Monetary Policy Wealth Effects: Evidence from the 2015 Swiss Franc Shock

Martin Brown, Daniel Hoechle, Lizet Alejandra Perez Cortes and Markus Schmid

Working Paper 25.06

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This version: November 2025

Abstract

This paper studies the transmission of monetary policy to household consumption through wealth effects in a small open economy. As a natural experiment, we exploit the 2015 Swiss franc shock, triggered by the Swiss National Bank's unexpected removal of the euro exchange rate floor. Using granular administrative data from a retail bank, we document substantial consumption responses by households with portfolio exposures to the policy shock. We show that a 1% valuation loss on financial assets is associated with a 0.7% reduction in total spending in the quarter following the shock. This effect is driven by large-ticket spending rather than out-of-pocket spending, attenuates rapidly over time, and depends strongly on the magnitude of the valuation loss. Our results provide direct evidence of a sizeable, immediate, and short-lived wealth channel of monetary policy. They underscore the role of exchange-rate-induced asset revaluations in shaping consumption dynamics in open economies.

Keywords: Household finance, monetary policy, exchange rates, wealth effects, small open economies

JEL Codes: E52, E58, F31, G51

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1 Introduction

Shocks to household wealth are viewed as a key channel in the transmission of monetary policy to consumer spending. The relevance of this wealth channel has increased with household holdings of liquid financial assets in recent decades.[1] Shocks to financial wealth are also crucial to our understanding of the heterogeneous effects of monetary policy across the wealth distribution (Kaplan et al., 2018). However, quantifying the consumption response of households to policy-induced wealth shocks is challenging because monetary policy is endogenous to both financial asset prices and consumer spending. In this paper, we provide causal evidence on how consumers adjust their spending in response to wealth changes driven by an unexpected and substantial change in monetary conditions.

In small open economies, monetary policy affects consumer spending through interest rate changes and exchange rate movements. In January 2015, the Swiss National Bank (SNB) abandoned the minimum exchange rate of Swiss franc (CHF) 1.20 per euro, introduced in 2011, and simultaneously cut the policy rate to -0.75%. This policy move was motivated by external developments, notably the depreciation of the euro against major currencies (Jordan, 2016, Maechler, 2015) and was not anticipated by market participants (Brunnermeier and James, 2015). Figure 1 shows that the policy change led to a sharp and persistent appreciation of the Swiss franc, a marked rise in exchange rate volatility, and a steep decline in nominal interest rates.

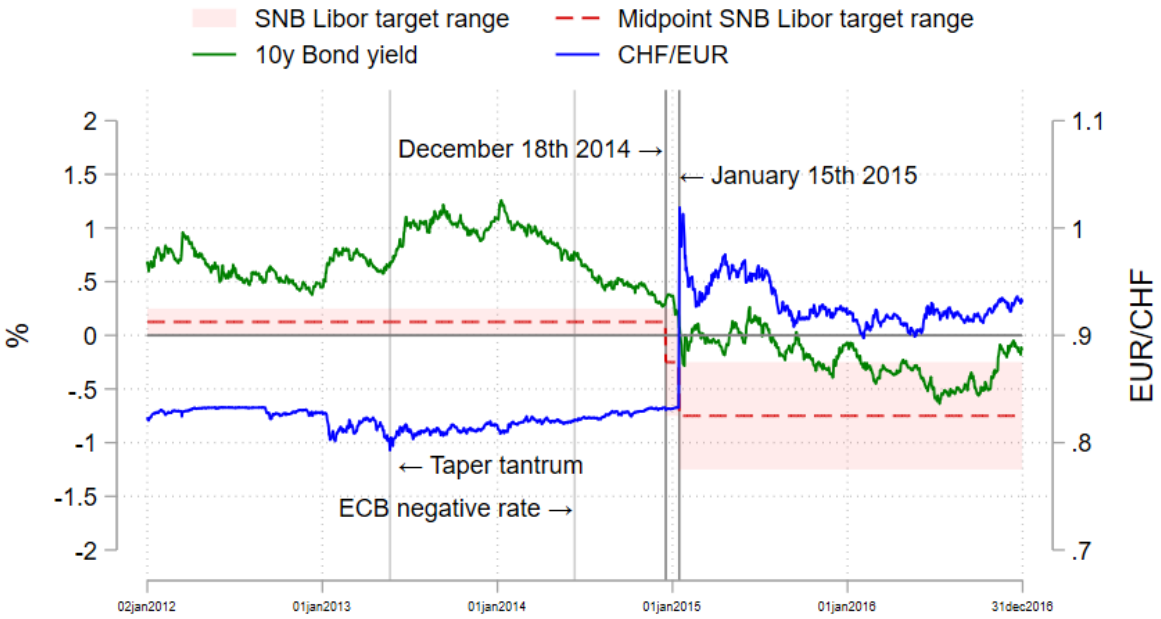
We study how this Swiss franc shock impacted on consumer spending through valuation changes to financial asset portfolios.[2] A key challenge in identifying this wealth channel is that the changes in monetary conditions may affect consumer spending through a host of other transmission channels. The interest rate channel may lead to a direct adjustment of consumer spending (Cloyne et al., 2020, Di Maggio et al., 2017), while the exchange rate channel may lead to substitution between domestic and foreign goods (Auer et al., 2024). Shocks to balance sheets of households may further induce changes in credit supply, affecting consumer demand for goods and services (Mian and Sufi, 2011). We isolate the wealth channel of monetary policy by leveraging rich administrative data

