

The nature and uses of NDFs

Non-deliverable forwards have become an important tool for managing emerging market currency exposures. Where do they represent a viable alternative to traditional deliverable forwards and what does their future hold? **KAI FISHER, RAMON ESPINOSA and NILSON STRAZZI** report.

Non-deliverable forward contracts (NDFs) are an important tool for managing emerging market currency exposures. Their development has been fuelled by the rising importance of emerging market economies, and the presence of regulations and restrictions on access to domestic financial markets. They thrive in a narrow economic environment – when a country's economic mass is sufficient to generate sizeable demand for currency management tools, but actual or anticipated restrictions limit participation in the deliverable forward market. Ironically, however, NDFs help to foster the integration of emerging markets into the global economy. The end result is that the eventual liberalisation of those markets leads to the demise of markets for NDFs.

NDFs are offshore instruments (that is in terms of regulatory status, although they may operate geographically within the relevant country). They do not involve the physical delivery of currencies; instead they settle in cash in a specified currency. In addition to settlement, the pricing and risk characteristics of NDFs differ from those of deliverable forwards. In practice, however, the consequences of these differences appear slight.

THE ORIGINS OF NDFs. As emerging market countries grow in importance in the global economy, they experience a natural increase in the demand for exposure management tools involving their currencies. Multinational firms active in these countries need tools to manage the risks associated with local currency revenues and expenses. Likewise, international investors, attracted to potential returns afforded by developing financial markets, will seek tools to manage currency risks associated with cash investments in those markets or to create a tradeable exposure to such markets.

In practice, however, emerging financial markets tend to be encumbered by actual or feared regulations that limit what investors can do. Regulations may take the form of outright prohibitions on forward-settling currency transactions, limitations on access to onshore financial markets (such as restrictions that limit participation in the market to domestic entities or permit transactions only in support of documented trade or investment flow), or burdensome taxes.

Executive summary

- **NDFs have emerged in countries where there is sizeable demand for currency management tools, but participation in the deliverable forwards market is restricted. They can help foster the integration of emerging markets into the global economy.**
- **The largest NDF markets are for the Korean won and Brazilian real where regulations impede capital flows and access to onshore deliverable forward markets. The economic significance of these countries means there is a healthy demand for liquid, offshore NDF markets to provide risk management tools.**
- **NDFs settle in cash. At settlement, one party compensates the other with an amount reflecting the difference between the contracted forward rate and the value of the designated 'fixing' rate (the representative spot market rate).**
- **Although broadly similar to deliverable forwards, NDFs differ in terms of pricing and risk. The extent of any discrepancy in pricing depends on the stringency of regulations impeding flows between the markets. The less restrictive the controls, the tighter the link between offshore and onshore pricing.**
- **When it comes to risk, NDFs differ in their exposure to credit, liquidity and market risk and, for hedgers, transfer settlement and rollover risk.**

The combination of a natural demand for exposure management tools and restrictions on traditional deliverable forwards has fuelled the development of an alternative instrument for managing currency exposure – the non-deliverable forward.

According to surveys and market participants, the largest NDF markets are those for the Korean won and Brazilian real (see *Table 1*), where regulations impede capital flows and access to onshore deliverable forward markets. The economic significance of these countries, which are the world's 11th and 15th largest respectively

(based on 2003 nominal US dollar Gross Domestic Product), means there is a healthy demand for liquid, offshore NDF markets to provide risk management tools.

NDFs in other Asian, Latin American and Eastern European currencies are also traded, but volumes tend to be smaller than those for the won and real. For the larger markets (such as Brazil and Chile), ample liquidity can be found for tenors of up to three years; for smaller markets, liquidity may exist only for tenors of three to six months, and even that may prove erratic. Generally, NDFs trade in tandem with onshore, deliverable forwards. The strength of links between NDF and onshore markets depends on the breadth and development of local markets and the severity and effectiveness of controls segmenting the two sets of markets.

