

# The myth of EM FX pass-through

By Jan Dehn and Gustavo Medeiros

One of the common perceptions about EM is that inflation rises sharply when their currencies weaken.

This is because weaker currencies allegedly push up the domestic prices of imported goods and services, which make up part of CPI indices. This phenomenon has a name: FX pass-through. Yet, currency weakness can equally be deflationary. Outflows can weaken economic growth and inflation, for example, turning the conventional thesis of FX pass-through on its head.

Given this theoretical ambiguity, what does the data show? Did the 43% depreciation of EM currencies between 2010 and 2015 cause inflation rates to rise in EM? The answer is no. EM inflation declined. There is also compelling evidence that stronger currencies have been associated with higher inflation.

The fact that FX pass-through is a myth implies that investors should have permanent allocations to EM local currency bonds. Looking forward, we expect flows to EM to pick up. This should also push EM inflation moderately higher, which means that EM carry will remain attractive. We quantify the likely source of return in EM local bonds over the next five years and find that currencies are likely to make significant contributions to total return.

## Introduction

Most investors expect inflation rates in Emerging Markets (EM) to increase sharply during periods of currency weakness, because prices of imports in domestic currency terms go up. This phenomenon is known as FX pass-through and it is frequently touted as a major obstacle to investing in EM local bonds. After all, if FX pass-through happens investors lose money on both currencies and on duration due to rising inflation.

However, the link between currencies and inflation is ambiguous. For example, if a bout of currency weakness triggers a recession then non-tradable prices can fall more than tradable prices. Given this theoretical ambiguity, we examine the empirical evidence of a link between currency movements and inflation. Using both country and index level data we find that nearly all the evidence contradicts the thesis that weaker currencies beget higher inflation. Indeed, we find that periods of weaker currencies are consistently associated with lower inflation, while periods of stronger currencies are consistently associated with higher inflation. This is exactly the opposite of what is predicted under the conventional FX pass-through thesis.

The most likely explanation for this result is that inflation and currencies are jointly determined by a third variable: capital flows. Growth and inflation can both decline significantly if foreign investors pull money from markets, where foreign capital finances economic activity at the margin. This condition is satisfied in most EM countries, which are severely finance constrained.

**It is a common perception that currencies and inflation rates are strongly negatively correlated in EM countries. However, there are equally strong theoretical reasons why currency weakness can be deflationary**

When inflation falls during bouts of currency weakness then local bonds become particularly attractive at such times. Investors should therefore add to positions in EM local currency bonds during bouts of currency weakness, while, of course, actively managing FX, while in general they should have permanent allocations in EM local currency bonds exactly as they do in developed bond markets.

Looking forward, we expect both growth and inflation to increase modestly in EM as flows return to the asset class. This should keep carry attractively high, while EM currencies could make a disproportionately large contribution to total return.

This report is structured as follows: Section 2 examines the relationship between currencies and inflation from theoretical and empirical perspectives. Section 3 suggests reasons why conventional FX pass-through is absent from the data with particular reference to the existence of finance constraints in EM. Section 4 discusses other determinants of FX pass-through, including government intervention in currency markets, commodity dependence and regional factors. Section 5 presents estimates of potential returns in EM local bond markets over the next five years, including an assessment of the sensitivity of returns to currency and inflation shocks. Section 6 concludes.

## The relationship between EM currencies and inflation

It is a common perception that currencies and inflation rates are strongly negatively correlated in EM countries. That is, weaker currencies push up inflation by raising the domestic prices of imports. This FX pass-through has brutal implications for investors in EM local markets: FX pass-through implies that investors should exit not only their currency positions, but also their bond positions during bouts of FX weakness due to the associated rise in inflation. Of course, the argument also holds in reverse: when EM currencies rally import prices fall, which pushes down inflation rates and make both currencies and bonds attractive. Over the cycle, the conventional thesis of FX pass-through therefore leads to the conclusion that EM local bond markets are bull-market instruments and therefore only suitable for trading rather than strategic allocations.

However, there are equally strong theoretical reasons why currency weakness can be deflationary. For example, if a downturn in global economic activity pushes down tradeable prices, say the price of oil, by more than currencies then the domestic price of tradeables can decline even if currencies weaken. Another possibility is that a bout of currency weakness makes foreign investors pull capital from EM, which in turn precipitates a slowdown in growth and inflation. The Box below explains this theoretical ambiguity in greater detail.