[1] See, e.g., the SNB report Swiss Financial Accounts - Household wealth in 2023.

[2] In companion work, we study how households adjusted their portfolios to this sudden change in monetary conditions (Brown et al., 2024).

from a retail bank, capturing monthly spending, asset holdings, and changes in asset valuation for a sample of 4,178 bank clients. We can thus compare changes in spending for otherwise identical consumers who differ in the pre-shock structure of their financial asset portfolio and thus in their balance-sheet exposure to changes in monetary conditions.

Figure 1: Monetary conditions, 2012-2016



The figure shows the SNB target range for the three-month Swiss franc Libor and the Swiss government bond yields at three-month and ten-year maturities from January 2012 to December 2016 (left axis in %). The figure further displays the Euro to Swiss Franc exchange rate (right axis). The grey vertical lines indicate key macroeconomic and financial market events during our observation period. On 18 December 2014, the SNB announced interest rates on reserves held with the SNB of -0.25%. On 15 January 2015, the SNB discontinued the exchange rate floor of 1.20 CHF = 1 EUR and announced an interest rate of -0.75% on reserves. In June 2014, the European Central Bank (ECB) introduced a negative policy rate. In May 2013, the Chairman of the US Federal Reserve suggested that the Fed may reduce their purchases of US treasury bonds, leading to a significant increase in bond yields, an event coined as the "taper tantrum". The data is obtained from the Swiss National Bank and Thomson Reuters Datastream.

We conduct three complementary empirical exercises: First we estimate the average short-term and medium-term effect of a 1% wealth loss on consumption growth, comparing consumer-level spending in identical calendar months before and after the shock. Second, we employ the continuous treatment estimator of Callaway et al. (2024a) to examine heterogeneous responses of consumer spending depending on the intensity of wealth exposure to the shock. Finally, we estimate the marginal propensity to consume (MPC) of consumers in our sample out of monthly portfolio

valuation changes over a 48-month period around the Swiss franc shock (2013:01-2016:12). This allows us to validate whether the causal estimates we obtain from our specific natural experiment translate to broader economic conditions. They do.

We report four main findings for the Swiss franc shock. First, the shock led to a substantial reduction in spending among clients who experienced portfolio valuation losses. A 1% valuation loss on financial assets is associated with a 0.7% reduction in total spending in the quarter following the shock, relative to the previous year. Second, the spending drop seems to be driven entirely by large-ticket items. Out-of-pocket spending using payment cards and cash does not decline in response to valuation losses. By contrast, other spending (captured by wire transfer payments) falls by 1% in response to a 1% valuation loss on financial assets. Third, at longer horizons (six months, nine months), the estimated effects attenuate rapidly, suggesting short-lived wealth effects of the policy shock only. Fourth, the effect of valuation losses on spending depends strongly on the magnitude of those losses. For clients with valuation changes between -0.1 and -10.7 percent (representing about 75 percent of our sample), we estimate an average drop in spending by 3.8 percent in the first quarter of 2015 compared to the same period in 2014. However, we find that the decline in total spending is most pronounced for clients who experience moderate valuation losses between 4-5%.

