SPECIAL FEATURES

A GLOBAL SAFE ASSET SHORTAGE, NON-TRADITIONAL RESERVE CURRENCIES AND THE GLOBAL FINANCIAL CRISIS[16]

The share of global reserves invested in non-traditional currencies, such as the Australian or the Canadian dollar, has increased significantly since the onset of the global financial crisis, reaching a 40-year peak of more than 6% at the end of 2012. This marked increase has occurred against the backdrop of growing discussions about a possible shortage of safe assets globally and a perceived worsening in the credit risk of several major advanced economy sovereigns.

This special feature reviews key developments regarding the emergence of non-traditional reserve currencies as well as the determinants of their growing importance since the outbreak of the global financial crisis. It shows that non-traditional reserve currency issuers are characterised by a track record of rapid and resilient growth, price stability and sound public finances. However, their debt security markets are markedly thinner and less liquid than those of major reserve currency issuers, which may act as a drag on the role of non-traditional currencies as reserve assets in the future. In addition, the special feature shows that higher risk aversion in foreign exchange markets and perceptions of a heightened credit risk of some advanced economy sovereigns have been two contributing factors to the increasing share of non-traditional currencies in global reserve portfolios, while traditional factors such as diversification and trade relations with the issuers of non-traditional reserve currencies have been less relevant.

I INTRODUCTION

Foreign exchange reserve holdings of central banks are traditionally invested in liquid financial assets denominated in the major floating currencies, namely the US dollar, the euro and – to a lesser extent – the pound sterling and the yen. About 95% of all global foreign exchange reserve holdings for which the composition is disclosed are invested in these four currencies. The fact that these four major reserve currencies are the only units (along with the Swiss franc) reported by the IMF in its statistics on the currency composition of official foreign exchange reserves (COFER) further illustrates their dominant reserve currency status. In addition, these four currencies are used to calculate the special drawing right.

The outbreak of the European sovereign debt crisis together with the credit downgrades of previously highly-rated sovereigns have triggered growing discussions about a possible shortage of assets perceived as safe and the potential implications for global financial stability (see Caballero, 2010; Garcia, 2011; Gourinchas and Jeanne, 2012). Such implications may stem from the key role of safe assets in global financial markets, including their use as a reliable store of value and reserve instruments, as collateral in repurchase and derivatives markets, as the main vehicle to fulfil prudential requirements and as a benchmark for the pricing of other financial assets (IMF, 2012).

Against this backdrop, there is tentative evidence that central banks have recently started to diversify part of their reserve portfolios into non-traditional currencies, albeit in still modest amounts. These "other" currencies (i.e. other than the US dollar, euro, pound sterling, yen and Swiss franc) accounted for more than 6% of global reserve holdings at the end of 2012, according to the IMF COFER data, standing at a four-decade high. In addition, the Australian dollar and the Canadian dollar are planned to be reported as separate items in these data. Many market participants consider