KEY CHARACTERISTICS OF NDFs. Designed in response to actual or feared regulations that impede access to domestic forward markets, NDFs settle in cash. At settlement, one party compensates the other with an amount that reflects the value, in the settlement currency, of any difference between the contracted forward rate and the value of the designated 'fixing' rate. The 'fixing' rate is a representative spot market rate, published by an accepted authority such as the local central bank or banking industry association. In the case of Brazilian real NDFs, illustrated in *Table 2*, the so-called PTAX rate – a weighted-average of inter-bank spot transactions published daily by the Brazilian Central Bank – serves as the fixing rate. On the valuation date, the published value of the PTAX rate is compared to the contracted non-deliverable forward rate, and the party facing a favourable differential pays the US dollar value of that differential to the counterparty facing the unfavourable differential.

Table 2 shows possible outcomes for the Brazilian real NDF. By assumption, XYZ Corp, a hypothetical US company, enters into the NDF to hedge its real revenues. Hedging with the NDF enables XYZ to protect the US dollar value of its real revenues at a rate of BRL/US\$ 2.8. On the valuation date, if the published PTAX rate shows a value of 2.70 (a stronger BRL than implied by forward rate), XYZ pays ABC Bank \$39,683 – in effect, by hedging with the NDF, XYZ foregoes

Table 1. Estimated daily turnover

	ON-SHORE FX*	NDFs***
Brazil	3000*	2000
Chile	2000	150
Argentina	1000	100
Colombia	1000	50
Peru	na	50
Korea	200000	2200
Taiwan	8000	250
China	1000*	150
Indonesia	2000	65
India	7000	38
Philippines	1000	38
Poland	6350	35
Russia	30000	na

*Estimated total (spot, forward and swap) activity. Triennial Central Bank Survey, 2004, BIS. **Spot transactions only. ***For Asian countries, 2003 estimates; for others, 2004 estimates. Sources: Bank for International Settlements, Emerging Markets Traders Association, World Bank and Bank of Scotland.

the benefit of the stronger real. Conversely, if the PTAX rate registers a value of 2.90, XYZ receives a payment of \$36,946 from ABC Bank, compensating for the weakness of the real relative to the 2.80 forward level.

Although *Table 2* illustrates the use of an NDF as a currency hedge by a non-financial corporation, international investors can use NDFs in a similar manner to manage currency exposure associated with emerging market investments. Equally significantly, investors can use NDFs to establish synthetic exposures to emerging markets, without the requirement of underlying cash investments in those markets.

COMPARING NDFs AND DELIVERABLE FORWARDS. In broad terms, non-deliverable forwards are similar to deliverable forwards – they enable multinational firms and international investors to manage exposure to emerging

Table 2. Key NDF terms and settlement examples

KEY NDF TERMS	
Trade date:	12/31/2004
Reference currency:	Brazilian real
Reference currency notional amount:	BRL 3,000,000
Notional amount:	USD 1,071,429
Forward rate:	BRL/US\$ 2.80
Reference currency buyer:	ABC Bank
Reference currency seller:	XYZ Corp
Settlement currency:	US\$
Settlement date:	3/31/2005
Settlement:	Non-deliverable
Valuation date:	2 days before settlement
Additional items:	Disruption events and fallbacks. Unscheduled holidays. Account details for payments
SETTLEMENT EXAMPLES	
#1 3/29/05 PTAX value:	2.70
Settlement:	XYZ Corp pays ABC Bank \$39,683 = \$1,071,429 – BRL 3,000,000 / 2.70
#2 3/29/05 PTAX value:	2.90
Settlement:	XYZ Corp receives from ABC Bank \$36,946 = \$1,071,429 – BRL 3,000,000/2.90

market currencies. However, in several respects – specifically pricing and risk – NDFs differ from their more common sibling.

As NDFs represent a market response to underdeveloped and restricted emerging financial markets, their pricing tends to vary from that of onshore deliverable forwards (which reflects spot and relevant interest rates). The extent of any discrepancy in pricing, however, depends on the stringency of regulations impeding flows between the markets: the less restrictive the controls, the tighter the link between offshore and onshore prices (and hence the greater the extent to which NDF prices reflect spot and interest rates). The more restrictive the regulations, the weaker the link between prices (and the greater the influence

of factors other than interest rates on NDF prices). The data in *Table 3* summarises recent trends in the pricing of NDFs and deliverable forwards for the Brazilian real. Although the NDFs have tended to price the BRL at a greater discount than deliverable forwards, prices on the two markets have been highly correlated (especially at tenors below one year), suggesting that the pricing of Brazilian NDFs is largely interest rate driven. By contrast, in a case such as Vietnam, where underdeveloped financial markets preclude trading of deliverable forwards, NDF pricing largely reflects expectations about the future spot level rather than interest rates.