From our validation exercise, we estimate an average contemporaneous MPC of 8 cents per 1 CHF wealth valuation change. We confirm that the response of consumer spending to asset valuation changes is driven by wire transfers as opposed to out-of-pocket (cash and card) payments. In line with previous evidence, we document significant variation in MPC across the wealth distribution. Finally, we find that - on average - consumption reacts quite similar to valuation losses and valuation gains, suggesting that the magnitude of the causal effect we estimate for the Swiss franc shock may transfer to settings in which monetary policy easing leads to significant positive wealth effects.

Our findings contribute to the literature analyzing how changes in consumer wealth impact spending. This literature employs household-survey data, household-level administrative data or region-level data, to document that changes in spending are positively related to changes in stock market wealth and housing wealth (Campbell and Cocco, 2007, Chodorow-Reich et al., 2021, Di Maggio et al., 2020, Paiella and Pistaferri, 2017). These studies document that the marginal propensity to consume

out of unrealized capital gains is lower than that out of capital income (Di Maggio et al., 2020), and also lower for stock market wealth than for housing wealth (Paiella and Pistaferri, 2017) . Moreover, the marginal propensity to consume out of stock market capital gains also decreases with wealth (Di Maggio et al., 2020). We add to this literature by exploring the impact of wealth effects due to an unanticipated monetary policy shock using high-frequency wealth and spending data at the consumer-level.

Second, we contribute to the literature examining the impact of monetary policy on household finances and consumption. Amberg et al. (2022), Andersen et al. (2023) and Holm et al. (2021) use annual administrative data to analyze how monetary policy affects consumption, income, and savings. These authors document substantial heterogeneity in consumption responses to monetary policy across income and wealth levels, driven by differential exposure to labor market and capital income. More recent research has employed financial transaction data to study the timing of the transmission of monetary policy to consumer spending. Buda et al. (2025) document very short lags of monetary policy transmission, with consumer spending reacting within weeks, especially for durables and luxury items. Bracke et al. (2024) document that monetary policy contractions lead to an almost immediate decline in spending for households with mortgage debt through a disposable income channel. We add to this literature by shedding light on the dynamics of the wealth channel of monetary policy using monthly data on consumer spending in combination with detailed portfolio data.

Third, our paper relates to the literature exploiting the 2015 Swiss franc shock to shed light on the transmission of monetary policy in small open economies. These studies reveal that exchange rate pass-through to import prices was rapid but incomplete at the consumer level, with the currency of invoicing shaping the extent of adjustment (Auer et al., 2019, 2021, Bonadio et al., 2020). They further document that consumers responded to these relative price shifts by reallocating spending toward cheaper imports, with stronger substitution by lower-income households and in border regions where cross-border shopping expanded (Auer et al., 2024, Burstein et al., 2024). In addition, card data reveals immediate declines in spending by foreign consumers (Felber, 2025).[3]

[3]On the firm side, exporters with high domestic costs and foreign sales saw profitability and investment decline as margins compressed, industries with higher CHF-invoicing shares experienced weaker export growth, and firms upgraded product quality to mitigate competitiveness losses (Auer et al., 2019, Baeriswyl et al., 2023, Efing et al.,

We contribute to this literature by documenting that beyond the direct exchange-rate channel, wealth effects may amplify the impact of exchange rate shocks on consumption in a small open economy.

2 Data

Our data set comprises a sample of anonymized account-level information from a mid-sized Swiss retail bank, to which we will refer to as *the bank*. The bank provides a broad range of financial services to retail clients, including savings and transaction accounts, mortgages, and small-business loans. Importantly for our purpose, the bank also provides investment accounts for securities trading as well as wealth management advisory services.[4] The underlying data sample is based on an anonymized and random selection of the bank's clients.[5] All clients in the underlying data sample hold total assets under management with the bank that are never above 10 million CHF[6]. Total assets under management are measured as the sum of deposit accounts, the amount invested in their investment account, and retirement account balances.

