Special Topic

Exchange rate pass-through and inflation trends in developing countries

Main messages

Two episodes of global financial turbulence over the past 13 months saw capital flows decelerate and a number of developing-country currencies depreciate. In parallel, developing-country inflation remained elevated, on average, increasing to 7.4 percent in 2013, up from 6.4 percent in 2012 and an average of 6 percent over the last decade.

The persistence of high inflation in an environment characterized by stable or even declining commodity prices reflects a variety of influences, including supply side bottlenecks, country-specific developments and, in the most recent period, adjustments to past exchange rate depreciations.

This special topic analyzes the link between currency and inflation patterns across developing economies, based on estimates of the size and timing of the exchange rate pass -through in 45 middle and low income countries. It breaks out the relative contribution of exchange rate movements and domestic cyclical conditions to recent inflation trends and presents inflation projections for 2014 and 2015.

The analysis concludes that currency-related price pressures are mainly concentrated in a few large middle income economies, including Argentina, Venezuela, Turkey, Ghana, South Africa, Indonesia or India. Higher inflation in these economies is influencing regional aggregates, whereas markedly different patterns are observed in other countries.

Reflecting the recent stabilization of foreign exchange markets, the inflationary impact of past depreciations is expected in most cases to peak around mid-2014, implying that developing-country inflation could be expected to moderate later this year and throughout 2015—barring further episodes of exchange rate volatility.

From a policy perspective, a low exchange rate pass-through helps to limit the impact of currency fluctuations on domestic demand and allows exchange rate adjustments to play a greater role in absorbing external shocks without undermining price or output stability. Evidence of lower pass-through rates among developing countries with inflation targeting central banks suggests the importance of credibly anchoring inflation expectations.

Recent developments

Inflation

Average inflation rates in developing and high-income countries have recently followed different patterns, trending downwards since end 2012 in high income countries, while stabilizing or increasing further in developing countries (see figure S1.1).

Inflationary pressures in several developing countries persisted throughout 2013 and at the start of 2014 despite declining commodity prices, which would normally be associated with a sharper deceleration in consumer price inflation in developing countries (where food and energy represents a larger share of households' spending than in high income countries). This suggests that other factors had counterbalancing effects, including growing external price pressures linked to past currency depreciations.

Above average or rising inflation since early 2013 was mostly observed among large middle-income economies, whereas in other developing countries inflation eased significantly, following more closely trends in commodity prices (see figure S1.1 and figure S1.2). The downward trend was reinforced among low income countries by a stabilization of local food prices after the 2011 droughts, policy tightening, and the easing of fuel and food supply disruptions during political turmoil in the Middle East and parts of Sub-Saharan Africa. Currently, average inflation in low-income countries is just over 6 percent,

Figure S1.1   **Inflation decoupling between developing and high-income countries**

percentage change, year-on-year

Developing countries
High-income countries
Developing median
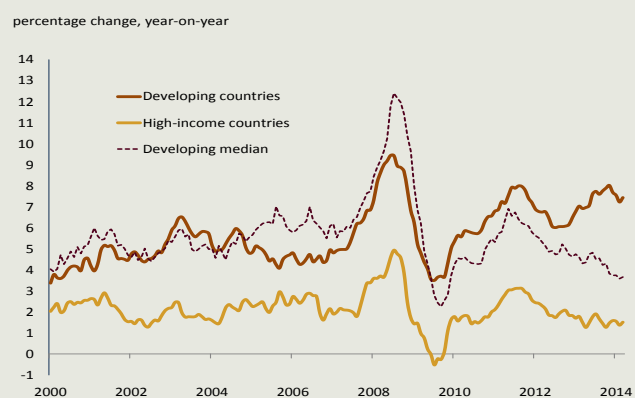
Source: Haver, World Bank.

somewhat higher than during the early 2000s but below post-crisis averages.

By contrast, inflation has picked up since January 2013 in a third of middle-income countries (and mainly large ones), despite the fall in global food prices and broadly stable energy prices. Persistently high or rising inflation in some of these countries resulted from excess demand pressures in recent years (due to easy policies and strong credit growth), country specific price shocks, and in many instances exchange rate depreciations.

Exceptionally large swings in inflation in few countries also influenced region-wide aggregates, notably Venezuela and Argentina in Latin America, Iran and Syria in the Middle East, or Belarus in Eastern Europe and Central Asia.

Exchange rate developments

Recent inflationary pressures are largely mirroring previous currency depreciations, which affected to varying degrees more than 60 percent of developing countries since the start of 2012 (in both US dollar and nominal effective exchange rate terms, figure S1.3).

Significant depreciations sometimes pre-dated the Summer 2013 turmoil, such as in the case of Malawi, Venezuela, Argentina, Ghana, Belarus or Iran, but were most pronounced after that among middle-income countries with large current account deficits such as Turkey, South Africa, Indonesia, India and Brazil (figure S1.4).