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this as an explicit recognition of the accession of these units to full reserve currency status (see e.g. State Street Global Markets, 2012).
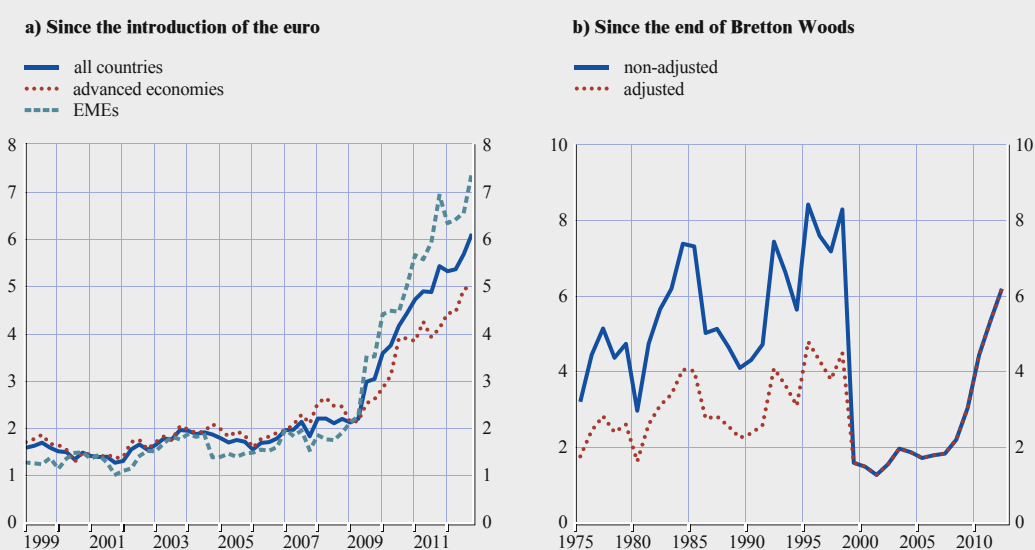
Section 1.2 of this special feature reviews selected stylised facts on the emergence of non-traditional reserve currencies. It examines, in Section 1.3, the extent to which non-traditional reserve currencies meet the standard criteria associated with international reserve currency status. Empirical estimates of the determinants of their growing importance in global reserve holdings (based on a unique dataset of 47 countries covering the period 1999-2012) are presented in Section 1.4. Section 1.5 provides concluding remarks.

2 STYLISED FACTS ON THE EMERGENCE OF NON-TRADITIONAL RESERVE CURRENCIES

The share of global foreign exchange reserves invested in non-traditional currencies has increased significantly since the onset of the global economic crisis (see Chart 22a). It almost tripled between mid-2007 and the end of 2012, from about 2.1% of globally disclosed foreign exchange reserve holdings to 6.2%. An equivalent of about USD 372 billion worth of central bank reserves is now known to be held in these currencies, which is above the figure for those held in yen or in pound sterling.[17] The increase in the holdings of emerging market economies – which hold the bulk of global reserves – is especially noteworthy. The share of their investments in non-traditional currencies has more than tripled in just five years, from 1.9% in mid-2007 to 7.6% at the end of 2012.[18] In advanced and emerging economies alike, the increase is noticeably steep after the third quarter of 2009, which

Chart 22 Share of non-traditional currencies in global reserves

(as a percentage of total)

a) Since the introduction of the euro
- all countries
- advanced economies
- EMEs

b) Since the end of Bretton Woods
- non-adjusted
- adjusted

Sources: IMF COFER data and ECB staff calculations.
Note: The adjustment in the share of non-traditional currencies prior to 1994 assumes that 55% of the share of "unspecified currencies" reported by the IMF – which included "other" and "non-identified" currencies – is accounted for by non-traditional reserve currencies.

17 Reserves denominated in pounds sterling and yen accounted for 3% and 4.7% of globally disclosed reserves in the fourth quarter of 2012.
18 Valuation effects, arising from the marked appreciation of some of the non-traditional reserve currencies since the global economic and financial crisis, have played a limited role in these developments.

Table 3 Survey-based evidence of diversification into non-traditional reserve currencies				
(as a percentage of respondents)				
	Investing in	Considering investing in now	Would consider investing in 5-10 years	No interest in investing
Advanced economy currencies				
Australian dollar	61	18	14	7
Canadian dollar	53	26	13	8
New Zealand dollar	36	9	28	28
Norwegian krone	37	12	24	27
Emerging market currencies				
Brazilian real	7	7	32	55
Chinese renminbi	14	27	37	22
Indian rupee	4	6	34	55
Russian rouble	7	7	26	61

Source: RBS (2013, p.22).
Note: Overview of survey responses to the following question: "Which view best describes your attitude to the following currencies (please tick one per currency)?"

