

Fiscal Controls, Payment Limits and the Demand for Cash

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The views expressed in the paper are solely those of the author and do not necessarily represent the views of the Bank of Italy or the Eurosystem.

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Drivers of Cash Demand

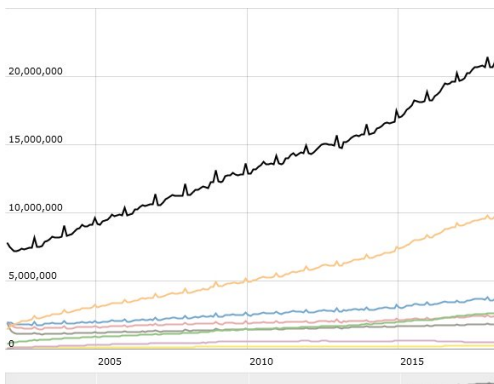
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Cash Popularity

- Despite the increasing use of electronic means of payment
- Cash is still widely used across Europe



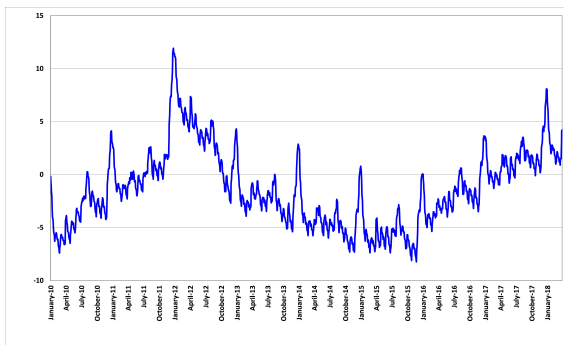
Source: https://www.ecb.europa.eu/stats/policy_and_exchange_rates/banknotes+coins/circulation/html/index.en.html. Notes: number of banknotes in circulation. Black line represents the aggregate of all denominations. Other lines colour corresponds to the reference denomination. Time series start from January 2002. Data display the amount in circulation at the end of the period.

Relevance for Central Banks

- **Banknotes** industrial production;
- Management of **payments systems**;
- Smooth transmission of **monetary policy**;
- **Financial stability**.

Demand in Italy

- Italy is one of the European countries where cash is still widely used (Esselink and Hernandez, 2017).
 - despite the availability of ATM and debit cards has apparently reduced the stock of cash held by families (Columba, 2002; Mercatanti and Li, 2017)



Source: Bank of Italy (Payment Systems) database. Notes: cumulated net withdrawals from January 2010 to March 2018, expressed in billions. Net withdrawals are calculated as the sum of gross cash withdrawals of all Italian commercial banks minus the sum of gross cash deposits.

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What Drives Cash Demand?

- **Public preferences;**
- **Macroeconomic variables;**
- **Monetary and fiscal policies.**

Assuming constant inflation and GDP, drivers can be divided in two macro-categories:

- **Transactions;**
- **Store of value.**

Transactions

- **Consumption expenditure**

- increase in families disposable income or a higher propensity to consumption can increase the stock of banknotes in circulation (Karni, 1973).

- **Payment instruments and services**

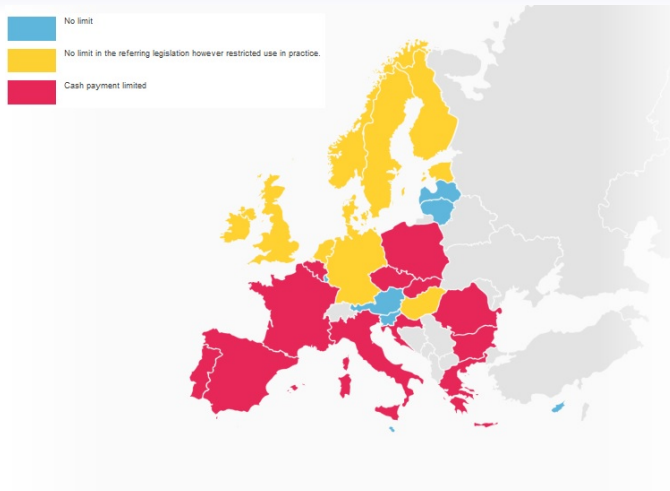
- The availability of new payment instruments, systems and infrastructures can increase the disutility of holding cash to settle transactions, raising its relative cost (Columba, 2002; Mercatanti and Li, 2017).
- This cost can increase also without a major shift in existing technology, due to shocks in consumers preferences (Schuh and Stavins, 2010) or in payment services costs.

- **Shadow economy**

- Preferable to electronic payment instruments, as long as the anonymity of transactions is concerned (Cagan, 1958, Tanzi, 1980; Schneider, 1986; Ardizzi et al., 2014).