Subsequent current account adjustments, notably in India and Indonesia, and reductions in domestic vulnerabilities meant that most of the countries hardest hit in the Summer of 2013 were less affected during the second episode of financial market unrest in January/February 2014. Currencies that depreciated most since the start of 2014 were those of Argentina, Ghana, Ukraine, Kazakhstan, Costa Rica or Zambia, typically as a result of negative country-specific news. Since end-February, foreign exchange markets have stabilized and capital flows have recovered, but a large number of developing countries are still adjusting to past depreciations, which remain in excess of 10 percent since early 2012 in more than 20 countries.
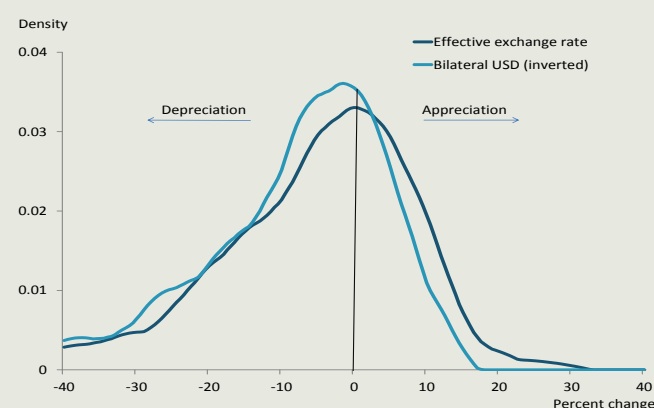
The next section provides a formal analysis of exchange rate pass-through effects and presents both counter-factual and forward looking simulations.

Figure S1.2   **Upward drift mainly a middle income phenomenon**
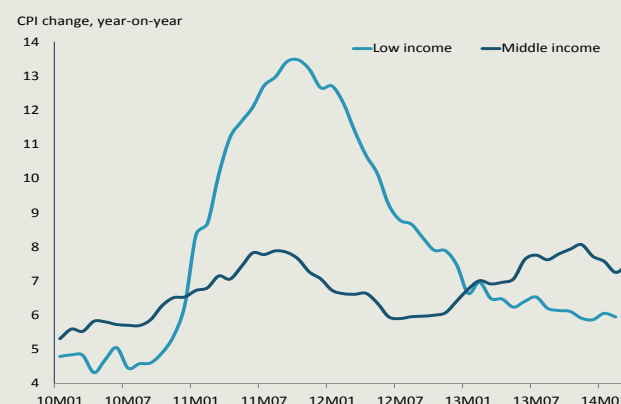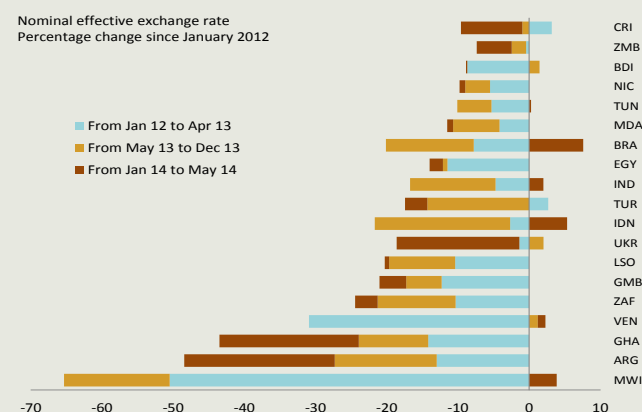

Source: Haver, World Bank.

Figure S1.3   **Distribution of currency changes across developing countries since January 2012**

Source: Haver, World Bank.

Figure S1.4   **Countries having seen the largest currency depreciations since 2012**

Source: Haver, World Bank.

Exchange rate pass-through and inflation

Understanding the impact of exchange rate developments on future inflation trends is critical to policy makers, particularly for central bankers who have to weigh conflicting objectives and varying time lags when seeking to limit price, currency and output volatility. The section provides a formal investigation of the exchange-rate pass-through (ERPT) to consumer price inflation in developing countries, presenting key results and simulations.

A substantial empirical and theoretical literature has investigated the exchange rate pass-through in high income countries and increasingly in developing economies (Ca' Zorzi, Hahn and Sanchez (2007), Frankel et al. (2005) or Mihaljek et al. (2000)). These studies generally conclude that currency movements are only partially transmitted to domestic prices, with the effect declining throughout the production chain (larger for import prices, then smaller for producer prices and more limited for consumer prices). They also provide evidence of considerable cross-country differences, with inflation in emerging economies generally displaying greater sensitivity to exchange rate developments than in high-income countries (McCarthy (1999), Choudhri and Hakura (2006) Reyes (2004), Schmidt-Hebbel and Tapia (2002)). Among other determinants, pass-through rates appear to be significantly influenced by policy choices, including the credibility of central banks and other institutional factors affecting inflation expectations and inertia (Taylor (2000)).

To investigate the size and timing of such exchange rate effect on future inflation, we estimate pass-through rates for over 45 developing countries (and 35 high income countries for comparison) using a single equation framework. The model and main results are described below.

