The demand for currency in Malta

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February 2014

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Introduction

Money serves four main purposes, namely serving as the main medium of exchange in a modern economy, a store of value, a unit of account and a source of deferred payment.[1] Like any commodity, demand for currency, the most liquid form of money, is mainly driven by price and income variables. Currency is needed to conduct transactions, but holding cash has its cost, as its value is eroded by inflation while no interest is earned on it.

In traditional classical theories like Fisher's quantity theory,[2] money does not have any intrinsic utility and serves only as a means of facilitating exchange. The quantity of money is related to the volume of transactions multiplied by the price level of goods and services traded by means of the velocity of circulation. The latter, while assumed to be stable in the immediate future, is deemed to move over time due to changing preferences and payment systems. Therefore, demand for money in this view is solely driven by transactions demand and by changes in payment system arrangements or in consumer payment habits.

In contrast, another strand of the literature, known as the Cambridge approach, argued that money demand played a more substantive role.[3] Rather than being determined by the volume of transactions and by the payments system, currency was seen as demanded in its own right, as a store of value that is convenient and secure. These economists emphasised the role of interest rates, wealth and inflation in helping to determine the demand for money. This was more rigorously defined by Keynes,[4] who developed the concept of precautionary demand (i.e. money kept for contingencies) and of speculative demand (i.e. currency holdings seen also as a reflection of portfolio choices and expectations). These ideas influenced and were, to some extent, incorporated in many other later theories, such as those developed by Friedman in the late 1950s.[5]

Given the importance of understanding the precise nature of money demand, especially the stability or not of this function, for monetary policy purposes, many empirical studies have been undertaken in this area.[6] While all studies start with a basic relationship between real money balances to a scale (or

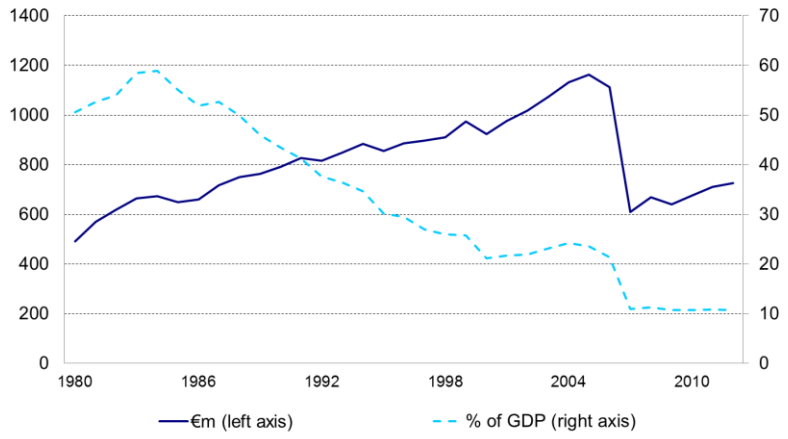
[1] For a broad explanation of these different roles, refer to Laidler, D. E. W., *The demand for money: theories, evidence and problems*, 4th edition, New York: HarperCollins College Publishers, 1993.
[2] Fisher, I., *The purchasing power of money*, New York: Macmillan, 1911.
[3] See Pigou, A. C., "The value of money", *The Quarterly Journal of Economics*, Vol. 37, 1917, pp. 38-65 and Marshall, A., *Money, credit and commerce*, London: Macmillan, 1923.
[4] Keynes, J. M., *The general theory of employment, interest and money*, London and New York: Macmillan, 1936.
[5] Friedman, M., "The quantity theory of money – a restatement" in *Studies in the Quantity Theory of Money*, M. Friedman (ed.), Chicago: University of Chicago, 1956.
[6] See footnote 2.

transactions demand) variable and an opportunity cost variable,[7] the role allocated to particular variables tends to differ according to the theoretical inclination of the authors. However, most recent studies tend to include the lagged value of the dependent variable as an explanatory variable to better explain its short-term dynamics. These partial adjustment models assume that agents are always in the process of adjusting their current cash holdings to the desired long-run level.[8] On the other hand, the definition of the dependent variable tends to differ, ranging from real currency in circulation or broader monetary aggregates in absolute terms, to ratios of monetary sub-aggregates to broader aggregates, or to measures of total payments.[9]

This Box will be studying the demand for one particular component of the money stock, currency, in Malta, in the light of the theoretical and empirical issues described above. In particular, it will argue that the commonly applied analytical framework needs to be tweaked slightly for it to explain better the reasons underpinning the relatively high currency demand in Malta compared to other euro area countries.

