.1824	-0.2529	-0.1557	-0.2114	-0.1343	-0.1828	173	232	200005:200504	-0.0518	-0.1378	-0.0365	-0.0954	-0.0814	-0.1341
1	233	198601:200505	-0.1824	-0.2529	-0.1557	-0.2115	-0.1319	-0.1839	174	233	200006:200505	-0.0511	-0.1307	-0.0305	-0.0896	-0.0634	-0.1397
1	234	198601:200506	-0.1818	-0.2524	-0.1549	-0.2112	-0.1319	-0.1840	175	234	200007:200506	-0.0546	-0.1295	-0.0326	-0.0992	-0.0633	-0.1427
1	235	198601:200507	-0.1819	-0.2525	-0.1548	-0.2111	-0.1319	-0.1840	176	235	200008:200507	-0.0524	-0.1307	-0.0340	-0.0946	-0.0643	-0.1405
1	236	198601:200508	-0.1822	-0.2526	-0.1548	-0.2112	-0.1320	-0.1840	177	236	200009:200508	-0.0585	-0.1353	-0.0379	-0.0985	-0.0624	-0.1386
1	237	198601:200509	-0.1829	-0.2537	-0.1552	-0.2120	-0.1321	-0.1841	178	237	200010:200509	-0.0606	-0.1338	-0.0531	-0.1052	-0.0509	-0.1327
1	238	198601:200510	-0.1829	-0.2538	-0.1553	-0.2122	-0.1320	-0.1840	179	238	200011:200510	-0.0636	-0.1304	-0.0611	-0.1066	-0.0521	-0.1333
1	239	198601:200511	-0.1828	-0.2544	-0.1551	-0.2126	-0.1319	-0.1841	180	239	200012:200511	-0.0572	-0.1167	-0.0583	-0.0995	-0.0451	-0.1237
1	240	198601:200512	-0.1829	-0.2545	-0.1550	-0.2125	-0.1319	-0.1842	181	240	200101:200512	-0.0537	-0.1133	-0.0563	-0.0946	-0.0488	-0.1162
1	241	198601:200601	-0.1842	-0.2561	-0.1552	-0.2131	-0.1317	-0.1840	182	241	200102:200601	-0.0535	-0.1282	-0.0537	-0.1023	-0.0510	-0.1187
1	242	198601:200602	-0.1841	-0.2563	-0.1554	-0.2134	-0.1318	-0.1840	183	242	200103:200602	-0.0507	-0.1221	-0.0553	-0.1065	-0.0519	-0.1152
1	243	198601:200603	-0.1841	-0.2563	-0.1559	-0.2140	-0.1317	-0.1842	184	243	200104:200603	-0.0198	-0.0911	-0.0532	-0.1000	-0.0561	-0.1180
1	244	198601:200604	-0.1843	-0.2561	-0.1558	-0.2136	-0.1316	-0.1841	185	244	200105:200604	-0.0226	-0.0965	-0.0468	-0.0884	-0.0662	-0.1150
1	245	198601:200605	-0.1839	-0.2562	-0.1553	-0.2145	-0.1315	-0.1843	186	245	200106:200605	-0.0348	-0.0956	-0.0463	-0.0901	-0.0747	-0.1137
1	246	198601:200606	-0.1817	-0.2569	-0.1542	-0.2158	-0.1302	-0.1845	187	246	200107:200606	-0.0358	-0.1085	-0.0571	-0.1116	-0.0667	-0.1163
1	247	198601:200607	-0.1805	-0.2579	-0.1532	-0.2153	-0.1300	-0.1847	188	247	200108:200607	-0.0376	-0.1097	-0.0624	-0.1102	-0.0670	-0.1138
1	248	198601:200608	-0.1807	-0.2582	-0.1541	-0.2165	-0.1308	-0.1856	189	248	200109:200608	-0.0363	-0.1111	-0.0621	-0.1067	-0.0717	-0.1144
1	249	198601:200609	-0.1807	-0.2579	-0.1540	-0.2177	-0.1311	-0.1864	190	249	200110:200609	-0.0269	-0.1031	-0.0506	-0.1036	-0.0800	-0.1240
1	250	198601:200610	-0.1818	-0.2593	-0.1538	-0.2178	-0.1319	-0.1874	191	250	200111:200610	-0.0288	-0.1093	-0.0494	-0.1021	-0.0831	-0.1294
1	251	198601:200611	-0.1819	-0.2592	-0.1539	-0.2178	-0.1319	-0.1875	192	251	200112:200611	-0.0362	-0.1178	-0.0565	-0.1077	-0.0727	-0.1297
1	252	198601:200612	-0.1820	-0.2592	-0.1539	-0.2180	-0.1320	-0.1879	193	252	200201:200612	-0.0533	-0.1303	-0.0590	-0.1089	-0.0711	-0.1456
1	253	198601:200701	-0.1820	-0.2595	-0.1541	-0.2179	-0.1319	-0.1876	194	253	200202:200701	-0.0496	-0.1361	-0.0570	-0.1123	-0.0867	-0.1606
1	254	198601:200702	-0.1820	-0.2592	-0.1540	-0.2178	-0.1319	-0.1876	195	254	200203:200702	-0.0551	-0.1433	-0.0631	-0.1260	-0.0909	-0.1663
1	255	198601:200703	-0.1820	-0.2593	-0.1540	-0.2179	-0.1319	-0.1877	196	255	200204:200703	-0.0622	-0.1522	-0.0601	-0.1247	-0.0675	-0.1628
1	256	198601:200704	-0.1817	-0.2590	-0.1540	-0.2175	-0.1319	-0.1878	197	256	200205:200704	-0.0718	-0.1731	-0.0526	-0.1204	-0.0688	-0.1531
1	257	198601:200705	-0.1816	-0.2588	-0.1537	-0.2171	-0.1312	-0.1874	198	257	200206:200705	-0.0889	-0.1965	-0.0629	-0.1366	-0.0719	-0.1428
1	258	198601:200706	-0.1821	-0.2592	-0.1536	-0.2171	-0.1302	-0.1877	199	258	200207:200706	-0.0966	-0.2100	-0.0847	-0.1718	-0.0601	-0.1451
1	259	198601:200707	-0.1823	-0.2593	-0.1538	-0.2173	-0.1301	-0.1878	200	259	200208:200707	-0.0995	-0.2101	-0.0811	-0.1786	-0.0590	-0.1517
1	260	198601:200708	-0.1818	-0.2590	-0.1534	-0.2169	-0.1302	-0.1881	201	260	200209:200708	-0.0897	-0.2061	-0.0732	-0.1771	-0.0637	-0.1544
1	261	198601:200709	-0.1816	-0.2584	-0.1536	-0.2168	-0.1298	-0.1873	202	261	200210:200709	-0.0832	-0.1976	-0.0768	-0.1779	-0.0628	-0.1461
1	262	198601:200710	-0.1811	-0.2583	-0.1533	-0.2168	-0.1302	-0.1879	203	262	200211:200710	-0.0835	-0.1943	-0.0787	-0.1786	-0.0647	-0.1517
1	263	198601:200711	-0.1814	-0.2584	-0.1529	-0.2166	-0.1302	-0.1879	204	263	200212:200711	-0.0713	-0.1868	-0.0686	-0.1758	-0.0583	-0.1528
1	264	198601:200712	-0.1815	-0.2583	-0.1529	-0.2166	-0.1299	-0.1876	205	264	200301:200712	-0.0383	-0.1699	-0.0549	-0.1720	-0.0588	-0.1441
1	265	198601:200801	-0.1813	-0.2578	-0.1528	-0.2161	-0.1299	-0.1876	206	265	200302:200801	-0.0356	-0.1680	-0.0484	-0.1609	-0.0508	-0.1353
1	266	198601:200802	-0.1818	-0.2585	-0.1529	-0.2164	-0.1298	-0.1875	207	266	200303:200802	-0.0329	-0.1681	-0.0356	-0.1544	-0.0414	-0.1254
1	267	198601:200803	-0.1808	-0.2586	-0.1524	-0.2165	-0.1298	-0.1879	208	267	200304:200803	-0.0314	-0.1739	-0.0304	-0.1606	-0.0440	-0.1261
1	268	198601:200804	-0.1808	-0.2588	-0.1526	-0.2171	-0.1297	-0.1882	209	268	200305:200804	-0.0317	-0.1767	-0.0288	-0.1662	-0.0405	-0.1175
1	269	198601:200805	-0.1785	-0.2565	-0.1519	-0.2157	-0.1292	-0.1877	210	269	200306:200805	-0.0292	-0.1640	-0.0267	-0.1585	-0.0434	-0.1090