Model description and main results

While the literature on exchange rate pass-through is voluminous, there is no uniform definition of the term "pass-through." Much of the existing research focuses on the relationship between movements in nominal exchange rates and import prices. A smaller but equally important strand of the literature concentrates on the exchange rate pass-through to aggregate consumer price inflation (Bachetta and van Wincoop (2003), Campa and Goldberg (2005), Gagnon and Ihrig (2004), Takhtamanova (2010)).
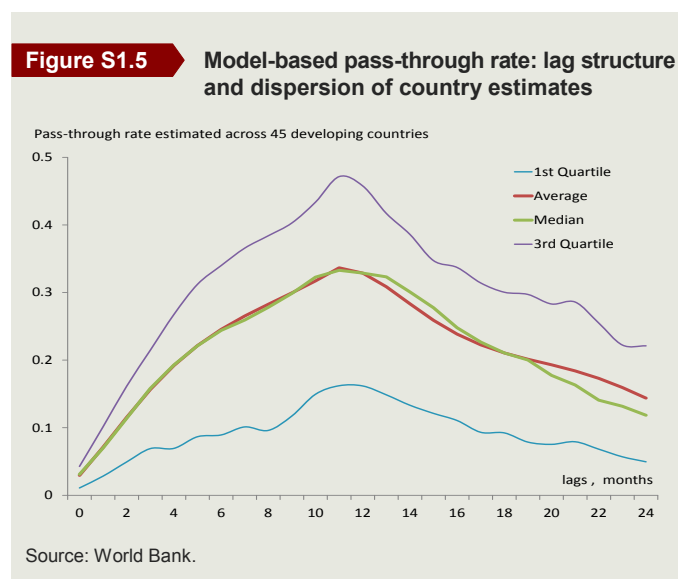
Our modelling approach also focuses on the relationship between aggregate consumer price inflation, exchange rate developments and the level of economic slack in an open economy Phillips Curve framework (see Technical Note for details and main estimation results). Figure S1.5 and S1.6 shows the estimated pass-through rates over time and across the 45 developing countries included in our sample.[1]

It shows that the effect of currency fluctuations on annual consumer price inflation generally peaks after 10 to 11 months. On average, the peak pass-through rate is about 0.3, implying that a permanent 10 percent depreciation in the effective exchange rate adds around 3 percentage points to developing country inflation after a year, with the effect gradually dissipating afterwards. However, estimated pass-through rates vary considerably across individual countries, ranging from less than 0.1 to more than 0.5.
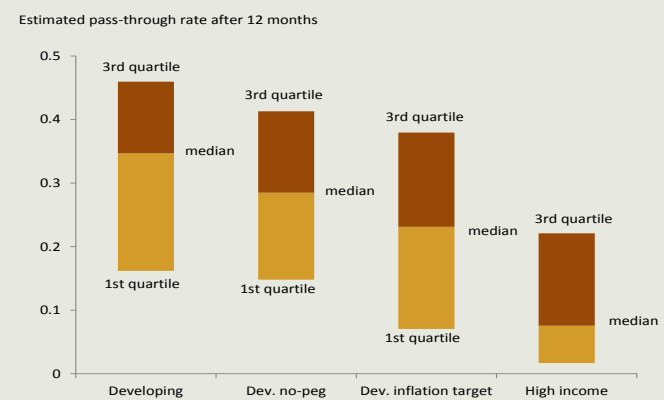
Confirming previous empirical findings (Gagnon and Ihrig 2004, Reyes 2004, Schmidt-Hebbel and Tapia 2002), the analysis shows that inflation in developing countries tends to be more sensitive to currency fluctuations than in high income countries.

However, those developing countries with credible inflation targeting central banks display significantly lower pass-through rates (see figure S1.6), whereas currency movements have the greatest impact on consumer price inflation in countries where inflation and exchange rates are historically more volatile (figure S1.7).

---

1. Discussed results are based on the polynomial distributed lag variant of the model (see annex for more details).

Figure S1.5 **Model-based pass-through rate: lag structure and dispersion of country estimates**

Pass-through rate estimated across 45 developing countries

Source: World Bank.

Figure S1.6 ▸ Pass-through rate higher in developing countries, more limited for inflation targeters

Estimated pass-through rate after 12 months

Source: World Bank.

Figure S1.7 ▸ Correlation of pass-through rates with inflation/currency trends across developing countries

Correlation of individual country pass-through rates with indicators of the inflation / currency environment over the period 2004 to 2013
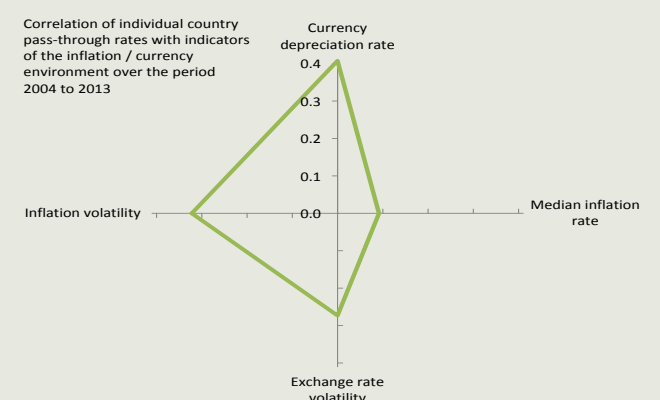

Source: World Bank.

These findings confirm that monetary policy, price and exchange rate stability are tightly connected and affect one another through a complex web of causal relationships (Mishkin 2008). In so far as inflation targeting regimes serve successfully the anchoring of inflation expectations, they will (and arguably have) reduce(d) the inflationary impact of currency fluctuations. Countries that have established such credibility can more easily tolerate exchange rate adjustments as a way of absorbing external shocks and regain autonomy in monetary policy decisions.

Impact of currency fluctuations: counter-factual simulations

Using the individual pass-through equations presented in the Technical Note, the impact of recent exchange rate developments on inflation can be investigated. Figures S1.8 and S1.9 summarizes counter-factual simulations, reporting the deviation between actual inflation and what would have occurred (according to model suggestions) if nominal effective exchange rates had remained constant since January 2012.

These simulations suggest that past depreciations in a number of large middle income economies are currently contributing to rising price pressures in most regions, adding at present between 1 and 4 percentage points to aggregate inflation in all regions but the Middle East and East Asia. In East Asia, a significant appreciation of the Renminbi in recent years continues to exert downward pressures on inflation in China, while currency

depreciations in Indonesia and to a lesser extent Thailand broadly cancel out the effect at region-wide level.