Currency demand in Malta

Chart 1
CURRENCY IN CIRCULATION IN MALTA: 1980-2012



Source: Central Bank of Malta, Eurostat, own calculations

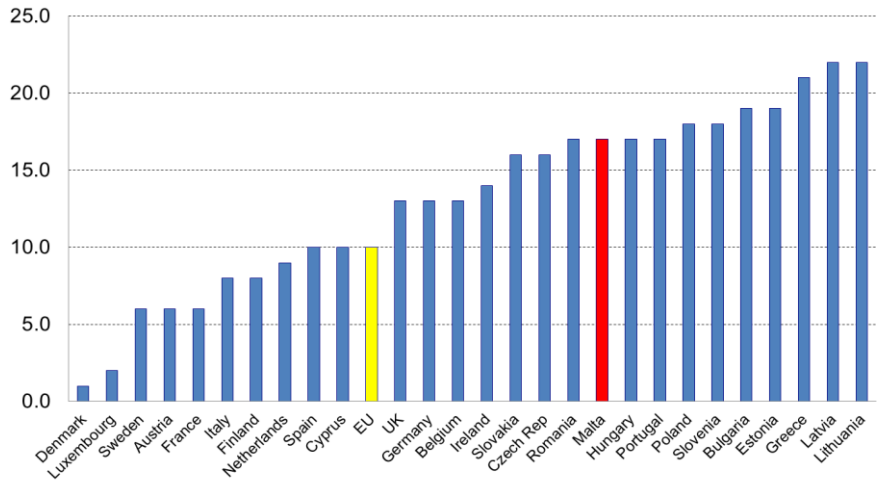
The amount of currency in circulation in Malta, which can be taken to be equivalent to the amount demanded, more than doubled in absolute quantity between 1980 and 2005, its historic peak. However, as can be seen in Chart 1, except in the early 1980s, there has been a steeply declining trend

[7] Sriram, S. S., "Survey of literature on demand for money: theoretical and empirical work with special reference to error-correction models", *WP/99/64*, International Monetary Fund, 1999.
[8] See Gordon R. J., "The short-run demand for money: a reconsideration", *Journal of Money, Credit and Banking*, 16(1): 1984, pp 403-434.
[9] For instance, recently some authors are using the ratio of the flow of cash withdrawn from bank accounts to total non-cash payments. See for instance, Ardizzi, G., Petraglia, C., Piacenza, M. & Turati, G. (2012), "Measuring the underground economy with the currency demand approach: a reinterpretation of the methodology, with an application to Italy", *Working Paper 864*, Banca d'Italia.

when compared with nominal GDP.[10] This ratio nearly halved over the decade 1986 to 1995, possibly reflecting the very rapid development of the local banking sector and financial liberalisation, which led to increasing use of non-cash payments. After remaining relatively stable for another decade, the ratio of currency in circulation to nominal GDP halved again in 2007 ahead of the adoption of the euro and the associated cash conversion process. Since then it has remained relatively stable.

However, the amount of banknotes issued by the Central Bank of Malta is significantly greater than the value of euro banknotes allocated to the Bank in accordance with the European Central Bank's banknote allocation key, which in turn is based on the Bank's share in the ECB's capital.[11] In addition, the demand for higher denomination banknotes, such as the €200 and €500 notes, is rising and also exceeds that in the rest of the euro area.[12] Moreover, holdings of currency are still very high in Malta, especially when compared with advanced Western European countries.[13] The implied velocity of currency in circulation in Sweden is more than three times higher than in Malta, for instance. In 2011 cash withdrawals from ATMs were equivalent to €2,570 for every Maltese person. This is just below the average observed in the euro area. However, when one translates this in terms of GDP per capita, the amount for Malta becomes nearly double the EU average. As can be seen from Chart 2, cash withdrawals in Malta from ATMs remain relatively high.