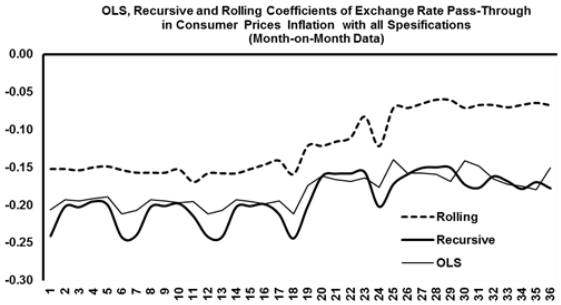
Appendix Table 3. Exchange Rate Pass-Through Coefficients As Averages Over Different Specifications Within Same Periods (Contunied)

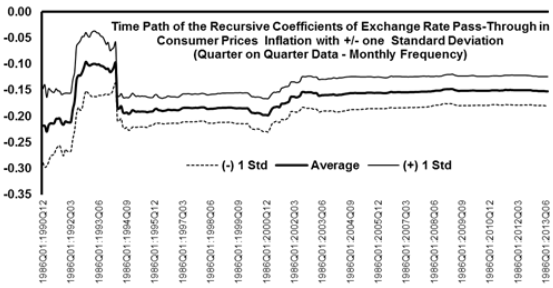
			Recursive Regression									5-Year Rolling Regression Windows					
			Monthly		Quarterly		Yearly					Monthly		Quarterly		Yearly	
Recursive Samples			CPI	PPI	CPI	PPI	CPI	PPI	Rolling Samples			CPI	PPI	CPI	PPI	CPI	PPI
1	270	198601:200806	-0.1786	-0.2566	-0.1516	-0.2156	-0.1292	-0.1875	211	270	200307:200806	-0.0273	-0.1662	-0.0267	-0.1546	-0.0529	-0.1129
1	271	198601:200807	-0.1785	-0.2568	-0.1508	-0.2153	-0.1288	-0.1873	212	271	200308:200807	-0.0302	-0.1741	-0.0297	-0.1672	-0.0485	-0.1119
1	272	198601:200808	-0.1785	-0.2596	-0.1510	-0.2167	-0.1280	-0.1882	213	272	200309:200808	-0.0398	-0.2092	-0.0400	-0.1858	-0.0483	-0.1399
1	273	198601:200809	-0.1778	-0.2588	-0.1510	-0.2174	-0.1279	-0.1883	214	273	200310:200809	-0.0393	-0.2165	-0.0379	-0.1944	-0.0487	-0.1348
1	274	198601:200810	-0.1756	-0.2521	-0.1501	-0.2143	-0.1276	-0.1876	215	274	200311:200810	-0.0595	-0.1794	-0.0429	-0.1774	-0.0372	-0.1217
1	275	198601:200811	-0.1755	-0.2521	-0.1487	-0.2121	-0.1283	-0.1884	216	275	200312:200811	-0.0662	-0.1930	-0.0546	-0.1911	-0.0308	-0.1258
1	276	198601:200812	-0.1757	-0.2525	-0.1482	-0.2103	-0.1281	-0.1881	217	276	200401:200812	-0.0748	-0.2220	-0.0580	-0.1835	-0.0259	-0.1177
1	277	198601:200901	-0.1751	-0.2525	-0.1481	-0.2100	-0.1279	-0.1877	218	277	200402:200901	-0.0731	-0.2278	-0.0572	-0.1859	-0.0229	-0.1119
1	278	198601:200902	-0.1755	-0.2526	-0.1480	-0.2100	-0.1278	-0.1875	219	278	200403:200902	-0.0773	-0.2255	-0.0573	-0.1929	-0.0279	-0.1188
1	279	198601:200903	-0.1756	-0.2519	-0.1479	-0.2100	-0.1276	-0.1876	220	279	200404:200903	-0.0842	-0.1979	-0.0640	-0.1854	-0.0281	-0.1238
1	280	198601:200904	-0.1759	-0.2516	-0.1479	-0.2098	-0.1276	-0.1877	221	280	200405:200904	-0.1034	-0.1796	-0.0746	-0.1761	-0.0227	-0.1261
1	281	198601:200905	-0.1780	-0.2538	-0.1496	-0.2113	-0.1274	-0.1865	222	281	200406:200905	-0.1084	-0.1806	-0.0899	-0.1646	-0.0193	-0.1151
1	282	198601:200906	-0.1791	-0.2554	-0.1505	-0.2138	-0.1277	-0.1865	223	282	200407:200906	-0.1070	-0.1789	-0.0973	-0.1730	-0.0168	-0.1174
1	283	198601:200907	-0.1791	-0.2555	-0.1514	-0.2139	-0.1277	-0.1858	224	283	200408:200907	-0.1084	-0.1855	-0.0949	-0.1732	-0.0167	-0.1095
1	284	198601:200908	-0.1791	-0.2558	-0.1513	-0.2140	-0.1272	-0.1868	225	284	200409:200908	-0.1111	-0.1837	-0.0969	-0.1756	-0.0162	-0.1261
1	285	198601:200909	-0.1787	-0.2556	-0.1511	-0.2139	-0.1271	-0.1869	226	285	200410:200909	-0.1079	-0.1834	-0.0928	-0.1663	-0.0175	-0.1342
1	286	198601:200910	-0.1784	-0.2557	-0.1512	-0.2139	-0.1264	-0.1863	227	286	200411:200910	-0.0992	-0.1939	-0.0884	-0.1715	-0.0170	-0.1186
1	287	198601:200911	-0.1783	-0.2558	-0.1512	-0.2139	-0.1266	-0.1868	228	287	200412:200911	-0.1013	-0.1989	-0.0861	-0.1772	-0.0198	-0.1108
1	288	198601:200912	-0.1783	-0.2559	-0.1512	-0.2139	-0.1269	-0.1880	229	288	200501:200912	-0.1028	-0.1970	-0.0828	-0.1773	-0.0221	-0.1166
1	289	198601:201001	-0.1771	-0.2557	-0.1510	-0.2138	-0.1262	-0.1878	230	289	200502:201001	-0.0914	-0.1905	-0.0815	-0.1684	-0.0213	-0.1127
1	290	198601:201002	-0.1774	-0.2559	-0.1508	-0.2137	-0.1268	-0.1881	231	290	200503:201002	-0.0882	-0.1873	-0.0740	-0.1614	-0.0308	-0.1065