Given the theoretical ambiguity about the direction and extent of the relationship between currencies and inflation what does the data show? In the next section we examine the link between inflation and currencies using country and index-level data.

## There is no consistent evidence in support of the conventional FX pass-through thesis in country-level data. The evidence at index level is even more damning

### a) Country-level evidence

In order to examine the relationship between currencies and inflation we ran individual simple regressions of nominal exchange rates on CPI inflation for the fifteen EM countries in the JP Morgan local currency government bond index (GBI EM GD).<sup>1</sup> Since nominal exchange rates are denoted in units of local currency per USD it follows that a statistically significant positive coefficient supports the thesis of conventional FX-pass-through. Conversely, a negative coefficient implies that weaker currencies are associated with lower inflation in direct contradiction to the thesis of FX pass-through.

Table 1: Regressions: Exchange rates on CPI inflation<sup>2</sup>

Country	Conventional FX pass-through?	Statistically significant?	Coefficient	t-value	R-squared
Brazil	YES	Yes	0.999	11.584	45%
Chile	YES	Yes	0.811	2.037	2.60%
Colombia	YES	Yes	1.625	11.346	44%
Hungary	NO	Yes	-4.855	-10.432	43%
Indonesia	YES	No	0.255	1.224	1.90%
Malaysia	NO	No	-0.382	-0.865	0.05%
Mexico	NO	Yes	-0.638	-6.715	21.70%
Peru	NO	No	-0.429	-0.488	0.04%
Philippines	YES	No	0.478	0.567	0.06%
Poland	NO	No	-1.253	-1.31	3.80%
Romania	NO	Yes	-2.446	-5.348	16.30%
Russia	YES	No	0.031	0.343	0.01%
South Africa	YES	Yes	0.881	4.537	11.20%
Thailand	NO	No	-0.135	-0.231	0%
Turkey	YES	Yes	-0.26	-2.869	4.80%

Source: Ashmore, Bloomberg.

### FX pass-through in theory

Theoretically, the link between currencies and inflation is ambiguous. The ambiguity can best be illustrated with reference to the equation 1, which shows that domestic inflation,  $CPI_{LC}$ , is the weighted sum of inflation of non-tradable goods and services,  $CPI_{LC}^{NT}$ , and domestic inflation of tradable goods and services,  $CPI_{FX}^T \times ER_{FX}^{LC}$ . The coefficients  $\alpha$  and  $\beta$  are the weights of non-tradable and tradable goods and services in the overall inflation index and the subscripts  $LC$  and  $FX$  denote local and foreign currencies, respectively:

$$\text{Equation 1: } CPI_{LC} = \alpha CPI_{LC}^{NT} + \beta (CPI_{FX}^T \times ER_{FX}^{LC})$$

Conventional FX pass-through – the notion that weaker currencies cause higher domestic inflation – is clearly a theoretical possibility, because of the existence of nominal exchange rate term,  $ER_{FX}^{LC}$ , in the second argument of equation 1. Tradable goods and services are bought and sold abroad in foreign currency, so their contribution to domestic inflation depends not just on the foreign price level,  $CPI_{FX}^T$ , but also on the nominal exchange rate.

However, equation 1 shows that other conditions must also be satisfied for the conventional FX pass-through thesis to hold. For example if the foreign prices of tradeable goods and services fall more than EM currencies then the overall contribution to overall inflation from tradables can be negative. In 2008/2009, oil prices fall by 67%, while EM currencies fall by less than half of that (28%). Also, if prices of non-tradable goods and services fall by more than the increased in the domestic price of tradable goods and services then overall inflation can also fall. These conditions can be summarised mathematically as follows:

$$\text{Equation 2: } \frac{\Delta ER_{FX}^{LC}}{-\Delta CPI_{FX}^T} > 1$$

$$\text{Equation 3: } \frac{\Delta (CPI_{FX}^T \times ER_{FX}^{LC})}{-\Delta CPI_{LC}^{NT}} > 1$$

In other words, conventional FX pass-through is a special case, which only holds if [2] and [3] are satisfied.

<sup>1</sup> Note that the statistical significance and the size of the coefficients in these simple regressions may well be overstated, since simple regressions suffer from omitted variable bias and potential spurious correlations due to non-stationarity. However, to the extent this is true it only strengthens the argument against conventional FX pass-through.