marked the onset of the intensification of the sovereign debt crisis in advanced economies. From a longer-term perspective, these developments are more remarkable still. According to estimates, at the end of 2012 the share of global reserves held in non-traditional currencies was the highest it had ever been since the end of the Bretton Woods system, i.e. some 40 years ago (see Chart 22b).[19]

Recent evidence from a regular survey of reserve managers (RBS, 2013) confirms that the Australian and the Canadian dollar are among the most popular non-traditional reserve currencies. In this survey, over half of the respondents – with USD 3.8 trillion in assets under management – indicated that they already invest in these currencies (see Table 3). The Chinese renminbi also appealed to some reserve managers, but its lack of convertibility was often cited as an obstacle to investment. Within the next five to ten years, however, 37% of the respondents indicated that they would consider investing in the Chinese renminbi.[20] Fewer reserve managers would consider investing in other emerging market currencies, such as the Brazilian real, Indian rupee or Russian rouble.

3   DETERMINANTS OF INTERNATIONAL RESERVE CURRENCY STATUS

Reserve currencies are typically issued by large economies (in terms of global output and trade) that have deep and liquid financial markets along with a record of price stability.[21] How do non-traditional reserve currencies score by these measures? Non-traditional reserve currency issuers are characterised by a track record of resilient growth, price stability and sound public finances (see Table 4).

The emergence of non-traditional reserve currencies is constrained by the fact that bond markets denominated in these currencies are markedly thinner and less liquid than those of major reserve currency issuers. The outstanding amounts of international bonds and notes denominated in traditional reserve currencies exceed USD 15 trillion (see Table 4). Those denominated in

19 This estimate corrects for the fact that the IMF does not report data on reserves invested in non-traditional (i.e. "other") currencies prior to 1994, but only on reserves invested in "unspecified" currencies (i.e. including both "other" and "unidentified" currencies). It is assumed that 55% of the share of "unspecified currencies" reported by the IMF – which included both "other" and "non-identified" currencies – is accounted for by non-traditional reserve currencies (55% being the average share of these currencies between 1994 and 1999, i.e. when the two series overlap).
20 The possible future role of the Chinese renminbi is discussed in detail in Special Feature B of this report.
21 See e.g. Chinn (2012) and Chinn and Frankel (2008 and 2007) for a survey of the traditional determinants of reserve currency choice.

Table 4 Reserve currency characteristics

Indicator	Unit	Traditional reserve currency issuers	Non-traditional reserve currency issuers
Size of the economy	GDP, USD billions (2011)	37,104	4,132
Size of the trade sector	Exports plus imports, USD billions (2011)	19,859	2,603
Size of bond market	USD billions (2012 Q2)	72,507,331	5,153,637
Size of international bond market	USD billion (2012 Q4)	15,162	2,046
Inflation	CPI, average (January 1999 – September 2012)	1.4	2.1
GDP growth	Average (1999-2011)	1.6	2.5
Sovereign rating	Long-term foreign currency rating by S&P	AA+	AAA
General government gross debt	(percentages of GDP)	114.6	50.3

Sources: IMF, World Bank, BIS, Standard and Poor's and ECB calculations.
Notes: Traditional reserve currency issuers include the United States, the euro area, Japan, Switzerland and the United Kingdom. Non-traditional reserve currency issuers include Australia, Canada, Norway and Sweden. Both aggregates show unweighted averages or sums in the case of size measures. The size of the bond market refers to total debt securities issued by residents in the respective countries, irrespective of the currency of denomination.

non-traditional reserve currencies including the Canadian dollar and the Australian dollar are considerably smaller (at about USD 2 trillion).