1	291	198601:201003	-0.1776	-0.2553	-0.1506	-0.2131	-0.1267	-0.1879	232	291	200504:201003	-0.0897	-0.1833	-0.0728	-0.1565	-0.0380	-0.1038
1	292	198601:201004	-0.1776	-0.2541	-0.1509	-0.2126	-0.1267	-0.1880	233	292	200505:201004	-0.0907	-0.1754	-0.0763	-0.1489	-0.0408	-0.1066
1	293	198601:201005	-0.1777	-0.2546	-0.1513	-0.2130	-0.1271	-0.1884	234	293	200506:201005	-0.0917	-0.1815	-0.0796	-0.1531	-0.0499	-0.1162
1	294	198601:201006	-0.1776	-0.2545	-0.1512	-0.2131	-0.1270	-0.1885	235	294	200507:201006	-0.0923	-0.1785	-0.0812	-0.1519	-0.0522	-0.1226
1	295	198601:201007	-0.1775	-0.2545	-0.1513	-0.2129	-0.1270	-0.1887	236	295	200508:201007	-0.0894	-0.1787	-0.0765	-0.1544	-0.0447	-0.1211
1	296	198601:201008	-0.1775	-0.2545	-0.1513	-0.2130	-0.1267	-0.1885	237	296	200509:201008	-0.0897	-0.1783	-0.0735	-0.1501	-0.0414	-0.1192
1	297	198601:201009	-0.1776	-0.2545	-0.1513	-0.2130	-0.1262	-0.1883	238	297	200510:201009	-0.0946	-0.1771	-0.0806	-0.1532	-0.0383	-0.1170
1	298	198601:201010	-0.1776	-0.2546	-0.1513	-0.2129	-0.1261	-0.1880	239	298	200511:201010	-0.0964	-0.1736	-0.0873	-0.1493	-0.0391	-0.1157
1	299	198601:201011	-0.1777	-0.2547	-0.1514	-0.2129	-0.1261	-0.1880	240	299	200512:201011	-0.0955	-0.1741	-0.0894	-0.1397	-0.0437	-0.1140
1	300	198601:201012	-0.1768	-0.2545	-0.1509	-0.2130	-0.1261	-0.1881	241	300	200601:201012	-0.0957	-0.1672	-0.0939	-0.1411	-0.0457	-0.1167
1	301	198601:201101	-0.1763	-0.2543	-0.1503	-0.2127	-0.1257	-0.1881	242	301	200602:201101	-0.0931	-0.1670	-0.0914	-0.1422	-0.0421	-0.1124
1	302	198601:201102	-0.1766	-0.2545	-0.1503	-0.2127	-0.1257	-0.1882	243	302	200603:201102	-0.0992	-0.1701	-0.0894	-0.1418	-0.0467	-0.1049
1	303	198601:201103	-0.1766	-0.2544	-0.1503	-0.2127	-0.1256	-0.1880	244	303	200604:201103	-0.1012	-0.1678	-0.0888	-0.1360	-0.0524	-0.1055
1	304	198601:201104	-0.1765	-0.2545	-0.1503	-0.2127	-0.1255	-0.1874	245	304	200605:201104	-0.0917	-0.1634	-0.0850	-0.1380	-0.0605	-0.1085
1	305	198601:201105	-0.1786	-0.2543	-0.1509	-0.2126	-0.1267	-0.1877	246	305	200606:201105	-0.1351	-0.1494	-0.0874	-0.1302	-0.0698	-0.1153
1	306	198601:201106	-0.1777	-0.2541	-0.1507	-0.2124	-0.1258	-0.1873	247	306	200607:201106	-0.1195	-0.1496	-0.0789	-0.1303	-0.0542	-0.1127
1	307	198601:201107	-0.1776	-0.2537	-0.1505	-0.2119	-0.1256	-0.1869	248	307	200608:201107	-0.1119	-0.1408	-0.0839	-0.1355	-0.0529	-0.1168
1	308	198601:201108	-0.1772	-0.2534	-0.1495	-0.2116	-0.1249	-0.1859	249	308	200609:201108	-0.1093	-0.1446	-0.0707	-0.1318	-0.0540	-0.1206
1	309	198601:201109	-0.1776	-0.2534	-0.1496	-0.2116	-0.1245	-0.1857	250	309	200610:201109	-0.1069	-0.1437	-0.0705	-0.1326	-0.0529	-0.1236
1	310	198601:201110	-0.1775	-0.2535	-0.1497	-0.2117	-0.1245	-0.1855	251	310	200611:201110	-0.1049	-0.1420	-0.0690	-0.1322	-0.0563	-0.1242
1	311	198601:201111	-0.1774	-0.2533	-0.1496	-0.2116	-0.1247	-0.1854	252	311	200612:201111	-0.1065	-0.1379	-0.0706	-0.1270	-0.0642	-0.1261
1	312	198601:201112	-0.1773	-0.2533	-0.1498	-0.2117	-0.1247	-0.1853	253	312	200701:201112	-0.1012	-0.1381	-0.0742	-0.1257	-0.0611	-0.1277
1	313	198601:201201	-0.1773	-0.2536	-0.1500	-0.2118	-0.1246	-0.1854	254	313	200702:201201	-0.1005	-0.1414	-0.0689	-0.1275	-0.0582	-0.1251
1	314	198601:201202	-0.1773	-0.2537	-0.1500	-0.2118	-0.1246	-0.1854	255	314	200703:201202	-0.0991	-0.1424	-0.0698	-0.1262	-0.0540	-0.1258
1	315	198601:201203	-0.1773	-0.2537	-0.1499	-0.2118	-0.1246	-0.1854	256	315	200704:201203	-0.1032	-0.1430	-0.0679	-0.1268	-0.0516	-0.1390