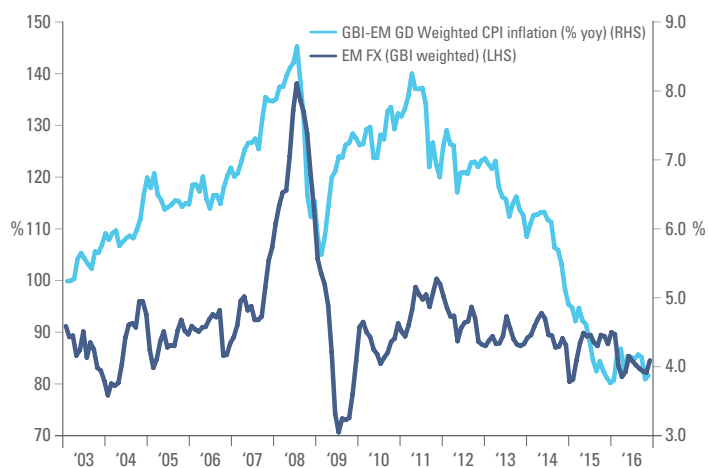
<sup>2</sup> The dependent variable was CPI inflation and the independent variable was the nominal exchange rate (e.g. USDBRL). Data was monthly from January 2003 to December 2016, in logarithmic form. A three period lag was used between exchange rates and CPI inflation.

The main observation from Table 1 is that there is no consistent evidence in support of the conventional FX pass-through thesis. Seven countries exhibit conventional FX pass-through, while eight countries have negative FX pass-through. The relationships between inflation and currencies are only statistically significant in half of the sample and within this subset exactly half – Brazil, Chile, Colombia and South Africa – exhibit signs of conventional FX pass-through, while the other half – Mexico, Romania, Hungary and Turkey – display the opposite relationship between currencies and inflation. Put bluntly, the relationships between currencies and inflation are so random across the sample that they could just as well have been generated through endlessly repeated random coin tosses.

### b) Index level evidence

The evidence at index level is even more damning of the conventional thesis of FX pass-through. We weighted currency and inflation indices of the countries in the JP Morgan GBI EM GD index by their respective weight in the index for the full life of the index (Dec 2003 through 2016). As Chart 1 shows, EM currencies appreciated by 46% between 2003 and 2008 followed by a long period of meaningful depreciation (43%) between 2011 and 2015. These two episodes were briefly interrupted by a wobble around the time of Developed Market Crisis of 2008/2009 during which currencies fell and then recovered sharply.

Chart 1: **EM FX and inflation**<sup>3</sup>



Source: Ashmore, Bloomberg, JP Morgan.

What is particularly revealing about Chart 1 is that these distinct periods of alternating currency strength and weakness have consistently been associated with higher and lower inflation, respectively. This flies in the face of the conventional thesis of FX pass-through, which predicts exactly the opposite behaviour. Specifically, inflation increased steadily during the bull period for EM currencies between 2003 and 2008. When the Developed Market Crisis struck in 2008/2009 inflation then declined sharply exactly at the same time that EM currencies crashed. As soon as EM currencies recovered in 2009-2010 inflation began to rise. When EM currencies then began their recent precipitous decline between 2011 and 2015 so did EM inflation. Inflation only stabilised in 2016 and currencies promptly followed suit.

### Why is FX pass-through a myth?

Based on the data presented in the previous section, it is difficult to avoid the conclusion that FX pass-through is a myth. The thesis of pass-through has ambiguous theoretical foundations and the data at both country and index levels reject the thesis. But why does inflation tend to rise when EM currencies rally and vice versa? The most likely explanation is that currencies and inflation are jointly determined by a third variable: capital flows.

Flows of capital from abroad are the binding constraint on economic activity in most EM countries. Hence, when foreign capital flows pick up economic activity immediately responds and inflation rises. Similarly, when foreign money leaves economic activity drops due to tighter domestic financial conditions and inflation slows. Flows also directly affect currencies, so this is why a positive link exists between inflation and currencies; the macroeconomic effect of flows dominates the exchange rate effect via import prices.

The evidence in support of severe capital constraints in EM is self-evident. EM countries now account for nearly 60% of global GDP (in PPP-adjusted terms), but less than 20% of global fixed income. Only about one third of EM countries even have access global capital markets. Moreover, capital flows within EM are highly distorted, because most institutional investors are index huggers and only 9% of EM fixed income is represented in the main EM fixed income benchmarks.