Looking into individual country results, considerable variations are reported. These reflect diverging exchange rate developments, but also different pass-through rates and levels of inflation inertia. In our sample, the ten countries facing the most intense currency related price pressures are at present Venezuela, Argentina, Malawi, Turkey, Moldova, Ghana, South Africa, Pakistan, Indonesia, Gambia and India (see figure S1.9). In those countries, current pressures can generally be traced back to post-May 2013 developments, although prior depreciations continued to play a dominant role in Venezuela or Malawi.

In general, currency related price pressures appear to be more widespread among large middle income countries with relatively flexible exchange rate regimes, deeper financial markets and relatively open capital accounts. This group includes most notably Turkey, South Africa, Indonesia, India or Turkey (see Eichengreen and Gupta, 2014; World Bank, 2014 for discussions of the causal and empirical linkages), which experienced significant capital inflows in the post crisis period and had seen most significant currency pressures when global interest rates suddenly rose after May 2013. However, loose policies and supply bottlenecks were already contributing to rising domestic price pressures and deteriorating current account deficits in some of these countries before currency pressures intensified 2013, blurring the direction of causality between exchange rate and inflationary pressures.

The likely impact of exchange rate fluctuations on subsequent inflation patterns is the focus of this analysis but is only one among several important drivers of diverging inflation trends across developing countries at present. Other factors that are unaccounted for in this analysis include developments in domestic food and energy prices, taxes and subsidies, wage and monetary policy. Nevertheless, exchange rate developments are estimated to account for no less than 50 percent of the actual dispersion of inflation trends across developing countries in 2013 (figure S1.10)- suggesting that adjustments to past currency developments are at present one the key factors driving inflation patterns at the individual country level.
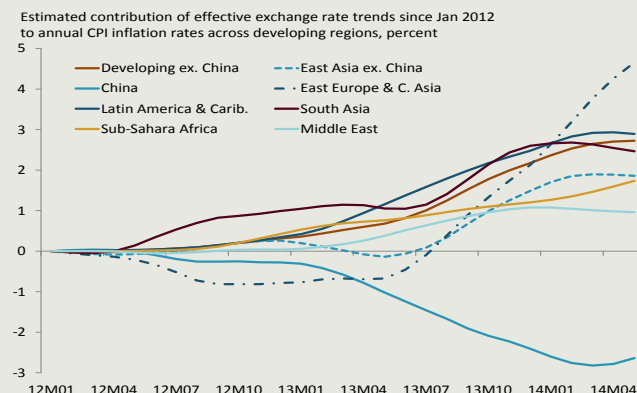
Outlook for 2014 and 2015

The above pass-through models can also be used to project when the effect of recent exchange rate movements will wear off and give a sense as to what extent inflation can be expected to ease in line with weaker domestic demand and below potential output in most developing regions this year.

Looking at aggregate results for developing countries (excluding China), the impact of past depreciations is expected to peak around mid-2014, and to gradually subside thereafter (figure S1.11). Interestingly, most of the residual effect of past depreciations is still a legacy of the May to December 2013 period, with currency developments since the start of 2014 having, on average, a much more limited impact thus far. Rising output gaps, as many developing regions continue to register below potential growth, are estimated to cut aggregate inflation by around ½ of a percentage point in 2014 and 2015.

In terms of annual average inflation, pressures resulting from past currency developments are still expected to build in 2014 in most regions (when compared with 2013, see figure S1.12). At the country level, the lagged effect of past currency depreciations / devaluations in countries like Malawi, Ghana, Turkey, Argentina or Venezuela should still have a considerable effect by year end. However, in most cases, inflation should start edging lower in the second half of the year and moderate further in 2015. This should result from a combination of declining external price pressures and a cooling off of domestic demand in the face of tighter financing conditions. These projections are strongly conditioned by our assumption of constant effective exchange rates throughout the projection period.

While current market conditions are stable and long term interest rates still at exceptionally low levels, the

Figure S1.8 **Estimated effect of currency developments on regional inflation**

Estimated contribution of effective exchange rate trends since Jan 2012 to annual CPI inflation rates across developing regions, percent

Source: World Bank.

Figure S1.9 **Exchange rate impact on current inflation (April 2014) across developing countries**

Estimated contribution of past NEER changes to CPI inflation in April 2014

Actual inflation in April 2014 (6-month avg), percent
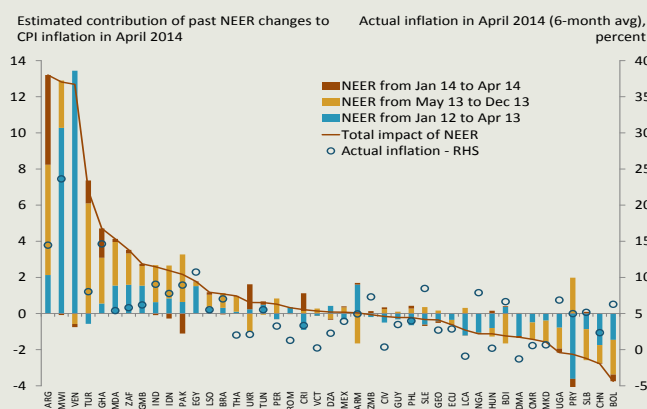
Source: World Bank.