Other factors that work against a growing role for non-traditional reserve currencies include network externalities and lock-in effects, which tend to benefit incumbent currencies and lead to significant inertia in the composition of global reserve portfolios.[22] If reserves are mainly held for precautionary or insurance motives – e.g. to pay for imports of goods and services, to service external debt or to provide a cushion against sudden stops in capital flows – central banks have limited interest in diversification. Therefore, even large reserve holdings, to the extent that they are held for precautionary reasons, are not necessarily more diversified.[23] In line with this, the build-up in reserves by emerging economies since the Asian crisis has largely been interpreted as a shift towards a preference for self-insurance against sudden stops in capital flows.[24]

Other factors might have contributed to the growing importance of non-traditional reserve currencies in global foreign exchange reserves. One such factor might be risk and return motives, i.e. the fact that central banks might wish to invest part of their reserves (e.g. the fraction not held for precautionary reasons) in non-traditional currencies to enhance returns and achieve a more diversified reserve portfolio. This is supported by a long-standing body of literature which derives the optimal currency composition of official reserves as the solution to a mean-variance optimisation problem à la Markowitz.[25] In this framework central banks maximise the risk-adjusted return of their reserve holdings in a similar way to private investors, albeit with a smaller risk appetite parameter or additional hedging considerations.[26] Hence central banks could invest in non-traditional currencies if they expect attractive returns (not least since the Australian and the Canadian dollar, for example, have both appreciated markedly in the last decade) or if they consider these currencies helpful in lowering the variance of their portfolio because they might be negatively correlated with traditional reserve assets.

22 See e.g. Krugman (1980) and (1984), as well as Matsuyama, Kiyotaki and Matsui (1993).
23 See e.g. Beck and Weber (2011).
24 See e.g. Aizenman and Lee (2008), Jeanne and Rancière (2011) or Obstfeld, Shambaugh and Taylor (2010), who find strong empirical support for this hypothesis. Non-linearities might also be at play. The larger the reserve holdings of a country are, the more likely it is that that country might move prices against its reserve positions involuntarily, and the weaker is its incentive to diversify into non-traditional currencies.
25 See Ben-Bassat (1980) for an earlier contribution, as well as Dooley (1983), Dooley et al. (1989), Dellas and Yoo (1991), and Papaioannou et al. (2006).
26 Beck and Rahbari (2011) consider the case where central banks hedge against sudden stops in capital inflows.

Mercantilist motives might be a further factor. The recent accumulation of foreign reserves in non-traditional currencies may arise from concerns about export competitiveness losses vis-à-vis countries issuing these currencies. Such motives also seem to partly explain the large build-up in foreign exchange reserves in emerging economies in recent years (see e.g. Dooley et al., 2003). Given that trade linkages with countries issuing non-traditional reserve currencies have strengthened (with several of them being commodity producers which face growing demand from emerging economies), the incentive to increase portfolio exposure to these currencies might, in turn, increase.[27] The fact that several non-traditional reserve currencies have appreciated strongly over the last decade works prima facie against the hypothesis that competitiveness concerns have become more pressing, however.

A final factor might stem from the tight risk management standards typically applied in central bank reserve management in connection with recent changes in risk appetite in foreign exchange markets and perceptions of increased credit risk among the traditional issuers of reserve currencies. In the recent period non-traditional reserve currency issuers have, on average, received higher sovereign credit ratings than traditional reserve currency issuers (see Table 4). In addition, survey-based evidence suggests that the euro area sovereign debt crisis, along with the downgrading of US government debt by one rating agency, has triggered a "profound debate about the future of reserve management" (RBS, 2012, p. 1). As this survey evidence puts it, challenges regarding the two major reserve currencies have "sharply increased interest in non-traditional currencies" (ibid). It also suggests that such considerations are indeed taken into account by central bank reserve managers.[28]

4   EMPIRICAL ESTIMATES

In order to shed light on the relative importance of alternative potential explanations for the rising importance of non-traditional reserve currencies, Table 5 reports panel estimates of the determinants of the share of non-traditional reserve currencies in a sample of 47 countries – i.e. all countries that publish data on their holdings of reserves denominated in currencies other than SDR currencies – over the period 1999-2012.[29] The estimates include standard determinants of reserve currency choice, namely persistence, stability and liquidity metrics. They also include a range of alternative determinants relating to (i) precautionary, (ii) mercantilist and (iii) diversification motives, as well as to (iv) changes in risk appetite in foreign exchange markets and in perceptions of the credit risk of advanced economy sovereigns.[30] Finally, the estimates control for fixed effects and time effects.