- **Limit for cash payments**

- The government can impose a limit to cash payments.
- Not all jurisdictions in the Eurozone limit cash payments by law.
- In Italy there have been several changes to this limit in the last decade.
- **In 2016 it was increased from 1000 to 3000.**



Source: The European Consumer Centre network (ECC-Net) - German Branch website. <https://www.evv.de/en/consumer-topics/buying-goods-and-services/shopping-in-the-eu/cash-payment-limitations/>.

Restrictions on Cash Usage

Belgium	€ 3,000	1 January 2014
Bulgaria	BGN 10,000 (€5,112)	1 July 2011
Czech Republic	CZK 350,000 (€12,673)	1 January 2013
Denmark	DKK 10,000 (€ 1,340)	1 July 2012
France	€ 1,000 Residents € 15,000 Non residents	1 January 2001 revised in 2015
Greece	€ 1,500	1 January 2012
Hungary	HUF 1.5 million (€ 5,000)	1 January 2012
Israel	€ 3,500 for merchants € 12,000 for individuals	
Italy	€ 1,000	6 December 2011
Portugal	€ 1,000	14 May 2012
Slovakia	€ 5,000	1 January 2012
Spain	€ 2,500 Residents € 15,000 Non residents	19 November 2012

Source: The Irreplaceability of Cash and recent Limitations on its Use : Why Europe is off the Track, Edoardo Beretta, Università della Svizzera italiana. Updated by AGIS Consulting.

Store of Value

- **Credit risk**

- banknotes are **guaranteed by the central bank** of issue;
- In the case of euro is also a supranational institution;
- More attractive for risk-averse agents (Stix, 2013).

- **Monetary policy**

- **Bank-driven withdrawals:** Negative interest rate + APP may generate also;
- **Customer-driven withdrawals:** Shape deposits remuneration.

- **Tax system and Monitoring**

- the government can request the access to taxpayers' accounts to fight tax evasion;
- incentive to withdraw funds from his bank account and hold them in cash;
- incentive depends on the kind of information available to the revenue agency;
- **In 2015 expansion of information available for the Italian revenue agency;**

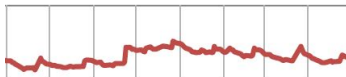


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The Role of Shadow Economy

Table 1 – Shadow economy and illegal activities

	Year			
	2012	2013	2014	2015
Shadow economy	+2,137	+0,751	+6,064	-5,531
Illegal activities	+0,944	+0,118	+0,336	+0,215
Non observed economy	+3,081	+0,869	+6,4	-5,316

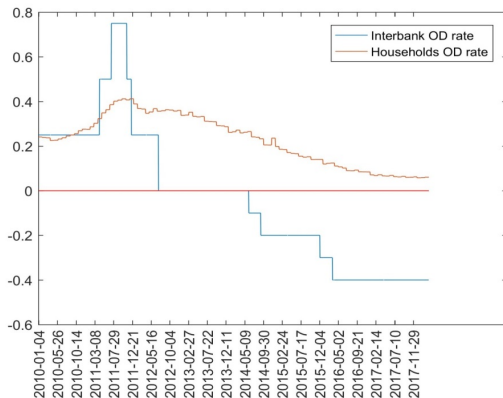
Source: ISTAT, “Non observed economy in National accounts” (<https://www.istat.it/it/archivio/204357>). Notes: absolute variations in € millions, period 2012-2015.

Shadow economy: activities that are deliberately concealed to fiscal, social security and statistical authorities.

Illegal activities: activities having as their object illegal goods or services, or which, although concerning legal goods and services, are carried out without proper authorization or title.

The Role of Monetary Policy

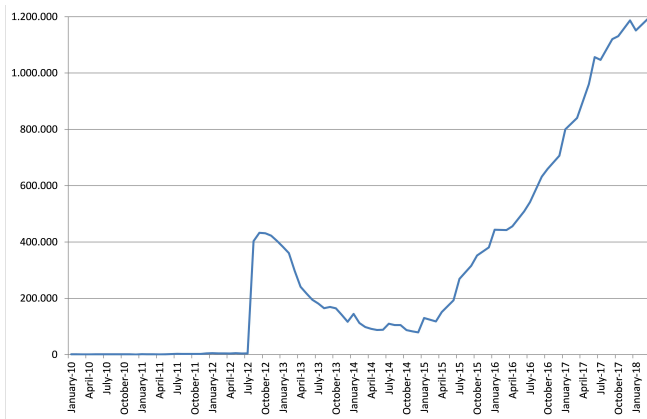
Key and banking rates by Italian banks to current accounts



Source: SDW. Notes: percentage values. Period January 1st, 2010 - March 31st, 2018. Orange line represents average rates applied to current accounts average balance. Blue line represents official overnight deposits rate applied in the Eurozone.