Figure S1.10 **Inflation change from 2012 to 2013: actual and model predictions**

Source: World Bank.

normalization of monetary policy in the US and eventually in other high income countries might exert additional downward pressure on some developing country currencies within the projection horizon. Should such pressures materialize, inflation might not moderate as currently predicted, fo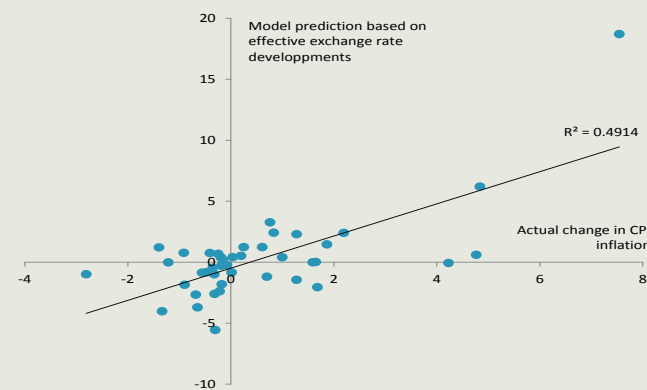rcing central banks to accelerate their tightening cycle, particularly in those economies combining above target inflation and large pass-through rates.

During recent episode of financial market turmoil, currency pressures have had an important bearing on monetary policy decisions, being more closely correlated with interest rate decisions than actual changes in inflation (see figure S1.13).

At the same time, the credibility of the central bank plays itself a considerably role in reducing the expected exchange rate pass-through, hence limiting risks to price stability resulting from significant currency fluctuations. In fact, when monetary authorities are known to act decisively to stabilize inflation or counteract imported price pressures, agents correctly understand the central bank's intentions and are less likely to pass-through cost increases, including those arising from exchange rate depreciations (Gagnon and Ihrig 2004).

The observed decline in the exchange rate pass-through among countries having adopted explicit inflation targets (Mishkin and Schmidt-Hebbel 2007, Coulibaly and Kempf 2010, World Bank 2013) reflects such a tendency towards greater credibility in monetary policy, breaking the old tendency for prices and wages to be indexed to past inflation and currency depreciations. In such case, exchange rate fluctuations can help mitigate external shocks and smooth macroeconomic adjustments when combined with prudent fiscal policy, stable financial systems and credible reforms.

Figure S1.11 **Outlook for inflation in developing country (exc. China) and main contributing factors**

CPI inflation and estimated contribution of NEER and output gap developments
Developing countries exc. China
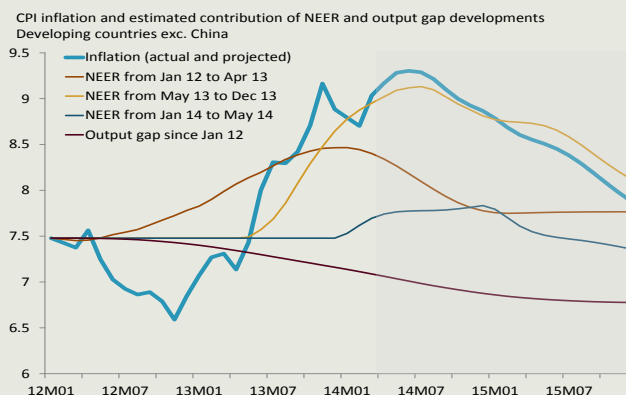
Source: World Bank.

Figure S1.12 **Currency-related pressures still building up in 2014 across most regions**

Contribution of NEER and output gap developments to inflation in 2014 (compared with 2013)
Percent
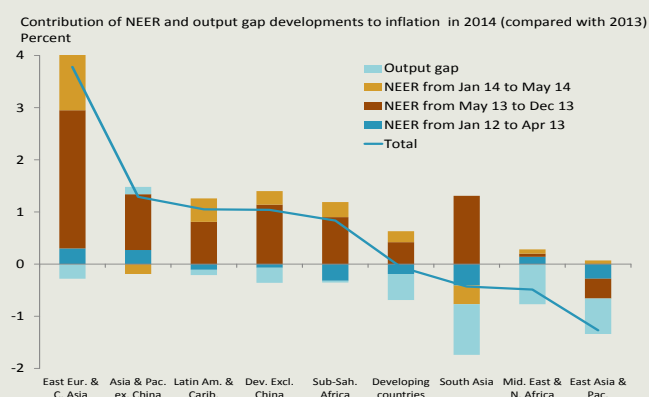
Source: World Bank.

Figure S1.13 **Monetary policy, inflation and recent currency trends across developing countries**

Source: World Bank.

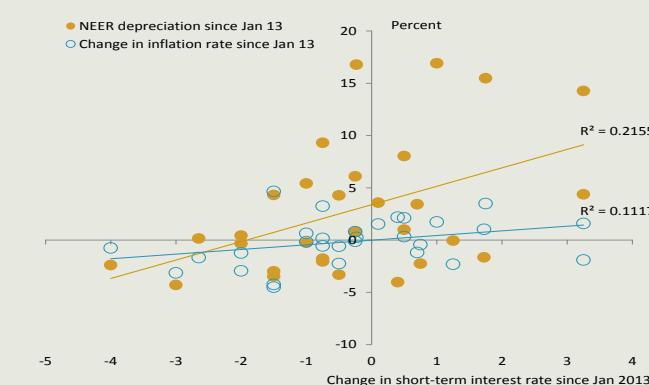A hybrid Philips Curve was used to estimate the pass-through rate across 35 high income and 45 developing countries. The single equation model is defined such that actual inflation Π_t is a function of the output gap (y_t) and expected future inflation, estimated as a combination of inflation inertia (i.e. $\emptyset.\Pi_{t-1}$), the expected exchange rate pass-through ($\alpha.\Delta e$) and an auto-regressive error term ($\delta.\varepsilon_{t-1}$). The model is estimated over the period 2002m1 to 2014m2 at a monthly frequency for each individual country using Nonlinear Least Squares.