1	316	198601:201204	-0.1772	-0.2537	-0.1501	-0.2119	-0.1246	-0.1853	257	316	200705:201204	-0.1024	-0.1461	-0.0656	-0.1299	-0.0552	-0.1439
1	317	198601:201205	-0.1773	-0.2534	-0.1501	-0.2118	-0.1254	-0.1849	258	317	200706:201205	-0.1063	-0.1366	-0.0741	-0.1287	-0.0590	-0.1271
1	318	198601:201206	-0.1773	-0.2536	-0.1500	-0.2119	-0.1249	-0.1849	259	318	200707:201206	-0.1097	-0.1452	-0.0753	-0.1358	-0.0563	-0.1201
1	319	198601:201207	-0.1773	-0.2537	-0.1499	-0.2118	-0.1245	-0.1845	260	319	200708:201207	-0.1144	-0.1433	-0.0913	-0.1377	-0.0560	-0.1185
1	320	198601:201208	-0.1776	-0.2538	-0.1501	-0.2118	-0.1241	-0.1844	261	320	200709:201208	-0.1116	-0.1426	-0.0891	-0.1376	-0.0464	-0.1176
1	321	198601:201209	-0.1771	-0.2535	-0.1501	-0.2121	-0.1242	-0.1844	262	321	200710:201209	-0.1139	-0.1437	-0.0874	-0.1362	-0.0483	-0.1074
1	322	198601:201210	-0.1772	-0.2535	-0.1502	-0.2119	-0.1242	-0.1845	263	322	200711:201210	-0.1180	-0.1403	-0.0921	-0.1406	-0.0493	-0.1050
1	323	198601:201211	-0.1796	-0.2553	-0.1510	-0.2125	-0.1248	-0.1849	264	323	200712:201211	-0.1136	-0.1283	-0.0943	-0.1392	-0.0497	-0.1031
1	324	198601:201212	-0.1797	-0.2549	-0.1511	-0.2126	-0.1247	-0.1849	265	324	200801:201212	-0.1137	-0.1239	-0.0961	-0.1369	-0.0472	-0.1013
1	325	198601:201301	-0.1800	-0.2548	-0.1512	-0.2128	-0.1249	-0.1849	266	325	200802:201301	-0.1090	-0.1250	-0.0942	-0.1329	-0.0468	-0.1018
1	326	198601:201302	-0.1802	-0.2552	-0.1517	-0.2128	-0.1249	-0.1848	267	326	200803:201302	-0.1094	-0.1118	-0.0899	-0.1183	-0.0442	-0.1027
1	327	198601:201303	-0.1801	-0.2549	-0.1516	-0.2127	-0.1246	-0.1846	268	327	200804:201303	-0.1057	-0.0895	-0.0797	-0.0972	-0.0393	-0.0913
1	328	198601:201304	-0.1801	-0.2548	-0.1516	-0.2129	-0.1246	-0.1846	269	328	200805:201304	-0.1107	-0.0901	-0.0810	-0.0901	-0.0442	-0.0914
1	329	198601:201305	-0.1801	-0.2553	-0.1517	-0.2130	-0.1247	-0.1847	270	329	200806:201305	-0.1023	-0.0887	-0.0837	-0.0910	-0.0379	-0.0896
1	330	198601:201306	-0.1809	-0.2558	-0.1522	-0.2134	-0.1253	-0.1854	271	330	200807:201306	-0.1027	-0.0957	-0.0836	-0.0910	-0.0490	-0.1015
1	331	198601:201307	-0.1809	-0.2558	-0.1522	-0.2138	-0.1254	-0.1855	272	331	200808:201307	-0.1004	-0.0627	-0.0473	-0.0769	-0.0524	-0.1151
Minimum			-0.2430	-0.2985	-0.2295	-0.2472	-0.2511	-0.2006	**Minimum**			-0.2893	-0.3998	-0.2775	-0.3351	-0.2345	-0.3171
Maximum			-0.1067	0.0061	-0.0958	-0.0074	-0.0710	0.1056	**Maximum**			0.0847	0.1458	0.1993	0.2077	0.0611	0.0430
Average			-0.1920	-0.2346	-0.1649	-0.2002	-0.1397	-0.1665	**Average**			-0.1182	-0.1884	-0.0858	-0.1519	-0.0955	-0.1534
Standard Deviation			0.0317	0.0842	0.0258	0.0611	0.0229	0.0531	**Standard Deviation**			0.0989	0.1177	0.1013	0.1020	0.0656	0.0819
198601:199012			-0.1697	-0.0597	-0.1859	-0.0958	-0.1620	-0.0759	**198601:199012-198712:199211**			-0.2356	-0.0757	-0.2149	-0.1120	-0.1509	-0.0722
198601:199212			-0.1154	-0.0095	-0.1044	-0.0203	-0.0879	-0.0123	**198801:199212-198904:199403**			-0.0003	0.0319	0.0388	0.0928	-0.0440	0.0027
198601:199404			-0.2284	-0.2893	-0.1873	-0.2373	-0.1553	-0.1851	**198905:199404-199403:199902**			-0.2629	-0.3741	-0.2087	-0.2955	-0.1806	-0.2590
198601:199903			-0.1951	-0.2638	-0.1641	-0.2214	-0.1407	-0.1873	**199404:199903-200403:200902**			-0.0460	-0.1640	-0.0181	-0.1267	-0.0725	-0.1555
198601:200903			-0.1780	-0.2544	-0.1506	-0.2126	-0.1257	-0.1865	**200404:200903-200808:201307**			-0.1031	-0.1543	-0.0816	-0.1410	-0.0433	-0.1150