The Role of Monetary Policy

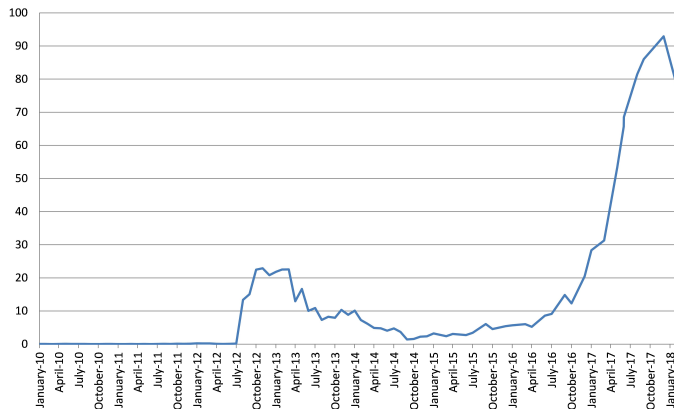
Eurozone Excess Reserves



Source: ECB Statistical Data Warehouse, Total excess reserves of credit institutions subject to minimum reserve requirements in the euro area. Notes: Excess reserves in the Eurosystem from January 2010 to March 2018, expressed in millions.

The Role of Monetary Policy

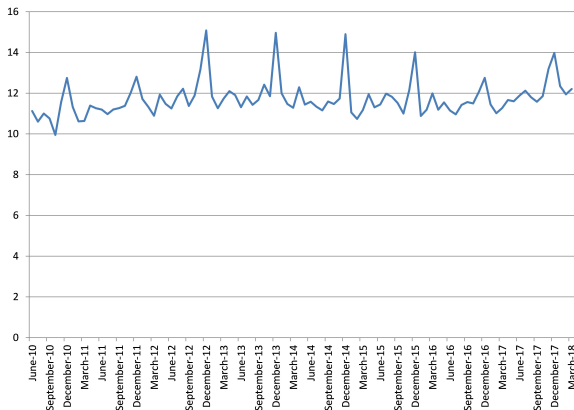
Italy Excess Reserves



Source: Bank of Italy (Infostat). Notes: data display the amount held at the end of maintenance periods. Period January 2010 March 2018. Data expressed in billions.

Banks' Caveau

Italian Banks' Banknotes Reserves



Source: Bank of Italy (Accounts Matrix). Notes: data display the amount in billion held at the end of month.
Period June 2010 - March 2018.

Payment Instruments and Services

- Debit cards, Credit cards, Mobile payments ...
- In the considered period potentially **disruptive instruments** did not spread;
- Wider diffusion of electronic payment instruments **should generate a reduction** of banknotes.

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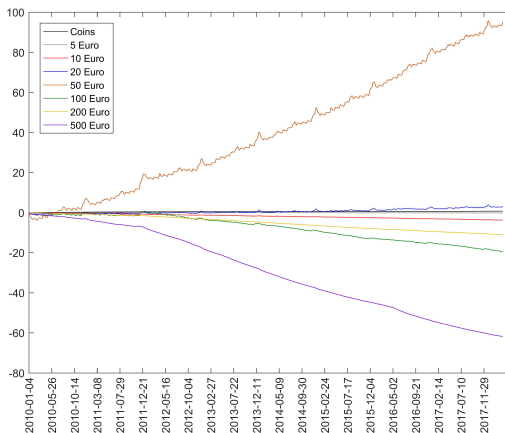
Explanatory Variables

Table 2 – Potential explanations and corresponding explanatory variables

Potential explanation	Explanatory variable	Source	Symbol
Current accounts remuneration	Average rates applied to current account balances. Monthly data.	ECB <i>statistical data warehouse</i>	r_{c/c_t}
Banking sector risk	FTSE Italia All-share Banks Index. Monthly average of daily returns.	Reuters	$PD_{CI,t}$
Country risk (Italy)	Spread between 10-year BTP and Bund. Monthly average of daily returns.	Reuters	B_t
Cash payments limit	Dummy variable whose value becomes 1 when the Law 208/2015 (Stability Law 2016), that raises the limit from 1.000 to 3.000 Euro, enters into force (January 2016).	Authors' calculations	L_t
Possibility for the fiscal authority to inspect current accounts	Dummy variable whose value becomes 1 when the Law 190/2014 (Stability Law 2015), that broadens the cases of utilization of current accounts' data for the fiscal authority, including average daily balance, enters into force (January 2015).	Authors' calculations	F_t
Consumption expenditure	Final consumption expenditure of domestic households on economic territory and abroad. Quarterly variations.	ISTAT	C_t

Dependent Variables

Net withdrawals by denomination in Italy



Source: Bank of Italy (Currency Circulation Management database). Notes: cumulated net withdrawals from January 2010 to March 2018, expressed in billions. Net withdrawals are calculated as the sum of gross cash withdrawals of all Italian commercial banks minus the sum of gross cash deposits.