We construct a balanced panel of observations by restricting the sample to clients observed every month during the time span from 2012:01 to 2016:12. We restrict the sample to include only wealth management clients, i.e. bank clients who hold assets other than bank deposits in Swiss francs in at least one month during the observation period. Further, we limit our sample to clients with liquid financial wealth exceeding 5,000 CHF throughout the observation period. The sample is filtered to include only those clients that, according to the bank's estimations[7], maintain their primary account with the bank. Further, we restrict the sample to include only persons who conduct out-of-pocket spending and receive income in every month of the observation period. Out-of-pocket spending includes cash withdrawals as well as credit and debit card payments. The resulting sample covers 4,178 clients (see Table A1).

2023, Freitag and Lein, 2023)

[4]Brown et al. (2020) report survey evidence which documents that the majority of Swiss consumers who have an investment account hold this with their main bank, where they also maintain a transaction account for payments.

[5]Only individuals whose dates of birth fall within the range of the second to the seventeenth day of the month are included.

[6]1 USD = 0.94 CHF in 2012:01 and 1.02 in 2016:01

[7]In accordance with criteria established by the bank, such as the client's utilization of debit cards or possession of other accounts.

We observe all financial wealth that clients hold with the bank in the form of deposits and securities at the account / security level. We also observe changes in the value of these assets that are due to price changes or exchange rate fluctuations. The data set also includes, for each bank client, the monthly amount of cash withdrawn, debit and credit card payments, wire transfer payments (via e-banking and non e-banking), incoming payments (including labor income), and any mortgage loan balance.

The main metrics we employ in our analysis are monthly spending amounts, and financial asset valuation changes.[8] We aggregate the spending data into two categories: 1) out-of-pocket spending composed of cash, debit card and credit card spending, and 2) other spending as captured by wire-transfers (including e-banking and other non e-banking payments). While a further disaggregation of the data is not available, wire-transfer payments are likely to include large-ticket durable purchases as well as regular payments for services such as rent and utilities. By contrast, out-of-pocket spending is likely to include the purchase of non-durables, irregular services (travel, entertainment, hospitality), and semi-durables.

We aggregate financial assets into three categories: i) bank deposits in transaction or savings accounts; ii) fixed income securities (bonds and bond funds); and iii) risky securities (single stocks, equity funds, ETFs, strategy and allocation funds, mixed funds including equity and bonds, convertible bonds, private equity, hedge funds, commodity funds, and real estate funds). The sum of these three asset types is referred to as financial wealth hereafter. For each asset type, we distinguish between assets denominated in domestic (CHF) and foreign (FX) currency.

Clients in our main sample hold an average financial wealth of 193,333 CHF (Panel A of Table 1), and are thus considerably wealthier than the average Swiss taxpayer.[9] Despite excluding clients holding only CHF deposits, bank deposits still dominate financial asset holdings in our sample, with an average portfolio share of 61%. Fixed income securities account for 11% and risky securities for 27%. The asset allocation in our sample compares well to representative household survey data from the Eurozone. Households in the Eurozone hold roughly two-thirds of their financial wealth

[8]The bank breaks down monthly changes in asset positions into components associated with price fluctuations, exchange rate variations (if the asset is not traded in Swiss francs), and buy or sell transactions.

[9]54,6% of Swiss residents subject to taxation have net wealth below 50,000 CHF, including non-financial wealth (FSO, 2022). Statistics as of December 2019.

in bank deposit accounts and one-third in securities.[10]

In line with widely observed home-bias and local-bias in investor portfolios (Ahearne et al., 2004, Coval and Moskowitz, 1999, French and Poterba, 1991, Grinblatt and Keloharju, 2001), 92% of financial assets held by clients in our sample are denominated in CHF, while foreign assets (mainly in Euro and USD) account for only 8%. The foreign share of assets does vary across asset type; from 36% of fixed income to 10% of risky securities and only 2% of deposits. However, as documented by Efing et al. (2023) and Baeriswyl et al. (2023), a significant share of equity holdings denominated in CHF may also be exposed to exchange rate movements, as many of the largest publicly traded Swiss firms are strongly export-oriented. Furthermore, mutual funds with reference currency CHF may invest internationally, and are thus indirectly affected by exchange rate movements.