In terms of risk characteristics, NDFs differ from deliverable forwards in their exposure to credit, liquidity and market risk and, for hedgers, transfer, settlement and rollover risk.

CREDIT RISK. Because offshore-traded NDFs involve major international banks as a counterparty in the transaction, they enable hedgers and investors to avoid direct credit exposure to emerging market entities. For multinational firms seeking to limit emerging market exposure and investors seeking to establish it carefully, this feature of NDFs adds to the instrument's appeal.

LIQUIDITY. As NDFs involve emerging market currencies, their markets are inherently less liquid and more exposed to fluctuations in liquidity than the markets for major currencies. *Figure 1* shows

Table 3. BRL forward discounts versus the US dollar

	1 month		3 month		6 month		12 month	
	USD/BRL bid	USD/BRL ask	bid	ask	bid	ask	bid	ask
NDFs Ave disc/prem (+/-)	1.1%	1.2%	3.4%	3.6%	6.6%	6.9%	13.0%	13.4%
Deliverable forwards Ave disc/prem (+/-)	1.0%	1.2%	3.3%	3.4%	6.5%	6.6%	12.4%	12.6%
Difference	0.1%	0.0%	0.1%	0.1%	0.2%	0.3%	0.5%	0.8%
Correlation (NDF – On shore)	93.8%	95.5%	93.6%	96.0%	90.1%	94.7%	68.1%	85.6%

*Not annualised. Source: Bloomberg and Bank of America estimates

average bid-ask spreads over the past year for a sample of currencies, illustrating the liquidity characteristics of emerging market currencies. NDFs tend to have wider and more volatile spreads – especially at longer tenors – than the deliverable forwards of major currencies. The Argentine peso, Indonesian rupiah, and Russian ruble in particular are vulnerable to extreme fluctuations in liquidity. The spreads for other NDFs, however, suggest exposure to fluctuations in liquidity comparable to that of emerging market currencies traded via deliverable forwards, such as the Hungarian forint and South African rand.

MARKET RISK. Although NDFs can face considerable exposure to market risk, it is not significantly greater than that of the deliverable forwards of other emerging market currencies or major currencies (see *Figure 2*). One difference, however, is the fact that the rate volatility of NDFs tends to increase with tenor, while that for deliverable forwards (both emerging market and major currencies) does not tend to rise with the tenor. By implication, the forward premia/discounts of NDFs appear more volatile than those for deliverable forwards.

For risk managers using NDFs to hedge emerging currency exposures, the instrument's cash settlement, based upon the observed difference between the agreed-upon forward rate and the value of the designated fixing rate, leaves hedgers exposed to transfer, basis and rollover risk:

- **Transfer risk:** When used, say, to hedge foreign currency revenues, an NDF provides compensation for any difference in value between the agreed-upon forward rate and the fixing rate. The hedger, however, retains responsibility for executing the spot sale of its underlying foreign revenue. As such, the NDF provides no protection against the imposition of foreign currency controls that impede that spot transaction or the transfer of funds;
- **Basis risk:** Even if able to execute the underlying spot transaction, the hedger is unlikely to execute it at the same rate as the fixing rate used to settle the NDF. As such, firms hedging with NDFs retain exposure to basis risk between the fixing rate and the rate on the underlying spot transaction;
- **Rollover risk:** Finally, if short-term NDFs are employed as hedges of longer-lived assets or liabilities, the periodic rolling of the NDFs upon their expiry will result in rollover risk – a cumulative version of the previous basis risk. This is because the fixing rate used to settle each expiring hedge is unlikely to match the spot rate used to establish the forward rate on each new hedge. To mitigate this risk, hedgers

Figure 1. Average bid/ask spread (% spot mid-rate)