Econometric Model

$$b_{d,t} = w_t \beta_d + \delta_d r_{c/c,t} + \pi_d PD_{Cl,t} + \omega_d B_t + \rho_d L_t + \phi_d F_t + \theta_d C_t + \epsilon_{d,t},$$

Identifying assumptions:

1. There are **no relevant omitted variables** impacting net cash withdrawals and correlated with the variables included in the model;
2. There is **no reverse causality**.
 - 2.1 the central bank does not determine official rates based on the variations of cash in circulation;
 - 2.2 financial markets do not factor the variations of cash in circulation in banking sector risk and country risk;
 - 2.3 cash in circulation does not influence fiscal authority regulation;
 - 2.4 consumption expenditure do not vary depending on banknotes held by consumers.

Main Results

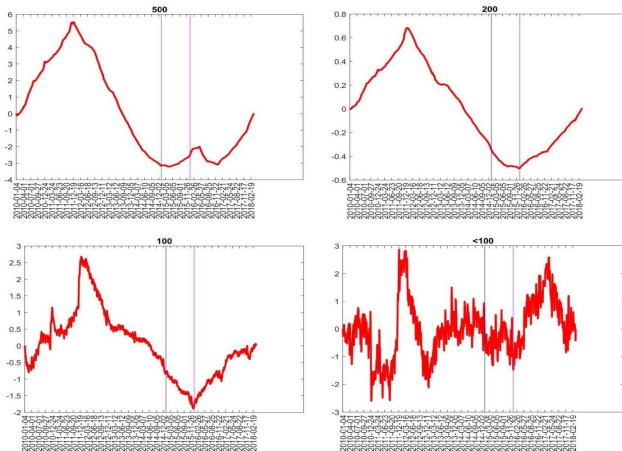
**Table 3 – Main results of the econometric analysis
(monthly net cash withdrawals, split by denomination)**

	500	200	100	<100
Current account rate	-1,009,390,040 (807,201,293)	2,945,891 (83,486,914)	558,494,032 (842,358,387)	1,003,462,704 (2,472,410,780)
BTP/Bund Spread	28,009,312 (42,795,916)	-211,898 (4,426,280)	22,410,630 (44,659,862)	4,321,704 (131,081,410)
FTSE Italian Banks	-38,801,855 (44,694,284)	-453,653 (4,622,624)	23,073,324 (46,640,913)	24,582,447 (136,896,001)
Payment limit	130,046,740 (99,967,400)	55,982,242 *** (10,339,391)	270,212,832 *** (104,321,411)	169,362,549 (306,194,354)
Fiscal controls	227,190,213 ** (98,481,730)	24,811,932 ** (10,185,732)	128,636,631 (102,771,034)	108,429,731 (301,643,832)
Consumption	41,383 * (21,964)	3,138 (2,272)	15,746 (22,920)	-13,156 (67,274)
R	0.53	0.67	0.69	0.95
\bar{R}	0.42	0.60	0.62	0.93
N. Obs	99	99	99	99
Month fixed effects	Yes	Yes	Yes	Yes
Constant	Yes	Yes	Yes	Yes
Trend	Yes	Yes	Yes	Yes

Notes: *= $p < 0.1$; **= $p < 0.05$; ***= $p < 0.01$. Dependent variable: monthly net cash withdrawals, period January 2010 - March 2018.

High-frequency Analysis

Seasonally adjusted net cash withdrawals (500, 200, 100 and less than 100 denominations)
(January 1st, 2010 - March 31st, 2018)

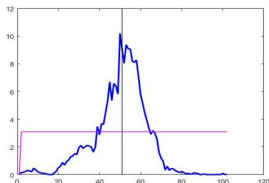


Notes: Blue line: possibility for the Fiscal authority to have granular information on current accounts (Stability Law 2015). Purple line: cash payments limit raised from 1.000 to 3.000 euros (Stability Law 2016).