The overall model explains reasonably well the heterogeneity of the share of non-traditional currencies over time and across countries (fitting about 80% of the latter's variance; see also Chart 23). Persistence is found to exert a statistically significant effect, confirming the relatively

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27 Heller and Knight (1978) find that a country's exchange rate regime and its trade patterns are significantly related to the currency composition of its reserves. Dooley et al. (1989) and Eichengreen and Mathieson (2000) find similar evidence for such a trade channel, as well as for a financial channel in the form of the currency composition of external debt or financial flows. Dellas and Yoo (1991) note, however, that the currency composition of reserves should be related to the currency denomination of imports.

28 78% of respondents to the survey also indicated that the euro area sovereign debt crisis had "impacted" their reserve management strategy. Moreover, 8% of respondents stated that the S&P rating downgrade of the United States in August 2011 had put the reserve currency status of the US dollar "at risk".

29 Such data are made publicly available in the framework of the IMF's Data Template on International Reserves and Foreign Currency Liquidity and may include reserves denominated in the Swiss francs, which is considered a traditional reserve currency. However, the IMF data on the currency composition of global foreign exchange reserves suggest that the share of Swiss franc holdings in total reserves is relatively small.

30 In an alternative specification, it is shown that the VIX as an indicator of risk aversion related to global stock market volatility is not statistically significant, in contrast to a more narrow measure of risk appetite in foreign exchange markets.

Table 5 Panel estimates of determinants of the share of non-traditional reserve currencies

(47 countries; 1999-2012)

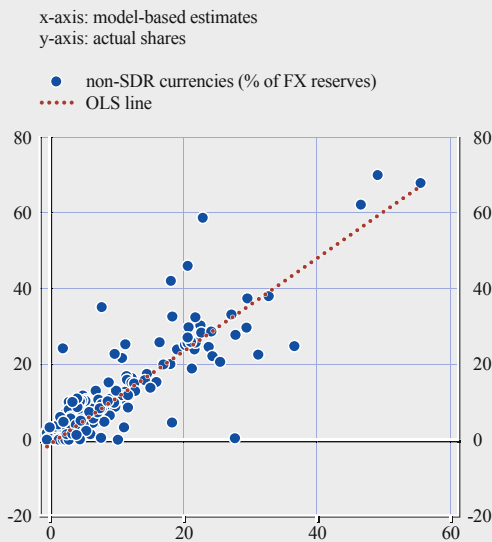|	Standard	Precautionary		Mercantilist		Diversification		Perceived	safety
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Persistence	0.838***	0.838***	0.751***	0.838***	0.864***	0.510***	0.837***	0.838***	0.752***
	(0.063)	(0.063)	(0.120)	(0.063)	(0.074)	(0.176)	(0.064)	(0.063)	(0.062)
Stability	-0.096	-0.095	0.112	-0.202	-0.467	-0.487	-0.200	0.206	-0.249
	(0.607)	(0.608)	(0.289)	(0.575)	(0.457)	(0.321)	(0.426)	(0.575)	(0.581)
Liquidity	0.770	0.760	1.182*	0.717	0.954*		1.099**	0.714	
	(0.984)	(0.999)	(0.631)	(0.947)	(0.495)		(0.513)	(1.038)	
Bilateral imports		0.021							
		(0.134)							
External debt			-0.016						
			(0.038)						
Export growth				0.006					
				(0.016)					
Overvaluation					0.018				
					(0.025)				
Excess reserves						0.037			
						(0.071)			
Hedging							-0.090		
							(1.339)		
Risk appetite								-0.023*	
								(0.013)	
Credit risk									0.019*
									(0.012)
Constant	-1.339	-1.365	-3.671	-0.880	-1.363	2.064**	-2.698	-1.164	2.310*
	(3.247)	(3.224)	(2.387)	(3.708)	(2.119)	(0.845)	(2.320)	(3.972)	(1.220)
Observations	461	461	246	461	392	172	461	461	379
R^2 (overall)	0.823	0.826	0.728	0.826	0.803	0.645	0.823	0.826	0.809