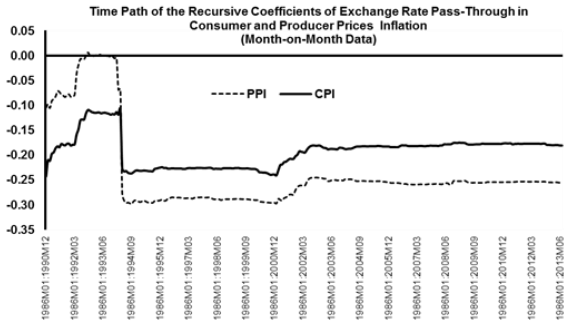
Appendix Graph 2. Time-Paths of Exchange Rate Pass-Through Coefficients

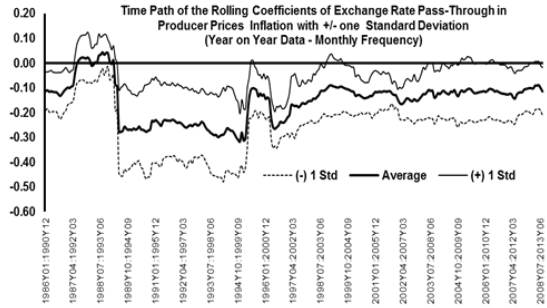


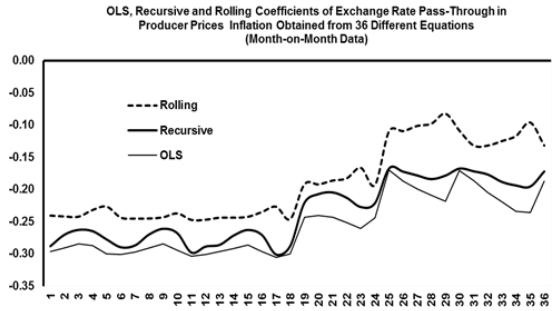


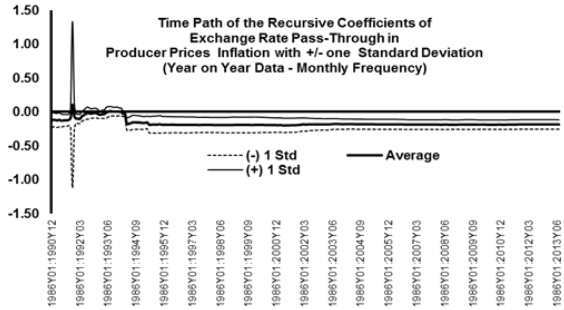




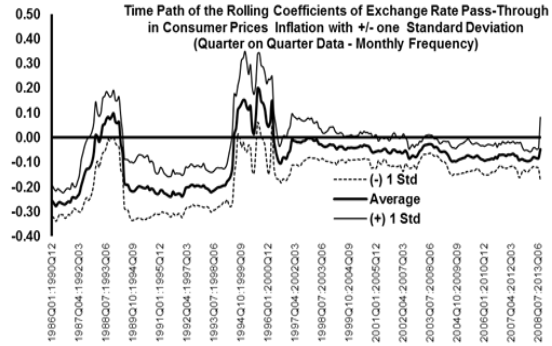


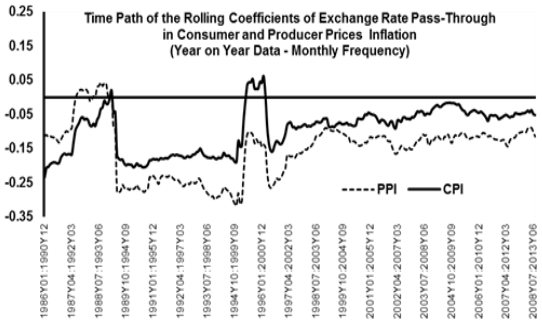


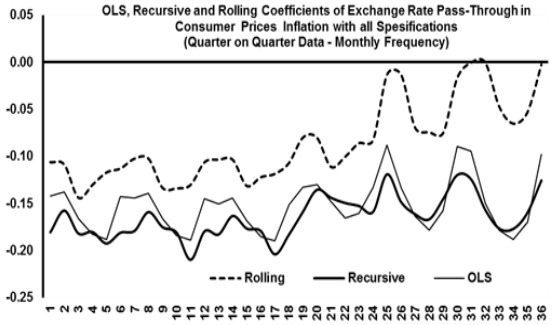


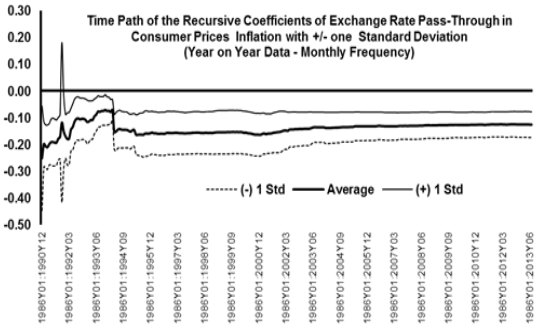


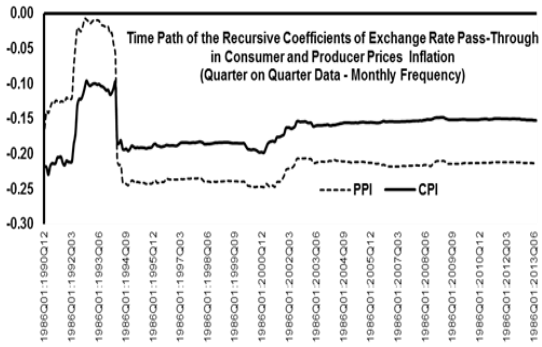
Appendix Graph 2. Time-Paths of Exchange Rate Pass-Through Coefficients (Continued)