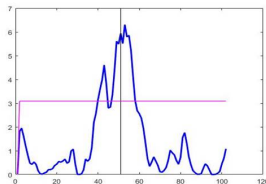
Exogenous Structural Break Test

Chow test on the residuals of net cash withdrawals (100 days range)

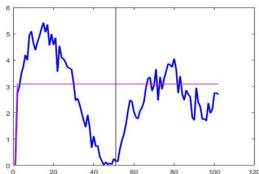
a. 500 euro (Fiscal authority access to current accounts)



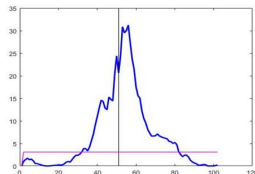
c. 100 euro (Cash payments limit increase)



b1. 200 euro (Fiscal authority access to current accounts)



b2. 200 euro (Cash payments limit increase)

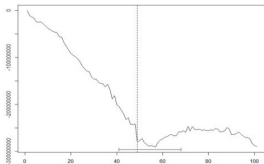


Notes: in Figure a the vertical line represents the 50th day of the considered period, i.e. January 2nd, 2015 (first working day after the entry into force of the Stability Law 2015). In Figure b1 the vertical line represents the 50th day, i.e. January 2nd, 2015 (first working day after the entry into force of the Stability Law 2015). In Figure b2 the 50th day is January 4th, 2016 (first working day after the entry into force of the Stability Law 2016). In Figure c the vertical line represents the 50th day of the considered period, i.e. January 4th, 2016 (first working day after the entry into force of the Stability Law 2016). The purple line signals the critical value, the value of the statistic is represented on the ordinates.

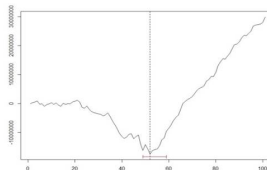
Endogenous Structural Break Test

Endogenous breakpoints test (Bai and Perron, 2009) on the residuals of net cash withdrawals (100 days range)

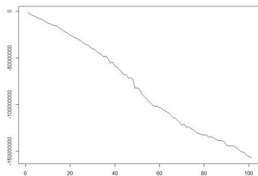
a. 500 euro (Fiscal authority access to current accounts)



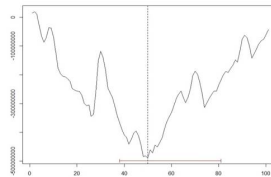
b2. 200 euro (Cash payments limit increase)



b1. 200 euro (Fiscal authority access to current accounts)



c. 100 euro (Cash payments limit increase)



Notes: the dotted vertical line is drawn at the date identified by the algorithm. The solid line is the cumulated residuals of net cash withdrawals for each denomination. Confidence interval is 95

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Main Results

- Growth of cash in circulation is not driven by its use for **low-value transactions**;
- **High-value transactions** and **store-of-value purposes** were behind it.
- The increase of the **limit for cash payments** from 1,000 to 3,000 euro, starting from January 1st, 2016 has contributed to the increase of net cash withdrawals of **100 and 200** euro banknotes (**use for transactions**);
- The possibility for the **fiscal authority to have granular information** on current accounts has contributed to the increase of net cash withdrawals of **500** euro banknotes (**use to store of value**);

Quantification

Table 4 – Estimate of the impacts of significant variables on net cash withdrawals
(data in € millions)

		Total	500	200	100	Months	Period
Possibility for the fiscal authority to inspect current accounts	70%	18,538	18,538			39	1/1/15-31/3/18
Increase of the limit for cash payments from 1.000 to 3.000 euro	30%	8,132		1,510	6,622	27	1/1/16-31/3/18
Total		26,670					

Notes: aggregated impacts are computed as difference between the expected value of net cash withdrawals in the presence of the respective policy and the counterfactual in the absence of the same policy. Every impact is calculated multiplying the coefficients estimated in Table 3, recalculated taking only the significant variables into account, for the number of months in which the net withdrawals were conditioned by the policy.

- More than the sum of Italian banks reserve requirements;
- More than 1.5% of the Italian GDP;
- Evasion-related withdrawals almost equal to 20% of unreported income in 2015;
- More than 7 billion missing taxes (Hp. all income taxable on average at 40 per cent).

Final Remarks and Policy Questions

- **Termination of 500** would affect this behavior or just **shift to 200 and 100**?
- Would **removing cash payment limits** have even bigger effects?
- May the diffusion of **instant payments** services change **the transactional demand for large denominations**?
 - immediate availability of funds for the creditor
 - cost IP vs cost of cash
 - reserves re-absorption
- How would **digital central bank money** change **the transactional and store-of-value demand for large denominations**?
 - safer than cash to store;
 - anonymity guaranteed?
 - unlimited amount?
 - transfers can be made in real-time
 - digital but guaranteed by the central bank

THANK YOU!

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