Panel B shows descriptive statistics for spending and income. Clients in our sample spend 9,305 CHF on average per month. Out-of-pocket (cash and card) spending accounts for 19% of total monthly spending, while wire-transfers account for the remaining 81%. As for incoming payments, the monthly average is 9,783 CHF. Our data compare well to the aggregate data for Switzerland for our observation period. According to the Swiss Household Budget Survey, the average household spent 8,542 CHF per month in 2014. Figure A1 shows the evolution of income and spending over time, revealing that spending is closely tied to income across the year.

Panel C reports descriptive statistics for valuation changes to clients' financial assets. On average between 2013:01 to 2016:12, monthly valuation gains amount to 104 CHF, corresponding to 0.05% of total financial wealth. Average valuation gains are accounted for entirely by assets denominated in Swiss francs, while they are close to zero for foreign currency assets.

[10]See 2014 wave of the Household Finance and Consumption Survey by the European Central Bank. By comparison, the average share of a household's wealth held in deposits is much lower, 22%, in the United States (see the 2016 wave of the Survey of Consumer Finances by the Board of Governors of the Federal Reserve Board.

Table 1: Descriptive statistics

Panel A. Asset holdings (CHF)	Mean	P25	P50	P75	SD	Obs
Financial wealth	193,333	59,318	116,316	220,469	292,978	200,544
Deposits	117,624	31,661	71,511	139,659	166,507	200,544
Deposits CHF	114,679	30,455	69,569	136,826	161,161	200,544
Deposits FX	2,622	0	0	0	17,982	200,544
Fixed Income	21,102	0	0	9,745	65,436	200,544
Fixed Income CHF	13,316	0	0	0	45,973	200,544
Fixed Income FX	7,377	0	0	0	33,604	200,544
Risky Securities	53,258	3,481	12,453	49,552	151,673	200,544
Risky Securities CHF	47,554	3,452	11,085	44,742	134,559	200,544
Risky Securities FX	5,367	0	0	0	25,377	200,544
Panel B. Spending and income (CHF)	**Mean**	**P25**	**P50**	**P75**	**SD**	**Obs**
Total spending	9,305	2,916	5,364	9,651	27,927	200,544
Out-of-pocket spending	1,771	500	1,410	2,508	1,734	200,544
Other spending	7,534	1,698	3,671	7,361	27,696	200,544
Incoming payments	9,783	4,039	6,448	9,931	28,545	200,544
Panel C. Valuation changes (CHF)	**Mean**	**P25**	**P50**	**P75**	**SD**	**Obs**
Total	104	-172	0	292	8,294	200,544
CHF assets	105	-134	0	240	7,584	200,544
FX assets	-1	0	0	0	2,210	200,544

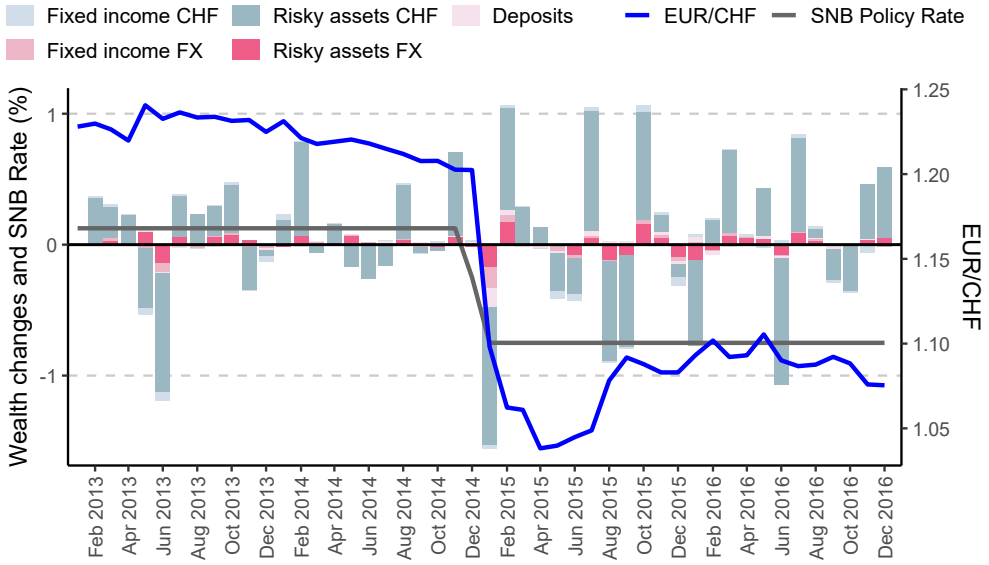
The table presents descriptive statistics for asset holdings and valuation effects by asset class, as well as spending based on investor-month (N*T) data for 2013:01 to 2016:12. Fixed income includes bonds and bond funds. Risky securities include single stocks, equity funds, ETFs, strategy and allocation, convertible bonds, private equity, hedge, commodity, and real estate funds. Currency breakdowns are by Swiss Francs (CHF), and foreign currencies (Euro, US Dollars, and other currencies).