Sources: Beck and Mehl (2013).
Notes: Estimates obtained with a fixed effect estimator and controlling for time effects. The standard errors reported in brackets are robust to heteroskedasticity and clustered heterogeneity; *** p<0.01, ** p<0.05, * p≤0.11.
Persistence: lag of the share of non-traditional reserve currencies. Stability: domestic inflation in Australia and Canada. Liquidity: share of Canada and Australia in the global stock of debt securities. Bilateral imports: imports from Australia and Canada to total imports. External debt and export growth: external debt-to-GDP ratio and nominal export growth in USD. Overvaluation: real effective exchange rate deviation from a time trend. Excess reserves: residual of a regression of reserves-to-GDP on a range of precautionary and mercantilist determinants of reserve accumulation. Hedging: average correlation coefficient between returns in AUD-USD and CAD-USD, on the one hand, and EUR-USD, on the other hand. Risk appetite: carry-to-risk ratios (long AUD-USD/CAD-USD short JPY/USD) for the three-month maturity. Credit risk: differential of the CDS sovereign spreads of major reserve currency issuers (United States, euro area, Japan and United Kingdom) relative to those of Australia and Canada. See Beck and Mehl (2013) for more details on the estimation and the results, as well as for robustness checks and sensitivity tests.

prudent portfolio management style of central bank reserve managers. Stability and liquidity are both found to have effects in line with theoretical priors (higher inflation reduces the share of non-traditional currencies; greater liquidity increases it), albeit statistically insignificant. Alternative determinants relating to precautionary, mercantilist and diversification motives are not found to exert statistically significant effects either. This contrasts with changes in risk appetite in foreign exchange markets and in perceptions of credit risk among the issuers of traditional reserve currencies, which are both found to have statistically significant and economically meaningful effects.[31] The aforementioned results are robust to the inclusion of additional control variables such as the VIX index, an EMU membership dummy variable, terms of trade, imports relative to

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31 As a metric of the former, the carry-to-risk ratios (based on a long Australian dollar/Canadian dollar-short yen position) and, as a metric of the latter, the differential between the sovereign CDS spreads of traditional reserve currency issuers (average of the United States, the euro area, Japan, the United Kingdom and Switzerland) relative to that of the (average) Australian and Canadian sovereigns are used.

Chart 23 Model fit

x-axis: model-based estimates
y-axis: actual shares

● non-SDR currencies (% of FX reserves)
⋯⋯ OLS line

Sources: Beck and Mehl (2013).
Note: The chart plots the average share of non-standard currencies in foreign exchange reserve holdings across all country-year observations for a sample of 47 countries between 1999 and 2012 against the fitted share obtained with the benchmark model estimates.

Chart 24 Estimated impact on the share of non-standard reserve currencies

(percentage points)

y-axis: increase in non-SDR currencies' share (p.p.)