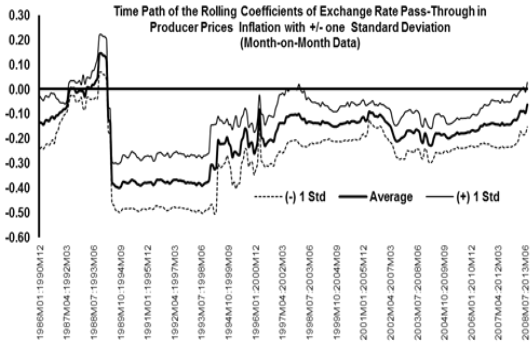


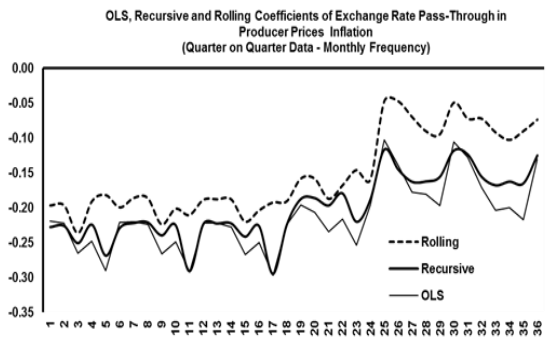


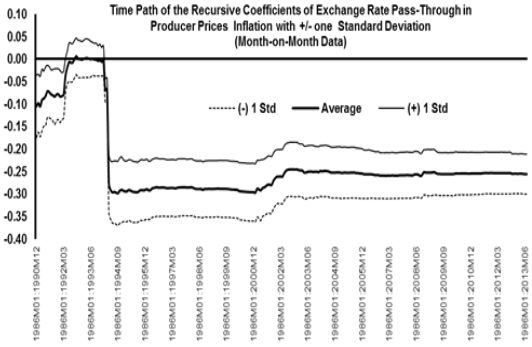




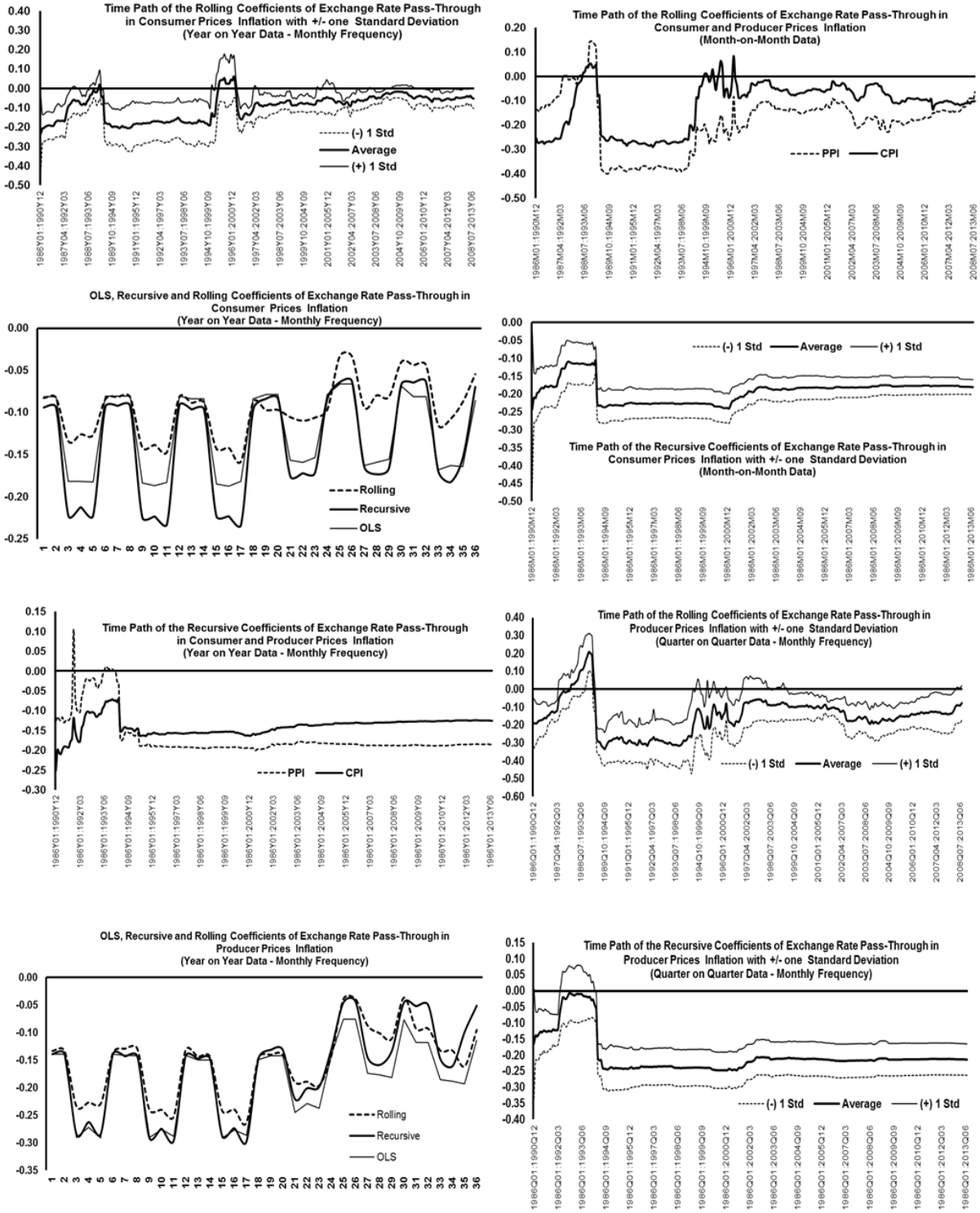








Appendix Graph 2. Time-Paths of Exchange Rate Pass-Through Coefficients (Continued)



Appendix Table 4. Var Lag Order Selection Criteria and Causality Test Results

Peridiocity	LR	FPE	AIC	SC	HQ
Monthly	13	**5**	**5**	**1**	**1**
Quarterly	13	11	11	**2**	4
Yearly	13	13	13	**1**	**2**

LR: sequential modified LR test statistic (each test at 5%level)