Figure 2 illustrates the monthly valuation changes in client wealth by asset type and currency for the period 2013:10-2016:12. Three observations stand out. First, valuation changes are dominated by domestic-currency risky securities. Second, January 2015 stands out as the month with the largest negative valuation change. Third, January 2015 also marks a sharp increase in the magnitude and volatility of valuation changes. Before the Swiss franc shock, valuation changes were moderate in most months, with the notable exception of the 2013 taper tantrum period. Following the policy shock, the magnitude of positive and negative valuation changes increased substantially.

Figure 3 compares household spending, income and asset valuation over time. Income and spending follow a closely aligned pattern with distinct seasonal variation. The seasonality of spending at the

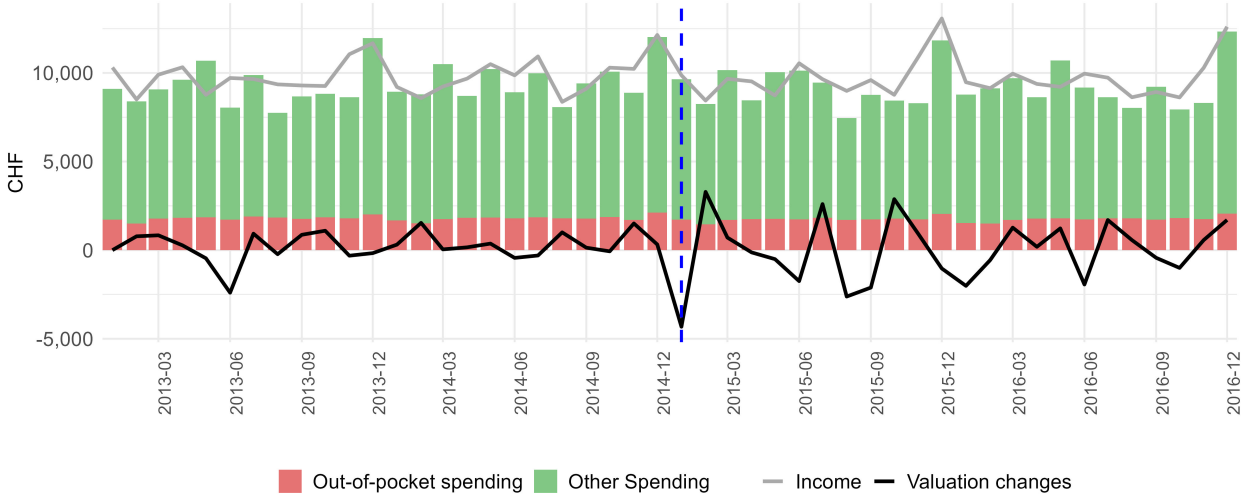
end / beginning of the year almost masks any effect of the Swiss franc shock on spending in early 2015. However, closer inspection reveals that the drop in spending in January / February 2015 (compared to December 2014) clearly exceeds that observed in the previous or following year.

Figure 2: Wealth changes by asset class



This plot shows valuation changes as a percentage of financial wealth in the previous month, the SNB policy rate, and the exchange rate. Based on a balanced panel of 4,178 individuals.

Figure 3: Average spending, income and changes in wealth



This plot shows mean monthly spending, income, and valuation changes in wealth. Based on a balanced panel of 4,178 individuals. The vertical line denotes January 2015.