■ short term
▦ long term
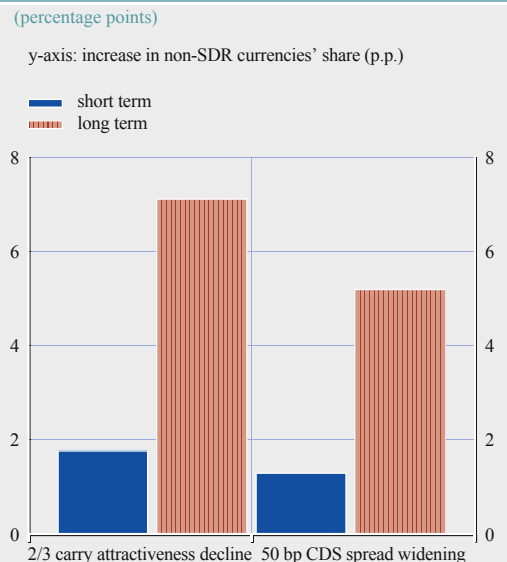
Sources: Beck and Mehl (2013).
Note: The chart shows the estimated short-term and long-term impact (in percentage points) on the share of non-standard currencies in the foreign exchange reserves of the sample's 47 countries of changes in risk appetite in foreign exchange markets and in perceptions of credit risk among issuers of traditional reserve currencies under two scenarios: (i) a two-thirds decline in carry trade attractiveness and (ii) a 50 basis point widening in the differential of the CDS sovereign spreads of major reserve currency issuers relative to those of Australia and Canada.

GDP and exchange rate flexibility. With respect to potential endogeneity, system GMM estimates suggest that relations between the variables may not necessarily be causal, however.[32]

Chart 24 gives more indications of the magnitudes involved. It shows the estimated short-term and long-term impacts (in percentage points) on the share of non-standard reserve currencies of (i) two-thirds decline in risk appetite in foreign exchange markets and (ii) a 50 basis point widening in the sovereign CDS spreads of major reserve currency issuers relative to those of Australia and Canada (two scenarios fairly close to actual developments during the crisis). The estimated effects are large.[33] Higher risk aversion in foreign exchange markets is associated with an almost 2 percentage point increase in the share of non-standard currencies in the short term (and 7 percentage points in the long term). Perceptions of a heightened credit risk for major reserve currency issuers are associated with about a 1 percentage point increase in the share of non-standard currencies in the short term (and 5 percentage points in the long term). This is broadly comparable with the actual increase in the share of non-traditional reserve currencies, i.e. about 5 percentage points in our sample between 2007 and 2012, hence underscoring that higher risk aversion in foreign exchange markets and perceptions of a

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32 Owing to instrument proliferation arising from the relatively small number of cross-sectional units relative to the time dimension of the panel dataset, these system GMM estimates should be interpreted with caution, however.

33 The effects shown in Chart 28 stem from separate ceteris paribus exercises. They are therefore not additive and cannot be considered to be contributions if the explanatory variables are correlated.

heightened credit risk for some advanced economy sovereigns have been two contributing factors to the increasing share of non-traditional currencies in global reserve portfolios.

5 CONCLUDING REMARKS

Within the investment universe of globally safe assets, which has become smaller owing to rating downgrades of major advanced economies, the share of non-traditional reserve currencies in global foreign exchange reserves (among countries which disclose such information) has increased markedly since 2009, albeit from a low level. The results presented in this special feature tentatively suggest that this increase cannot be explained by traditional factors which used to largely determine the portfolio allocation of central bank reserves. In particular, precautionary reserve holdings, for example due to trade relations with the issuers of non-traditional reserve currencies, do not appear to be associated with the increase in non-traditional reserve holdings. Reserve portfolio diversification – which was put forward as one way to reduce the cost of large reserve holdings prior to the crisis – does not explain the increase in non-traditional reserve holdings either.

Two other factors which appear to be more novel drivers of reserve currency choice appear to largely explain the increase in non-traditional reserve holdings: perceptions of increased credit risk among the traditional issuers of reserve currencies and risk aversion in foreign exchange markets, both of which have intensified since 2009.

Overall, the use of new reserve currencies such as the Australian and the Canadian dollar reflects temporary and structural factors alike. The lack of large, deep and liquid financial markets limits their potential to become truly major reserve currencies, however. In addition, the growing use of such currencies might decelerate to the extent that market conditions normalise and all major advanced economy sovereigns introduce and implement ambitious and credible medium-term fiscal consolidation plans.

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