Chart 2
CASH WITHDRAWALS AS A % OF GDP IN EU COUNTRIES: 2011



Source: European Central Bank, own calculations

[10] A similar trend is observed when looking at the ratio of currency in circulation to M2, a monetary aggregate which, besides currency holdings, includes overnight deposits and other short-term deposits. Note that the ratio of M2 to GDP has, on the other hand, increased consistently since the 1980s.
[11] The regulation setting out this allocation can be downloaded at: http://www.ecb.europa.eu/ecb/legal/pdf/l_03520110209en00260030.pdf
[12] These data were obtained from the ECB's Statistical Data Warehouse. See http://www.ecb.europa.eu/stats/payments/paym/html/index.en.html
[13] On the other hand, the ratio to M2 to GDP is in line with those in countries like Germany, France and Italy.

Factors underpinning currency demand in Malta

There are a number of reasons why cash still remains so popular in Malta. Possibly, the most important is Maltese consumers' payment preferences. Besides consumer preferences, this could also reflect those of retailers. The fragmented nature of the retail market in Malta, possibly combined with the uneven impact of bank charges on small retail outlets, could be a contributing factor for the popularity of cash. Convenience may also play a role, as the availability of ATMs in Malta is quite low on a per capita basis, standing at less than half the euro area average. This could lead consumers to maintain higher cash balances.

Despite it probably becoming less important over the years, the relative thinness and weak liquidity of the local financial markets may also contribute to high domestic cash balances. Although the household saving rate in Malta has declined substantially, households have accumulated considerable financial wealth over time. In fact, on a per capita basis, the average Maltese household holds twice the financial assets of the average euro area household.[14] For a considerable period of time, these savings mostly ended up either as cash or bank deposits on account of strict capital controls and the unavailability of alternative assets, such as private debt securities, equity and private pension products. In recent years, Maltese households have had more investment options, both local and overseas, but cash may still have retained a larger-than-average share in their portfolio allocation.

Another possible cause could be the shadow economy, i.e. "market-based production of goods and services, whether legal or illegal, that escapes detection in the official estimates of GDP".[15] A sizeable shadow economy would boost the demand for currency since cash-based transactions are harder to trace. Many US economists in the 1960s and 1970s (such as Cagan and Guttman),[16] who tried to rationalise the rise in currency demand in the post-war period, noticed that standard price and income variables did not have much explanatory power. They therefore introduced tax burden or government regulation variables, arguing that higher demand for cash was being driven by a desire to operate in the shadow economy. They found that these additional explanatory variables were, indeed, significant.

[14] An estimate of household wealth based on the results of a survey carried out in 2010 can be found in Caruana, K. & Pace, C., "Household Finance and Consumption Survey in Malta: main results of 2010 exercise", Central Bank of Malta, 2013.
[15] Smith, P. "Assessing the size of the underground economy: the Canadian statistical perspective", *Canadian Economic Observer*, 11(10): 1994, *pp* 16-33.
[16] Cagan, P. "The demand for currency relative to the total money supply", *Journal of Political Economy*, 66(4): 1958, pp: 303-328, and Guttman, P. M., "The subterranean economy", *Financial Analysts Journal*, 33(6): 1977, *pp* 26-27.

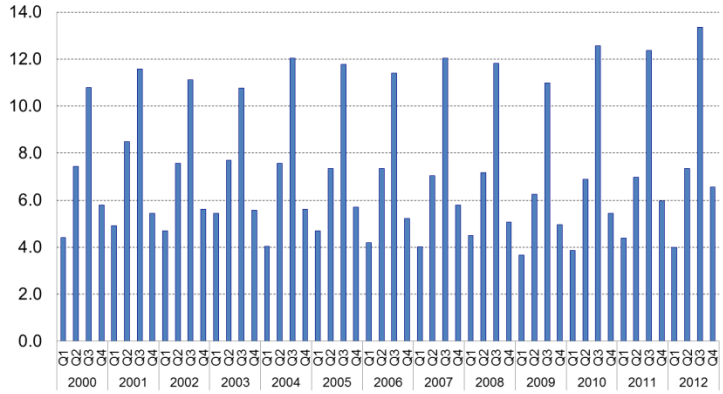
Incidentally, a similar argument was made in Malta in the 1970s in relation to "cash-hoarding".[17] There are a number of estimates of the size of the shadow economy in Malta.[18] Some are the result of cross-country studies, undertaken by the European Commission and by Schneider, which estimate the size of Malta's shadow economy at around a quarter of GDP.[19] Interestingly, these results are very similar to those found in earlier studies, conducted by the Maltese economists.[20]

One frequently ignored determinant of the use of cash in Malta is the large size of the inbound tourist industry. In parallel with the situation in one part of any monetary union, the currency stock in one country within a multi-country monetary union, such as the euro area, includes the amount issued by the national central bank, plus the net amount that is carried in or out by visitors.