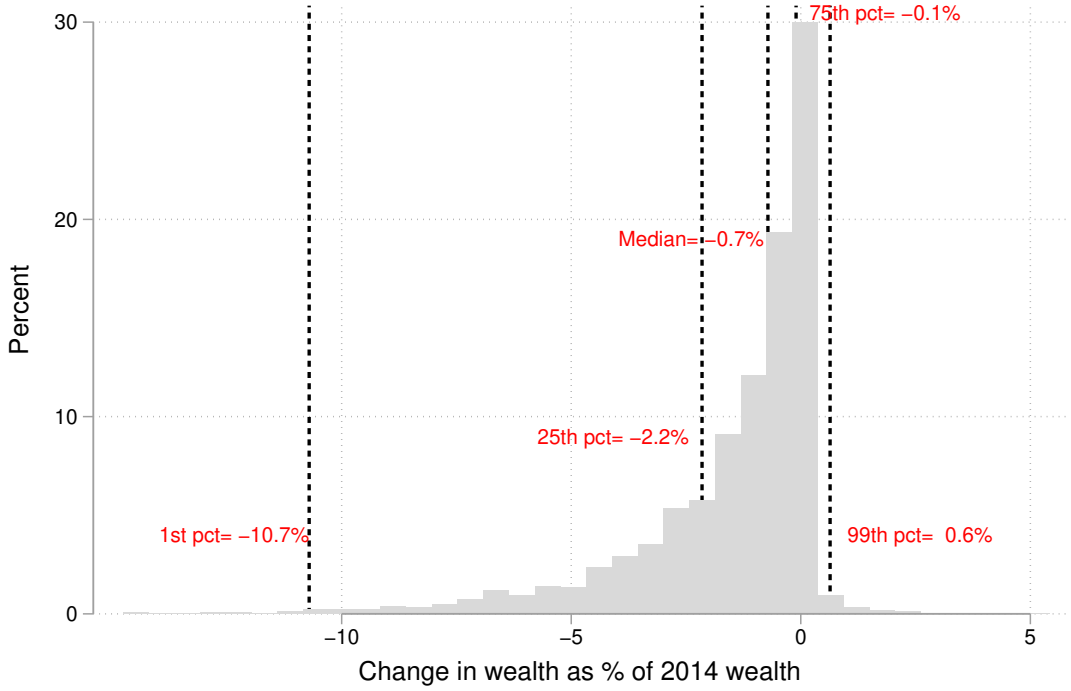
3 Empirical strategy

The goal of our paper is to assess the response of consumer spending to the financial wealth changes induced by the Swiss franc shock in January 2015. We conduct three complementary empirical exercises: First we estimate the average short-term and medium-term effect of a 1% wealth loss on consumption growth, comparing consumer-level spending in identical calendar months before and after the shock. Second, we employ the continuous treatment estimator of Callaway et al. (2024a) to examine heterogeneous responses of consumer spending depending on the intensity of wealth exposure to the monetary policy shock. Finally, we estimate the marginal propensity to consume (MPC) of consumers in our sample out of monthly portfolio valuation changes over a 48-month period around the Swiss franc shock (2013:01-2016:12). This allows us to validate whether the causal estimates we obtain from our specific natural experiment translate to broader economic conditions.

3.1 Asset valuation changes in January 2015

Our explanatory variable is the valuation change in each client's portfolio between end-December 2014 and end-January 2015, normalized by mean financial wealth in 2014. This measure captures portfolio revaluations induced by the Swiss franc shock and reflects only price and exchange-rate movements, excluding trading or flow effects. Figure 4 displays the distribution of these wealth changes. The median valuation change is a -0.7% loss, while the 25th and 75th percentiles correspond to -2.2% and -0.1% losses, respectively. The lower 1st percentile of the loss distribution corresponds to -10.7%. The variation of valuation changes is substantial, with a maximum loss of -37.3% and a maximum gain of +5.4%.

Figure 4: Distribution of wealth changes



This figure shows the distribution of wealth changes in January 2015 normalized by financial wealth in 2014. Based on data for 4,178 individuals. Of these, 428 have zero losses and 174 have gains. The maximum loss is -37.3%; the maximum gain is 5.4%.