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### Other influences

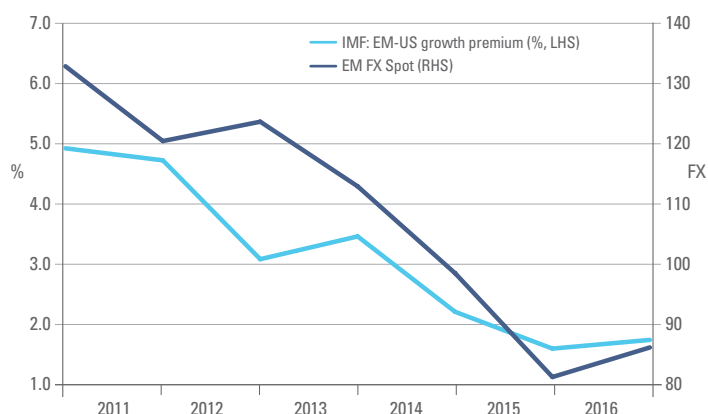
While flows through the capital account have significant effects on inflation via their impact on economic activity there are also other factors that can affect the relationship between currencies and inflation.

#### a) Current account dynamics

Currency movements clearly have the potential to impact growth rates via the current account by changing the competitiveness of exports. However, the impact via the current account is likely to be much slower than the impact via the capital account, since resources take a long time to relocate from non-tradable to tradable sectors to take advantage of cheaper currencies. The period from 2010 to 2015 is a case in point. Foreign capital began to leave EM bond markets as early as 2010 and outflows accelerated sharply after the Taper Tantrum in 2013. EM currencies began to weaken in 2010 and the EM growth premium – as well as inflation as shown in Chart 1 – reacted almost immediately. The EM growth premium eventually dropped from 6% to 2%. The current account took much longer to react, however. EM current account balances only turned in 2013, but by early 2017 the improvement was larger and broad-based.

<sup>3</sup> Inflation and currencies are both weighted by the weights used in the JP Morgan local currency government bond index (GBI EM GD) in order to replicate as closely as possible the experience of investors in EM local markets most of whom benchmark to the GBI EM GD. The data starts at index inception in January 2003 and goes through December 2016.

Chart 2: EM real GDP growth and EM FX



Source: Ashmore, IMF, Bloomberg.

### b) Government policies

Government policies also impact the relationship between currencies and inflation. Many EM governments intervene in currency markets to protect exporters, to reduce the risk of financial bubbles or simply to reduce macroeconomic volatility. Others do it to extend artificially economic upswings beyond their sell-by dates. A recent example is Brazil. When capital inflows appreciated BRL by 30% between 2007 and 2011 Brazilian Finance Minister Guido Mantega announced capital controls to prevent further appreciation. In so doing, he loosened domestic financial conditions well beyond what was warranted for macroeconomic stability. To make matters worse, he exerted pressure on a politically weak central bank to keep rates too low and discouraged efforts to save the proceeds from a powerful commodity boom. The decision to intervene in the currency market contributed to serious overheating of the Brazilian economy. The bill eventually landed on Mantega's own desk: he was fired.

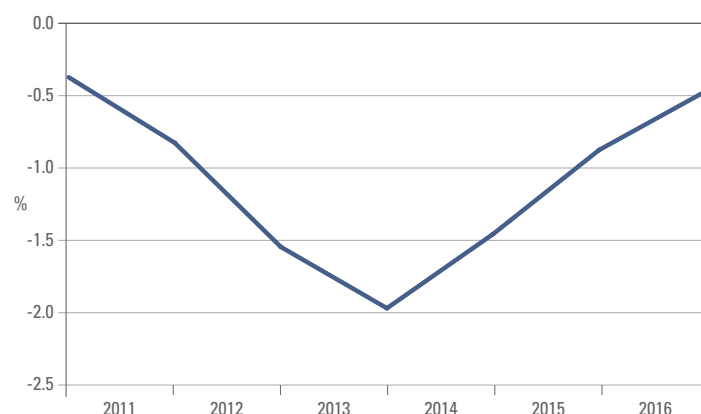
### c) Commodity dependence

The evidence linking commodity dependence and FX pass-through is ambiguous. Some of the commodity exporters in Table 1, such as Brazil, Colombia, Chile and South Africa experienced conventional FX pass-through over the sample period, but others, such as Mexico, Russia, Malaysia and Peru did not. Indeed, Mexico, Peru and Malaysia actually experienced negative FX pass-through. The same ambiguity exists in reverse: commodity importers, such as Philippines, Poland, Indonesia and Thailand, did not experience statistically significant negative FX pass-through. Commodity dependence is therefore not a reliable predictor of FX pass-through. Similar conclusions can be reached with respect to a range of other variables – for more details see Appendix 1.