$$\pi_t = \beta y_t + \emptyset \pi_{t-1} + \sum_{k=0}^{12} \alpha_k \, \Delta e_{t-k} + \varepsilon_t + \delta \varepsilon_{t-1}$$

Inflation is measured as annual changes in the overall consumer price index for each individual countries, output gap estimates are those of the World Bank derived by using a Cobb Douglas production function approach (see Burns, Bui, Dzybak and van Rensburg, 2014), while exchange rates are measured in nominal effective (trade-weighted) terms and calculated by the IMF and World Bank. The estimated lag structure of the exchange rate pass-through is defined following two alternative approaches. The first one consists of defining the optimal lag structure for each country using the Akaike information criteria. The second one consists of estimating a full 12 lag structure for each country, reducing the number of estimated coefficients by fitting a 3rd order lag polynomial function.

Both approaches show that the immediate exchange rate pass-through coefficients (α_k) are relatively small, with their effect generally peaking after 3 to 4 months. However, the final pass-through rates are both larger and longer lasting when accounting for second round effects relating to inflation inertia and the usual propagation of price shocks (captured in the model by the lagged dependent variable and autoregressive errors).

Table S1.1 and S1.2 show the main regression results for high income and developing countries, based on the polynomial distributed lag variant of the model.

Table S1.1 **Main regression results for high income countries**

	Cumulative pass-through	t-stat	Output gap	t-stat	Inflation inertia	t-stat	R2	Durbin-Watson
AUT	-0.01	-0.2	0.01	0.3	0.91	20.3	0.9	2.0
CHE	-0.02	-2.5	0.01	0.3	0.86	16.8	0.9	2.0
KWT	-0.06	-2.8	0.01	1.1	0.97	35.4	0.9	2.0
SAU	-0.02	-1.5	0.02	0.8	0.97	47.2	1.0	2.2
DNK	-0.01	-0.9	0.02	1.3	0.90	21.0	0.9	2.1
LUX	-0.04	-1.3	0.02	1.3	0.86	16.0	0.8	2.0
NLD	-0.01	-1.0	0.02	1.7	0.88	22.4	0.9	2.0
DEU	-0.01	-0.5	0.02	1.0	0.87	13.3	0.8	2.0
FRA	0.01	0.4	0.03	1.0	0.88	15.9	0.9	2.0
RUS	0.00	-0.2	0.03	1.6	0.95	40.5	1.0	2.0
HKG	-0.01	-0.2	0.03	1.3	0.95	34.8	0.9	2.0
TTO	0.01	0.1	0.03	1.4	0.90	22.2	0.9	1.9
ITA	0.00	-0.2	0.03	2.2	0.91	22.9	0.9	2.2
JPN	-0.01	-1.9	0.04	1.4	0.81	10.8	0.9	2.0
FIN	-0.05	-3.2	0.04	2.9	0.87	22.7	0.9	2.0
SGP	-0.02	-0.6	0.05	3.1	0.93	32.8	0.9	2.0
NZL	0.00	-0.2	0.05	0.4	0.75	1.3	1.0	2.0
PRT	-0.05	-1.4	0.06	1.9	0.92	26.1	0.9	2.0
ISL	-0.08	-3.4	0.07	2.7	0.70	8.3	1.0	2.0
CZE	-0.03	-1.8	0.07	3.1	0.85	16.7	0.9	2.1
BEL	-0.02	-0.6	0.07	1.5	0.87	15.2	0.9	2.1
HRV	-0.16	-2.5	0.08	3.0	0.80	11.9	0.9	1.9
TWN	-0.01	-0.4	0.11	2.7	0.72	9.8	0.7	2.0
KOR	-0.01	-1.1	0.12	2.0	0.85	14.1	0.9	1.9
POL	-0.01	-1.6	0.12	2.8	0.82	12.8	0.9	2.1
CHL	-0.03	-2.0	0.20	3.7	0.85	19.7	1.0	2.1
IRL	-0.05	-0.7	0.42	3.5	0.43	4.7	1.0	2.0