In 2012, more than 1.4 million tourists visited the Maltese islands, more than three times the size of the resident population. Chart 3 quantifies this impact by converting the number of tourists into an equivalent resident using data on the average length of stay of tourists. Thus, if on average tourists stay 7.5 days in a month, they are treated as equivalent to a quarter of a resident. Using this approach one finds that there have been points at which the local population has been boosted by nearly a seventh as a result of incoming tourists.[21] Incidentally, the latest available ECB payment statistics suggest that in 2012 €0.2 billion were withdrawn from ATMs in Malta by means of cards issued outside the country, equivalent to one-sixth of the total amount withdrawn using cards issued in Malta. A similar proportion is reported in Cyprus. In contrast, across the euro area this ratio stood at less than 3%.

[17] See Delia, E.P., "The single equation model, monetary influences and estimation of economic variables in the Maltese economy*"*, in E.P. Delia, *Focus on Aspects of the Maltese Economy*, Malta: Midsea Books, 1978.
[18] These studies tend to follow the approach developed by Tanzi, V., "The underground economy in the United States: annual estimates, 1939-80", *IMF Staff Papers, 30(2*), 1983, pp: 283-305, International Monetary Fund.
[19] See European Commission, "European Employment Observatory Review", *Spring, 2007*; Schneider, F. *The shadow economy in Europe*, 2011; A.T. Kearney; Schneider, F. (2012), "The shadow economy and work in the shadow: what do we (not) know?" *Discussion Paper IZA DP No.6423*, 2012, Institute for the Study of Labour (Germany). According to these studies, Malta has one of the largest shadow economies, equivalent to between two and three times the euro area average.
[20] See Cassar, A., "An index of the underground economy in Malta", *Bank of Valletta Review*, No:*23*, Spring, 2001; and Briguglio, L, "Factors affecting the ratio of currency demand to total monetary assets in Malta", *Paper* presented at the International Conference on Applied Statistics, Middle East Business and Economic Association, Cairo: January 1989.
[21] Arrivals are quite seasonal, peaking in the third quarter of the year. This implies that on an annual basis, the impact falls to 5%, on average. This is still much higher than the 0.6% impact of incoming tourism on the European Union's population. Only Cyprus faces a similar situation to Malta in this respect.

Chart 3
IMPACT ON POPULATION SIZE OF TOURISM (%)



Source: own calculations using NSO data on tourist departures, length of stay and population.

Estimation

To study the extent to which these different factors drive the demand for currency in Malta, two currency demand specifications, both modelled in error-correction form, were applied to Maltese data.

In the first specification the dependent variable is currency in circulation as a ratio of M2. In the second the dependent variable is currency holdings deflated using the GDP deflator. Note that both specifications differ slightly in two ways from those used in literature. A linear trend was included to account for growing financial sophistication (such as the increasing use of electronic payments). Two dummy variables were used to capture the impact of one-off shocks, namely a significant change in monetary data compilation in 2003 along with the adoption of the euro in 2008. In the latter case, while there was a large decline in currency in circulation, this resulted from the euro changeover, and evidence suggests that people quickly reverted to previous patterns of behaviour.

The results of these regressions, shown in Table 1, suggest that the increase in population caused by tourists does play a significant role in determining both the short-run and long-run dynamics of currency demand in Malta.[22]

The tax ratio, computed as the sum of income tax paid by households, social security contributions and VAT as a share of GDP, also appears to play an important part. As expected, an increase in the tax burden raises the demand for cash, with this effect being significant in the long run. In line with theory, demand for currency is also affected by its opportunity cost, with the real deposit interest rate exerting a relatively strong impact both in the short term and in the long term. An increase in real deposit rates lowers the demand for currency.

[22] Note that the seasonal dummies were found to be significant, implying that besides the fluctuations in population size due to tourism, there are other seasonal determinants of the demand for money in Malta, such as the increase in consumption around Christmas.

Currency holdings are positively related to household financial wealth, which is proxied by a variable that is the sum of Malta Government Stock outstanding and M2 (excluding currency). This suggests that Maltese households allocate a share of their financial asset portfolio to currency, with an increase in their financial wealth being accompanied by higher cash holdings.