### d) Regional effects

There is some evidence that currencies and inflation are more strongly linked in Latin America than elsewhere in EM. The statistical significance of the regression results in Table 1 is consistently higher for Latin American countries than for other EM countries, although the direction of the relationship is ambiguous. One hypothesis is that Latin American countries by virtue of their lower domestic savings rates rely more on external financing, which in turn makes them more prone to the vagaries of global portfolio flows.

EM current account balances (% of GDP)



Source: Ashmore, IMF, Bloomberg.

### Potential returns in the next five years

Inflows to EM are likely to pick up in the coming years due to better return prospects, stronger growth and favourable technicals. Based on the analysis above, this would suggest that EM currencies and inflation could both pick up albeit from extremely low levels. EM real exchange rates are today 20% below their peak, the most competitive levels in more than thirteen years.

Given this attractive starting point, how much upside can investors in EM local bonds expect over the next five years? The upside is obviously not unlimited. Bond returns are constrained by inflation and currency appreciation is constrained by real exchange rates. Indeed, nominal appreciation and inflation both push up real exchange rates to the point where they eventually undermine competitiveness and may even trigger recessions which then weaken nominal exchange rates and push inflation rates down again.

To reflect these natural economic constraints, we calculate returns subject to the requirement that: (a) EM real exchange rates must obey the ranges observed over the period from 2011 to 2015 (see the chart in Appendix 2); and (b) EM inflation rates must not exceed nominal bond yields, i.e. that real bonds yields must at all times remain non-negative.<sup>4</sup>

Table 2 (overleaf) summarises our five year return projections for EM local bonds subject to these constraints. Since returns are highly sensitive to the US-EM inflation differential Table 2 shows returns for the range of inflation differentials, which have prevailed over the past decade (1%-3%). Basically, the larger the rate of inflation in EM compared to the US the smaller the upside to EM bonds, because higher domestic inflation undermines competitiveness more quickly and hence causes real exchange rate appreciation. EM local bonds look attractive in all three scenarios, however, with total returns between 48.3% and 63.0% in Dollar terms.<sup>5</sup> Clearly, returns cannot be guaranteed and they will certainly not accrue in a straight line, but they are material enough that investors should focus on the big picture and not be distracted by the transitory volatility that will inevitably occur along the way.

<sup>4</sup> Inflation and currencies are both weighted by the weights used in the JP Morgan local currency government bond index (GBI EM GD) in order to replicate as closely as possible the experience of investors in EM local markets most of whom benchmark to the GBI EM GD. The data starts at index inception in January 2003 and goes through December 2016.

<sup>5</sup> We assume that EM bond yields remain stable at 6.5% over the full five years. Any returns due to capital appreciation and active management would have to be added.

Table 2: **Maximum return subject to real exchange rate and inflation constraints**

EM-US inflation differential	Maximum FX upside	Total annual return (*)	Total compounded 5-year return	% contribution from FX
1%	18.8%	10.3%	63.0%	30%
2%	13.4%	9.2%	55.1%	24%
3%	8.5%	8.2%	48.3%	18%

\*Assumes 6.5% yield.

Source: Ashmore.

Table 2 also shows that due to the very attractive starting point in real exchange rates EM FX is likely to contribute significantly to total return in the next five years. We estimate that the range for the percentage contribution of FX to total return will be from 18% to 30% of total return depending on the inflation differential.

## EM local bonds look attractive under most scenarios for EM-US inflation differentials over the next five years with total returns between 48.3% and 63.0% in Dollar terms

It is possible that EM-US inflation differentials break out of the ranges observed over the last decade. In fact, this would not be hugely surprising, since flows are subject to herd dynamics and can change quickly, though EM inflation will still be contained in the near-term since many EM countries still operate with considerable spare capacity. Inflation surprises are a greater risk in the US, because the economy is close to full employment and the Fed funds rate is still deeply negative and risks of additional fiscal stimulus are high and rising. The pronounced reliance on unprecedented unconventional monetary policies also carries its own potential inflation risks.