Main regression results for developing countries

	Cumulative pass-through	t-stat	Output gap	t-stat	Inflation inertia	t-stat	R2	Durbin-Watson
ARG	-0.34	-5.4	0.00	0.0	0.35	3.2	1.0	2.1
ARM	-0.12	-3.2	0.09	2.7	0.81	13.0	0.9	2.0
BDI	-0.05	-1.4	0.01	0.1	0.92	24.7	0.9	2.0
BOL	-0.09	-3.5	0.23	2.4	0.91	24.8	1.0	2.1
BRA	-0.01	-2.1	0.02	0.7	0.94	25.7	1.0	2.1
CHN	-0.08	-3.7	0.11	3.0	0.88	22.5	0.9	2.0
CIV	-0.02	-0.4	0.02	0.5	0.86	15.4	0.8	2.0
CMR	-0.02	-0.5	0.00	0.1	0.89	19.8	0.9	2.0
CRI	-0.07	-2.7	0.06	1.7	0.88	19.6	1.0	2.1
DMA	-0.09	-2.6	0.02	0.8	0.88	16.4	0.9	2.0
DZA	-0.01	-0.1	0.06	0.8	0.82	12.2	0.8	2.0
ECU	-0.03	-1.0	0.00	0.0	0.88	24.6	1.0	1.8
EGY	-0.03	-1.1	0.17	1.2	0.88	13.4	1.0	2.1
GEO	-0.12	-3.3	0.08	1.7	0.85	16.7	0.9	2.0
GHA	-0.06	-1.2	0.02	0.5	0.85	13.4	0.9	2.0
GMB	-0.03	-2.1	0.02	0.0	0.91	21.3	1.0	1.9
GUY	-0.08	-1.6	0.02	0.3	0.87	16.3	0.8	2.0
HUN	-0.04	-2.6	0.03	1.7	0.98	30.8	0.9	2.0
IDN	-0.06	-2.5	0.01	0.1	0.87	18.5	0.9	2.0
IND	-0.04	-1.6	0.10	1.8	0.88	18.4	0.9	1.9
LCA	-0.18	-3.0	0.07	2.0	0.83	16.3	0.8	1.8
LSO	-0.01	-1.6	0.04	0.7	0.94	35.7	1.0	2.1
MDA	-0.08	-3.8	0.03	0.6	0.93	18.5	1.0	2.0
MEX	-0.02	-1.6	0.03	1.1	0.76	6.4	0.9	1.7
MKD	-0.12	-1.5	0.01	0.2	0.90	20.8	0.9	2.0
MWI	-0.03	-2.3	0.03	0.9	0.95	40.0	1.0	2.1
NGA	-0.12	-2.4	0.02	0.2	0.77	11.0	0.8	2.0
PAK	-0.05	-1.0	0.04	0.8	0.91	20.6	1.0	2.1
PER	-0.03	-1.0	0.09	2.6	0.82	14.0	0.9	2.1
PHL	-0.04	-1.3	0.28	1.8	0.80	7.2	1.0	2.0
PRY	-0.10	-2.7	0.16	1.7	0.81	12.0	0.9	2.0
ROM	-0.02	-1.2	0.02	0.7	0.93	52.9	1.0	2.0
SLB	-0.06	-1.7	0.06	1.5	0.89	18.1	0.9	2.0
SLE	-0.07	-3.1	0.00	0.0	0.88	17.3	0.8	1.8
THA	-0.06	-0.8	0.25	1.9	0.39	3.3	0.9	2.1
TUN	0.00	-0.1	0.01	0.3	0.89	17.5	0.9	2.0
TUR	-0.09	-2.1	0.02	0.3	0.87	22.1	1.0	1.9
UGA	-0.03	-0.8	0.07	0.4	0.89	18.1	1.0	2.1
UKR	-0.13	-2.8	0.18	3.2	0.80	12.4	1.0	1.7
VCT	-0.06	-2.9	0.01	0.4	0.92	25.6	0.9	2.0
VEN	-0.02	-0.6	0.05	1.4	1.00	42.0	1.0	1.9
ZAF	-0.04	-3.3	0.02	0.6	0.86	17.5	1.0	2.1
ZMB	-0.01	-1.2	0.00	0.0	0.97	37.9	1.0	1.9

References

Bacchetta, P. and Eric van Wincoop (2003). "Why do Consumer Prices React Less than Import Prices to Exchange Rates?", Journal of European Economic Association, 1, 662-670

Bacchetta, P., and Eric van Wincoop (2005). "A Theory of the Currency Denomination of International Trade," Journal of International Economics, vol. 67 (December), pp. 295-319.

Bernanke, Ben S., Thomas Laubach, Frederic S. Mishkin, and Adam S. Posen (1999). Inflation Targeting: Lessons from the International Experience. Princeton: Princeton University Press.

Betts, Caroline, and Michael B. Devereux (1996). "The Exchange Rate in a Model of Pricing-to-Market," European Economic Review, vol. 40 (April, Papers and Proceedings of the Tenth Annual Congress of the European Economic Association), pp. 1007-21.

Bodnar, Gordon M., Bernard Dumas, and Richard C. Marston (2002). "Pass-through and Exposure," Journal of Finance, vol. 57 (February), pp. 199-231.

Burns, Andrew, Theo Janse Van Rensburg, Kamil Dybczak and Trung Bui (2014). "Estimating potential output in developing countries", forthcoming.

Burstein, Ariel T., João C. Neves, and Sergio Rebelo (2003). "Distribution Costs and Real Exchange Rate Dynamics During Exchange-Rate-Based Stabilizations," Journal of Monetary Economics, vol. 50 (September), pp. 1189-214.

Burstein, Ariel, Martin Eichenbaum, and Sergio Rebelo (2007). "Modeling Exchange Rate Passthrough after Large Devaluations," Journal of Monetary Economics, vol. 54 (March), pp. 346-68.

Campa, José Manuel, and Linda S. Goldberg (2005). "Exchange Rate Pass-through into Import Prices," Review of Economics and Statistics, vol. 87 (November), pp. 679-90.

Ca' Zorzi, Michele, Elke Hahn and Marcelo Sánchez (2007). "Exchange rate pass-through in emerging markets," ECB Working Paper series, n 739 (March)

Choudhri, E. and Hakura, D. (2006). "Exchange Rate Pass-Through to Domestic Prices: Does the Inflationary Environment Matter?", Journal of International Money and Finance, 25, 614-639.