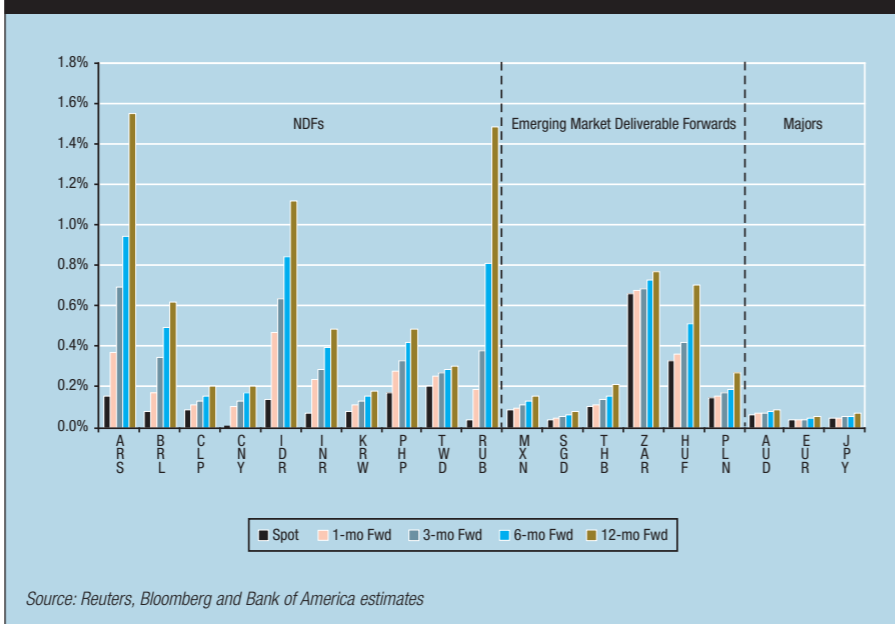
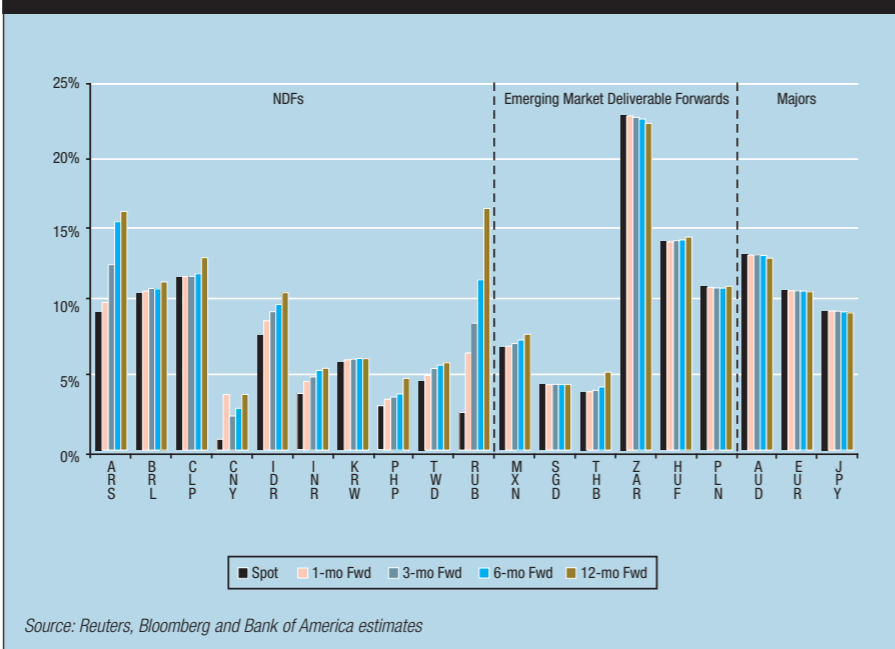


Figure 2. Annualised volatilities of NDFs and deliverable forwards



should use forward-forward swaps (initiated a day or two before the expiry of a hedge to be rolled) to roll NDF hedges. The forward-forward swap ensures that a single/common spot rate is used both to settle the expiring hedge and to establish the forward rate associated with the new NDF.

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