We have therefore estimated Dollar-returns in EM local bonds for a broader range of EM and US inflation rates – see Table 3. Suppose, for instance, that US inflation averages 5% and average EM inflation declines to 2% over the next five years then investors in EM local markets can look forward to a total return of 76.9% in Dollar terms. On the other hand, if the US inflation falls back to zero and EM inflation rises to 6% over the next five years then investors in local bonds will only get a total return of 16.4% in Dollar terms.

Table 3: **Returns for different inflation differentials**

EM inflation	US Inflation scenarios					
	0.0%	1.0%	2.0%	3.0%	4.0%	5.0%
2.0%	40.8%	47.5%	54.4%	61.6%	69.1%	76.9%
3.0%	34.3%	40.8%	47.5%	54.4%	61.6%	69.1%
4.0%	28.1%	34.3%	40.8%	47.5%	54.4%	61.6%
5.0%	22.1%	28.1%	34.3%	40.8%	47.5%	54.4%
6.0%	16.4%	22.1%	28.1%	34.3%	40.8%	47.5%

Source: Ashmore.

Finally, we estimated the sensitivity of returns to currency shocks (Table 4). We considered three different scenarios for EM currencies versus the Dollar: -10%, 0% and +10%. The startling observation about Table 4 is that investors can reasonably expect to make nearly 25% in Dollar terms even if EM currencies drop another 10% from current levels. This can be attributed in part to high yields, in part to the attractive starting point for real exchange rates. The results in Table 4 assume that EM real exchange rates migrate to their mid-point based on the range from 2011-2015.

Table 4: **Sensitivity to FX moves**

5-year EM FX move	Annual FX move	Total annual return (*)	Total compounded 5-year return (*)
-10%	-2.0%	4.5%	24.6%
0%	0.0%	6.5%	37.0%
10%	2.0%	8.5%	50.4%

\*Assumes constant 2.0% EM-US inflation differential over the five year period.

Source: Ashmore.

## Conclusion

Conventional FX pass-through is a myth. Bouts of EM currency weakness typically unleash deflationary forces, which enable central banks to cut rates, so yields can decline. This means that local bonds are not the highly pro-cyclical instruments instrument they are made out to be. Investors should therefore aim to have permanent allocations to local currency bonds while managing FX risks independently.

The empirical evidence also implies that investors can expect inflation to rise modestly in EM countries in the coming years as flows return. This should ensure that yields do not drop exorbitantly and that the upside from currencies may be

considerable. Currencies also contributed significantly to total return in local bond markets prior to Developed Market Crisis of 2008/2009.

The broad case for EM fixed income remains strong after a protracted period of severe headwinds. EM growth is picking up faster than in developed economies, yields are vastly superior and price in significant Fed hikes, technicals are benign and EM currencies are at thirteen year lows in real terms and already outperforming the Dollar.<sup>6</sup>

<sup>6</sup> We have been making the case for local currency bonds emphatically for some time. See for example: *'Emerging Markets Local Currency bonds – the stars are aligned'*, Market Commentary, August 2016. See also *'2017 Emerging Markets outlook'*, Emerging View, December 2016.



**Appendix 1****Do structural factors determine FX pass-through in EM countries?**

The thesis of FX pass-through, whereby shocks to nominal exchange rates feed into higher inflation is rarely given the same attention in rich countries as in EM countries. This is odd, because equation [1] applies equally to rich and poor countries. One reason why EM countries are seen as more susceptible to FX pass-through is that their currencies are seen as more volatile than currencies in developed economies. However, this is generally not the case. The table below shows the range and standard deviation of EM currencies from 2003 and 2017 as well as the ranges for EUR and JPY over the same period. EM currencies have only traded in marginally wider ranges and have in fact exhibited lower volatility than JPY. There is, in other words, not much difference.

Fig 1: **EM FX vs EUR and JPY** (currencies indexed=100 on 1 January 2003)

	EURUSD	JPYUSD	JGENFXGD Index
<b>Standard deviation</b>	11	17	16
<b>Range</b>	54	62	68
<b>Max</b>	152	157	146
<b>Min</b>	99	95	78

Source: Ashmore, Bloomberg.