In contrast, Table 1 suggests that transactions demand plays a limited role in determining the demand for currency, with the coefficient on GDP per capita being insignificant even at the 10% confidence level. In part, this could reflect the very significant persistence of currency demand, which contrasts with the relative volatility of economic activity. Finally, there is some evidence that the attractiveness, or not, of foreign investment assets could slightly affect currency holdings in Malta. In one specification, the latter are negatively related to the level of the Dow Jones stock index (used here as a proxy for the return on foreign investment).

Table 1
CURRENCY DEMAND SPECIFICATION RESULTS FOR MALTA[(1)]

	Specification 1: Dependent = Currency/M2	Specification 2: Dependent = Currency/deflator
Constant	-0.34***	-2.49***
$dlog(Touristeq_t)$	0.02***	0.14***
$d(IR_t)$	-0.01**	-0.12**
$d(TR_t)$	0.26*	0.19
$d(VT_t)$	0.14	0.70
$Log(Dependent_{t-1})$	-0.13***	-0.15***
$Log(Touristeq_{t-1})$	0.05***	0.23***
IR_{t-1}	-0.01**	-0.03**
TR_{t-1}	0.09**	1.69***
VT_{t-1}	0.08**	0.31
$Log(FW_{t-1})$	0.04**	0.22**
$Log(DOW_{t-1})$	-0.01**	-0.00
Trend	-0.01***	-0.01***
Dmondata	-0.03***	-0.01
Dintro	-0.02***	-0.31***
Adjusted R^2	0.87	0.89
Standard Error of regression	0.00	0.02
Durbin-Watson	2.39	2.06

[(1)] Sample is 2000Q1 to 2012Q4. Data were not seasonally adjusted, but seasonal dummies (results not shown here for conciseness) were included in the estimation. Interest rate data are CBM measures, and not MIR data.

*** denotes significant at 1% level, ** at 5% level and * at 10% confidence level

Dependent variable in specification 1 is currency holdings as a share of M2; it is real currency holdings in specification 2, VT is transactions demand (i.e. GDP per capita), IR is the real deposit rate, TR is the tax ratio, Touristeq measures the impact on population size of tourist arrivals, FW is total government bonds and M2 excluding currency, and DOW is the level of the Dow Jones index. Dintro is a dummy for the adoption of the euro and dmondata is a dummy for a change in methodology of monetary statistics in 2003.

Source: author's calculations.

Conclusion

The estimates shown above must, however, be interpreted and used with due caution. Despite the popularity of estimating demand for money functions, there are several issues to keep in mind. For

instance, the currency demand equation could be incorrectly specified. This is particularly true when there are structural breaks in the demand for cash, such as changes in payment preferences or in payment systems. A further major issue is correctly accounting for the abrupt change in the relative size of currency in circulation as a result of the adoption of the euro.

Following euro adoption, it is almost impossible to assess with a good degree of certitude how many banknotes (and coins) are circulating at any one time in the Maltese economy as euro banknotes (and coins) can be brought in from overseas by both locals and visitors, while those issued in Malta can be taken and used abroad.

In terms of policy implications, these results suggest that the Maltese economy is likely to continue to use more currency than larger economies in the short to medium term. Moreover, the impact of a large tourism sector in raising currency demand merits further investigation.

The demand for cash could be reduced if more transactions are carried out using electronic means. The latter development would be facilitated if payment preferences of the Maltese population change significantly. This could be aided by modified bank charges, particularly on smaller operators in the retail and tourism sectors. Efforts to discourage the shadow economy, for instance by strengthening tax enforcement and by creating the right incentives to formalise activity, could also contribute.[23] The faster development of the local financial sector, for example through the establishment of a private pension industry, should widen the investment options for Maltese savers. Coupled with the continued high level of regulatory oversight, this should gradually help reduce reliance on currency as a store of wealth.

[23] There are much wider benefits resulting from a smaller shadow economy. The latter not only leads to resource misallocation in an economy, with too many self-employed or small firms in the traditional sectors (i.e. construction, agriculture and retail trade), but also boosts unnecessarily the level of prices (as margins need to be higher to make up for low turnover), as well as to unfair competition with operators in the formal economy. For more on this topic, see Singh A., Jain-Chandra, S. & Mohammad A., "Out of the shadows*", Finance and Development, Vol.49, No.2,* IMF, 2012.