FPE: Final prediction error

AIC: Akaike information criterion

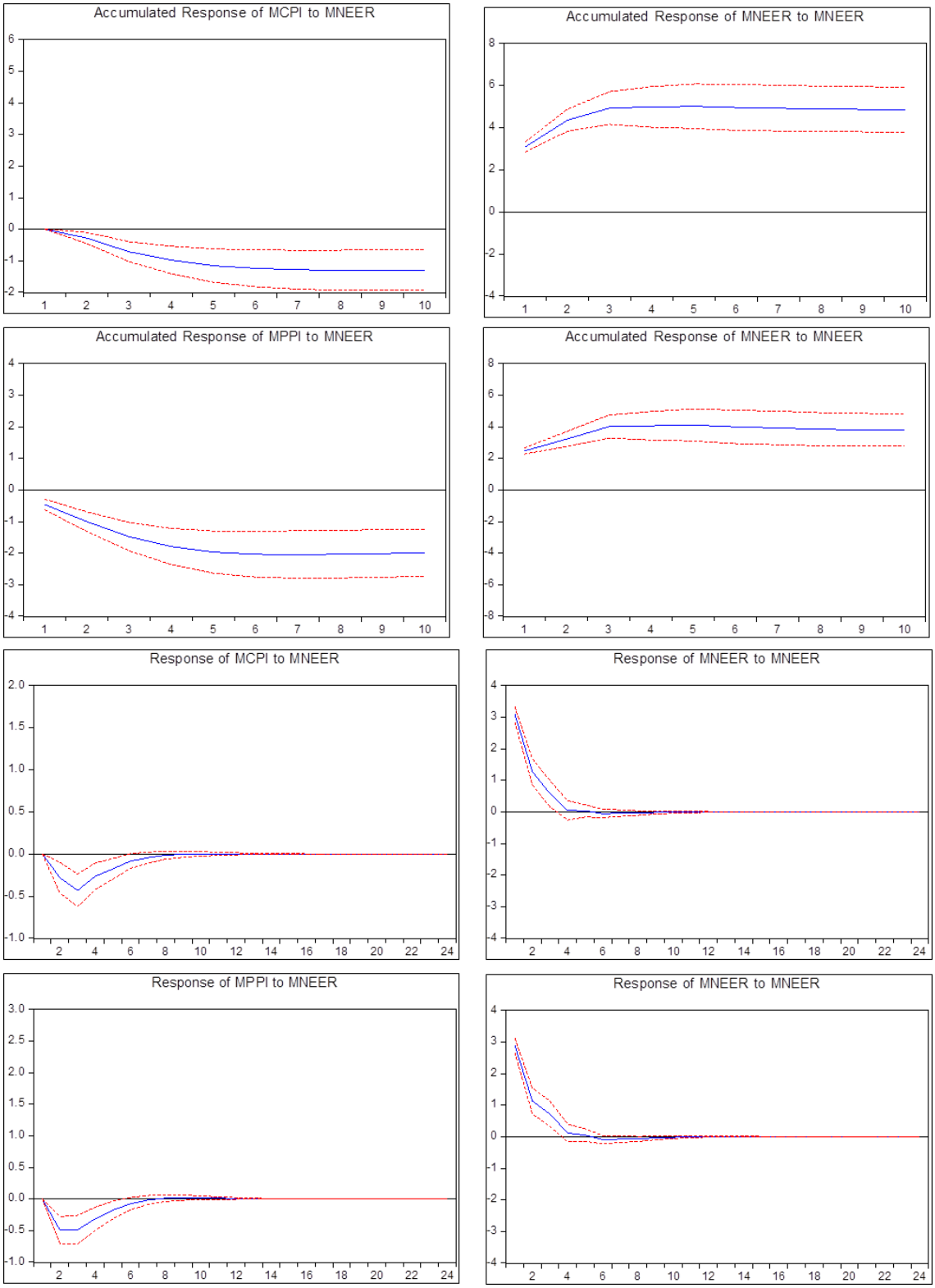
SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Appendix Table 5. Results of Multiple Breakpoint Tests

	Break dates				
Monthly	**1**	**2**	**3**	**4**	**5**
Bai-Perron tests of L+1 vs. L sequentially determined breaks (Squential L+1 breaks vs. L)	1996M07	2003M02			
Bai tests of breaks in all recursively determined partitions (Squential tests all subsets)	1996M07	2003M02			
Bai-Perron tests of 1 to M globally determined breaks (Global L breaks vs. none)	1990M05	1994M10	1998M12	2003M02	2007M03
Bai-Perron tests of L+1 vs. L globally determined breaks (L+1 breaks vs. global L)	1990M05	1994M10	1998M12	2003M02	2007M03
Compare information criteria for 0 to M globally determined breaks (Global information criteria)	1990M05	1994M10	1998M12	2003M02	2007M03

Appendix Graph 3. Responses and Accumulated Responses of CPI/PPI to NEER (Response to Cholesky One S.D. Innovations ± 2 S.E.)



Appendix Table 7. VAR Summary Results of ERPT Coefficients Calculated from Accumulated Response and Variance Decomposition

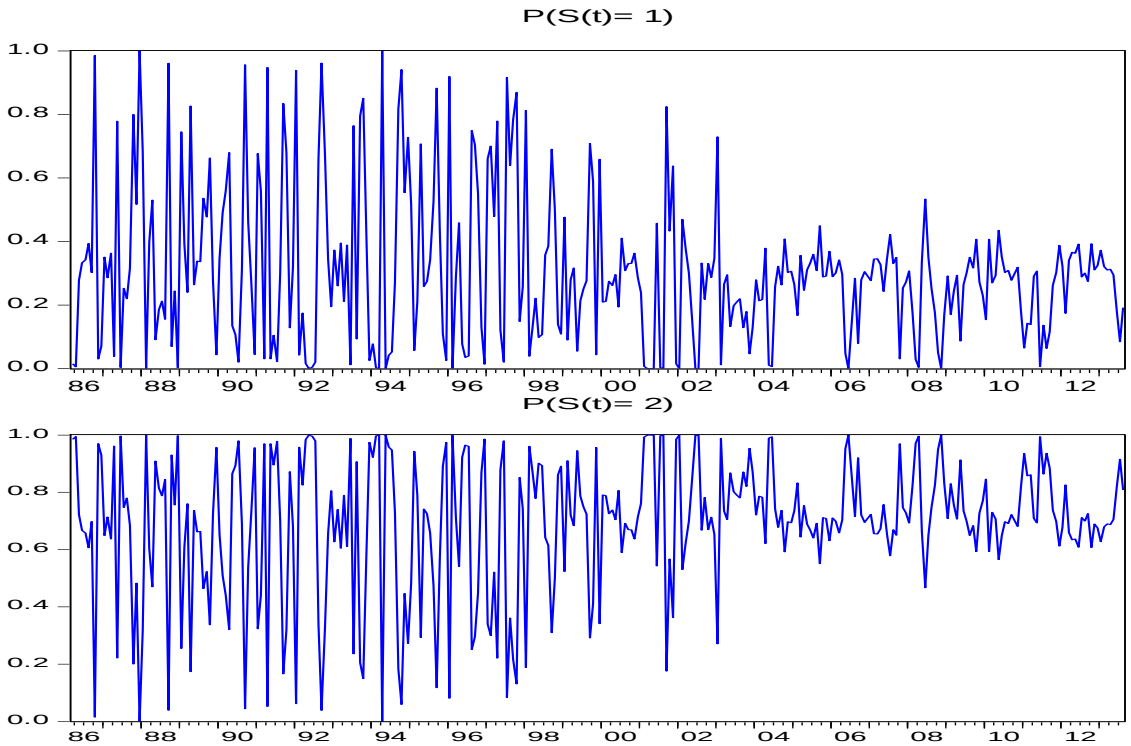
	Accumulated Response		Variance Decomposition	
Periods	**CPI**	**PPI**	**CPI**	**PPI**
1	-0.1613	-0.1887	0.1290	0.1221
2	-0.2375	-0.3127	0.2158	0.2416
3	-0.3123	-0.3697	0.3271	0.3007
4	-0.3728	-0.4423	0.3613	0.3340
5	-0.4152	-0.4799	0.3848	0.3461
6	-0.4443	-0.5109	0.3891	0.3476
7	-0.4607	-0.5230	0.3908	0.3475
8	-0.4700	-0.5294	**0.3909**	0.3473
9	-0.4741	-0.5287	0.3909	0.3473
10	-0.4760	-0.5270	0.3909	**0.3474**
11	-0.4766	-0.5246	0.3909	0.3474
12	-0.4768	-0.5229	0.3909	0.3474
13	-0.4767	-0.5218	0.3909	0.3474
14	-0.4767	-0.5213	0.3909	0.3474
15	-0.4766	-0.5211	0.3909	0.3474
16	-0.4766	-0.5211	0.3909	0.3474
17	**-0.4765**	-0.5212	0.3909	0.3474
18	-0.4765	-0.5212	0.3909	0.3474
19	-0.4765	**-0.5213**	0.3909	0.3474
20	-0.4765	-0.5213	0.3909	0.3474
21	-0.4765	-0.5213	0.3909	0.3474
22	-0.4765	-0.5213	0.3909	0.3474
23	-0.4765	-0.5213	0.3909	0.3474
24	-0.4765	-0.5213	0.3909	0.3474
25	-0.4765	-0.5213	0.3909	0.3474
26	-0.4765	-0.5213	0.3909	0.3474
27	-0.4765	-0.5213	0.3909	0.3474
28	-0.4765	-0.5213	0.3909	0.3474
29	-0.4765	-0.5213	0.3909	0.3474
30	-0.4765	-0.5213	0.3909	0.3474
31	-0.4765	-0.5213	0.3909	0.3474
32	-0.4765	-0.5213	0.3909	0.3474
33	-0.4765	-0.5213	0.3909	0.3474
34	-0.4765	-0.5213	0.3909	0.3474
35	-0.4765	-0.5213	0.3909	0.3474
36	-0.4765	-0.5213	0.3909	0.3474