The other reason why EM countries are perceived to be more susceptible to FX pass-through is that their structural characteristics make them more prone to this malady. On one hand, there is no doubt that EM economies are structurally less diversified and have shallower financial systems than rich countries. Indeed, those are the very characteristics that define them as EM countries. On the other hand, more rudimentary economic and financial structures do not lead automatically to the conclusion that there is greater FX pass-through, because vulnerability to FX pass-through ultimately hinges mainly on the quality of macroeconomic management. Any country that experiences a real shock must adjust through a change in nominal exchange rates and appropriate changes to fiscal, monetary and credit policies. If the adjustment is done right there will be no lasting impact on inflation, regardless of the size of the shock.<sup>7</sup> Structural economic 'simplicity' does not enter into the equation.

Still, there may be other structural characteristics that render some countries more prone to FX pass-through. These characteristics are universal, i.e. they do not apply specifically to EM countries:

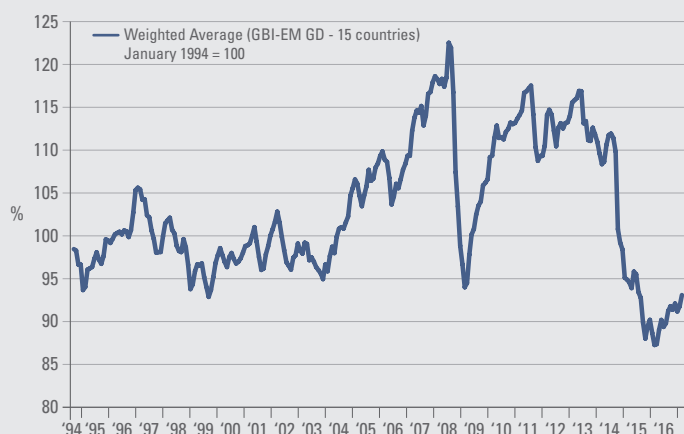
- 1) The size of the tradable sector versus the non-tradable sector ( $\beta$  and  $\alpha$  in equation [1]):** The larger the non-tradable sector the smaller the potential pass-through to overall inflation from changes in nominal exchange rates.
- 2) Spare capacity in the economy:** If the economy has spare capacity, say if demand is weak or if financial conditions are tight, such as might be the case during recessions then the income sensitivity of demand to changes in prices is likely to be higher resulting in fewer imports.
- 3) Economic flexibility:** A flexible economy would more easily 'generate' domestic substitutes for imports in response to a bout of currency depreciation, which makes imports more expensive. Economies with larger informal sectors will typically have more flexible labour markets. By contrast, countries with pervasive wage and/or price indexation, strong union power and other factors that impede the free operation of markets will typically be less well sheltered from FX pass-through.
- 4) Central bank credibility:** The speed and extent to which FX volatility is discounted by households and businesses as a source of inflation depends on the credibility of the central bank's long-term record in fighting inflation.
- 5) FX reserves:** Countries with large FX reserves should have greater capacity to smooth their currencies, wherefore currency shocks should feature less prominently in the inflation expectations formation process.
- 6) FX regime:** Fixed exchange rate regimes are often used as anchors for inflation, but if other policies are not consistent with fixed exchange rates then real exchange rates quickly become overvalued and large discrete devaluations eventually become inevitable. This is often reflected in parallel exchange rates before the actual devaluation of the official exchange rate happens. In extreme cases inflation expectations begin to reflect the parallel exchange rate. This is obviously an extreme case of inflation pass-through, which is currently confined to just a few EM countries, such as Venezuela.

<sup>7</sup> Sebastian Edwards (1989): Real exchange rates, devaluation and adjustment, MIT Press.

## Appendix 2

### Recent ranges for EM real exchange rates and EM-US inflation differentials

Fig 2: EM real effective exchange rates (GBI EM GD weighted)



Source: BIS, JP Morgan, Bloomberg, Ashmore.

The table below shows actual EM-US inflation differentials for the period from 2003 and 2007, the period from 2011 to 2015 and the average of the two periods.

Inflation Scenarios	2003-2007	Average	2011-2015
EM	5.00%	4.00%	3.00%
US	4.00%	2.00%	0.00%
Differential	1.00%	2.00%	3.00%

Source: Ashmore.

## Contact

### Head office

**Ashmore Investment Management Limited**  
61 Aldwych, London  
WC2B 4AE

T: +44 (0)20 3077 6000

[@AshmoreEM](#)

[www.ashmoregroup.com](http://www.ashmoregroup.com)

### Bogota

T: +57 1 347 0649

### Dubai

T: +971 440 195 86

### Jakarta

T: +6221 2953 9000

### Mumbai

T: +91 22 6608 0000

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