Corsetti, Giancarlo, and Luca Dedola (2005). "A Macroeconomic Model of International Price Discrimination," Journal of International Economics, vol. 67 (September), pp. 129-55.

Coulibaly, Dramane and Hubert Kempf (2011). "Does Inflation Targeting decrease Exchange Rate Pass-through in Emerging Countries?" CES Working paper 2010.49

Devereux, Michael B., and Charles Engel (2002). "Exchange Rate Pass-Through, Exchange Rate Volatility, and Exchange Rate Disconnect," Journal of Monetary Economics, vol. 49 (July), pp. 913-40.

Dornbusch, Rudiger (1987). "Exchange Rates and Prices," American Economic Review, vol. 77 (March), pp. 93-106.

Erceg, Christopher J., Luca Guerrieri, and Christopher Gust (2006). "SIGMA: A New Open Economy Model for Policy Analysis," International Journal of Central Banking, vol. 2 (March), pp. 1-50.

Eichengreen, Barry and Gupta, Poonam (2014). "Tapering talk : the impact of expectations of reduced federal reserve security purchases on emerging markets," Policy Research Working Paper Series 6754, The World Bank.

Frenkel, Jacob A. (1976). "A Monetary Approach to the Exchange Rate: Doctrinal Aspects and Empirical Evidence," The Scandinavian Journal of Economics, 78 (June, Proceedings of a Conference on Flexible Exchange Rates and Stabilization Policy), pp. 200-24.

Frankel, J., Parsley, D. and Wei, S. (2005). "Slow Pass-Through Around the World: A New Import for Developing Countries", NBER Working Paper No. 11199.

Gagnon, Joseph E., and Jane Ihrig (2004). "Monetary Policy and Exchange Rate Pass-Through," International Journal of Finance and Economics, vol. 9 (October), pp. 315-38.

Goldberg, Pinelopi Koujianou, and Michael M. Knetter (1997). "Goods Prices and Exchange Rates: What Have We Learned?" Journal of Economic Literature, vol. 35 (September), pp. 1243-72.

Goldfajn, Ilan, and Sergio Ribeiro da Costa Werlang (2000). "The Pass-Through From Depreciation to Inflation: A Panel Study," Banco Central do Brasil Working Paper Series No. 5. Brasilia: Banco Central do Brasil, July.

Gust, Christopher, Sylvain Leduc, and Robert J. Vigfusson (2006). "Trade Integration, Competition, and the Decline in Exchange-Rate Pass-Through," International Finance Discussion Papers 864. Washington: Board of Governors of the Federal Reserve System, August.

Kasa, Kenneth (1992). "Adjustment Costs and Pricing-to-Market Theory and Evidence," Journal of International Economics, vol. 32 (February), pp. 1-30.

Krugman, Paul (1987). "Pricing to Market When the Exchange Rate Changes," in Sven W. Arndt and J. David Richardson, eds., Real Financial Linkages Among Open Economies. Cambridge, Mass.: MIT Press, pp. 49-70.

McCarthy, Jonathan (1999). "Pass-Through of Exchange Rates and Import Prices to Domestic Inflation in Some Industrialised Economies," BIS Working Paper No. 79. Basel: BIS, November.

Michener, Ronald W., and Robert E. Wright (2005). "State 'Currencies' and the Transition to the U.S. Dollar: Clarifying Some Confusions," American Economic Review, vol. 95 (June), pp. 682-703.

Mihaljek, D. and Klau, M. (2000). "A Note on the Pass-Through from Exchange Rate and Foreign Price Changes to Inflation in Selected Emerging Market Economies", BIS Papers, 8, 69-81.

Mishkin, Frederic and Klaus Schmidt-Hebbel. (2007). "Does inflation targeting make a difference ?" National Bureau of Economic Research, NBER Working Paper 12876.

Mishkin, Frederic S. (2008). "Exchange Rate Pass-Through And Monetary Policy," NBER Working Paper No. 13889

Nakamura, Emi (2007). "Accounting for Incomplete Pass-Through," unpublished paper, Columbia University, New York.

Pincheira, P. (2013). "Interventions and Inflation Expectations in an Inflation Targeting Economy," BIS Working Paper No 427.

Reyes, Javier (2004). "Exchange rate pass-through effect and inflation targeting in emerging economies: what is the relationship?," University of Arkansas.

Schmidt-Hebbel, Klaus and Matías Tapia (2002). "Monetary Policy Implementation and Results in Twenty Inflation-Targeting Countries," Working Papers Central Bank of Chile 166, Central Bank of Chile.

Sekine, Toshitaka (2006). "Time-Varying Exchange Rate Pass-Through: Experiences of Some Industrial Countries," BIS Working Paper No. 202. Basel: Bank for International Settlements, March.

Takhtamanova, Yelena F. (2010). "Understanding changes in exchange rate pass-through," Journal of Macroeconomics, Elsevier, vol. 32(4), pages 1118-1130, December.

Taylor, John B. (2000). "Low Inflation, Pass-Through, and the Pricing Power of Firms," European Economic Review, vol. 44 (June), pp. 1389-408.

Vigfusson, Robert, Nathan Sheets, and Joseph Gagnon (2008). "Exchange Rate Pass-through to Export Prices: Assessing Some Cross-Country Evidence," Review of International Economics.

World Bank, (2013). "Latin America's Deceleration and the Exchange rate Buffer," WB Semiannual Report.

World Bank, (2014). "Global Economic Prospects: ," Volume 8. January 2014.