Cholesky Ordering for CPI: IPI MS MIPI NEER EPI OIL CPI
Cholesky Ordering for PPI: IPI MS NEER EPI MIPI OIL PPI

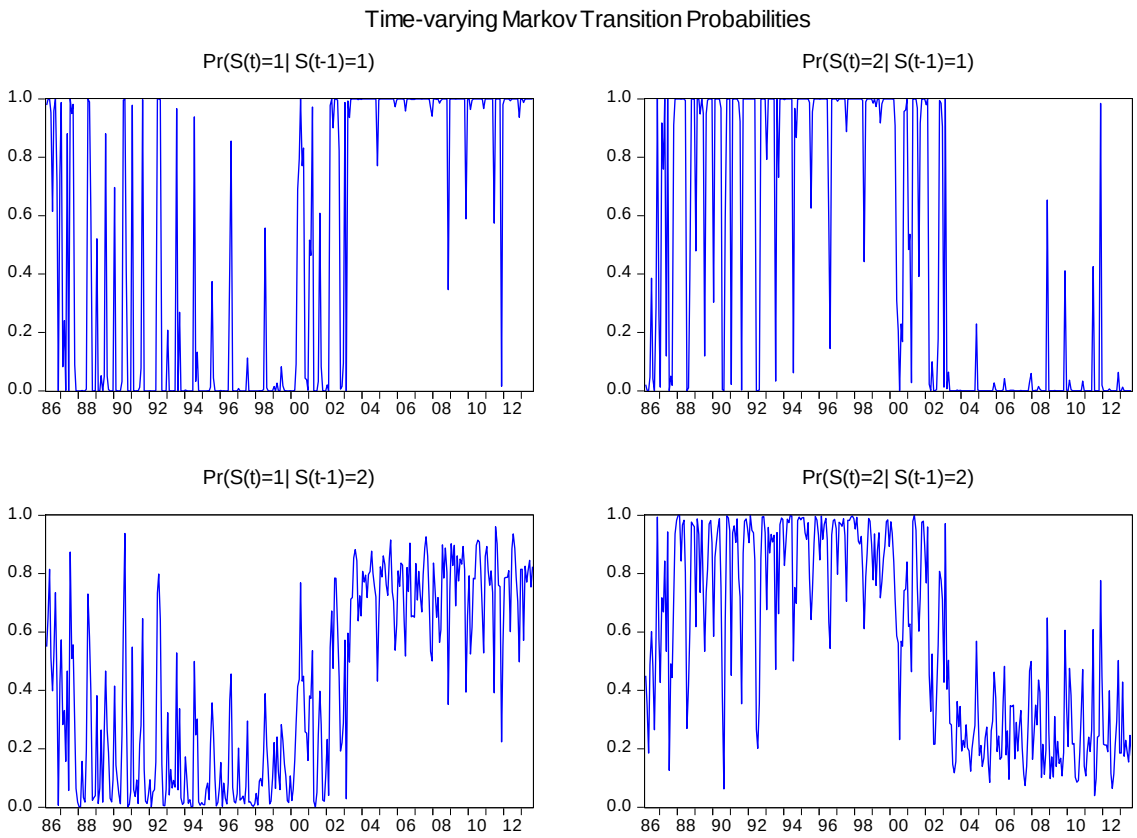
Appendix Table 8. Two-State MarkovSwitching Regression Results

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Regime 1				
NEER	-0.288708	0.050167	-5.754910	0.0000
NEER_1	-0.282339	0.073956	-3.817658	0.0001
Regime 2				
NEER	-0.126117	0.035285	-3.574281	0.0004
NEER_1	0.068010	0.031390	2.166633	0.0303
Common				
CPI_1	0.530814	0.050391	10.53381	0.0000
EPI	0.094231	0.017787	5.297635	0.0000
IPI	0.031295	0.021966	1.424706	0.1542
MIPI	0.007035	0.009719	0.723877	0.4691
MS	-0.007988	0.026693	-0.299254	0.7647
OIL	0.015807	0.008898	1.776492	0.0757
C	0.516874	0.127071	4.067595	0.0000
LOG(SIGMA)	0.223060	0.052669	4.235137	0.0000
Transition Matrix Parameters				
P11-C	-0.371501	0.652085	-0.569714	0.5689
P21-C	-1.011115	0.420524	-2.404420	0.0162
Mean dep. var	2.932053	**S.D. dependent var**		2.686452
S.E. of regression	1.631856	**Sum squared resid**		846.8193
D-W statistics	2.151364	**Log likelihood**		-590.6811
AIC	3.664734	**Schwarz criterion**		3.825908

Appendix Graph 4. Filtered Regime Probabilities



Appendix Graph 5. Time-varying Markov Transition Probabilities



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