The variation in asset valuation changes across clients reflects differences in their pre-shock portfolio structure. Table 2 presents summary statistics of portfolio structure, income and spending, grouping clients by quartile of valuation changes. As shown in Panel A, individuals with larger valuation losses in January 2015 are wealthier than those with small losses or gains. However the main difference between the groups lies in the share of domestic currency risky securities and foreign currency assets. Clients in Quartile 1 of valuation changes (largest losses) hold 43% of their assets in CHF risky securities and 16% in FX assets. By comparison, clients in Quartile 4 of valuation changes (smallest losses, gains) hold 4% of their assets in CHF risky securities and 5% in FX assets.

Table 2: Summary statistics by quartiles of valuation changes in January 2015

	Quartiles of valuation changes			
	Quartile 1 (below -2.2%)	Quartile 2 (-2.2% to -0.7%)	Quartile 3 (-0.7% to -0.1%)	Quartile 4 (above -0.1%)
Panel A. Financial wealth (means per quartile)				
Financial wealth (CHF)	254,893	199,229	146,621	168,554
In %				
Deposits	39.4	60.9	83.7	85.8
Deposits CHF	35.4	60.0	83.4	85.5
Deposits FX	3.9	0.8	0.3	0.2
Fixed Income	11.5	7.9	3.8	9.8
Fixed Income CHF	5.8	6.5	2.6	5.3
Fixed Income FX	5.7	1.4	1.2	4.5
Risky Securities	49.0	31.2	12.5	4.4
Risky Securities CHF	43.0	29.7	12.2	4.0
Risky Securities FX	6.0	1.5	0.2	0.4
Panel B. Changes in income and wealth and individual characteristics (means per quartile)				
Yoy Δ log(income) x100	-0.1	-0.9	0.1	1.3
Lag yoy Δ log(wealth) x100	5.6	4.6	3.8	5.8
Age (in years)	58.0	58.1	56.0	56.1
Has mortgage	0.5	0.4	0.5	0.4
Panel C. Spending and Income (CHF)				
Total spending	10,199	8,884	9,232	9,857
Out-of-pocket spending	1,956	1,748	1,774	1,690
Other	8,243	7,136	7,458	8,167
Incoming payments	9,656	9,578	9,699	10,443

This table presents the mean financial wealth composition and individual characteristics by quartiles of valuation changes in January 2015 (normalized by 2014 wealth). Panel A reports average financial wealth by asset class and currency. Panel B reports averages of YoY $\Delta \log(\text{income}) \times 100$, lagged YoY $\Delta \log(\text{wealth}) \times 100$, age (years), and a mortgage indicator at the individual level. Panel C shows spending and income. Based on a balanced panel of 4,178 individuals. Data for 2014:01-2014:12.

A large body of literature has examined the determinants of household financial risk-taking (see Guiso and Sodini (2013) and references therein), showing that participation in and diversification of financial assets are strongly correlated with wealth. Less wealthy households typically hold portfolios concentrated in bank deposits, while wealthier households participate broadly across asset classes (Briggs et al., 2015, Calvet and Sodini, 2014). Moreover, background risk[11] has been shown to reduce financial risk-taking. These findings strongly suggest that client exposure to the

[11]Determined by factors such as human capital (Benzoni et al., 2007, Calvet et al., 2007), housing or private business ownership (Cocco, 2005), financial literacy (Van Rooij et al., 2011), cognitive ability (Grinblatt et al., 2011), and family structure (Love, 2010)

Swiss franc shock is not randomly assigned. However, Panel B of Table 2 shows that clients with very different valuation losses are quite similar in terms of their income and spending patterns. Moreover, they are also quite similar in terms of age group, and homeownership status.

3.2 First-Difference regression

In our first empirical exercise we estimate a linear, two-way fixed effects model relating spending changes to wealth valuation changes induced by the policy shock. As documented in Figure 3, spending displays strong seasonal patterns, peaking in December and declining at the beginning of the year. We explicitly control for seasonality by comparing changes in spending across identical calendar months before and after the shock. In our main analysis, we consider spending over a 3-month horizon (2015Q1 vs. 2014Q1). In subsequent analysis, we consider 6- and 9-month horizons (2015Q1-Q2 vs. 2014Q1-Q2 and 2015Q1-Q3 vs. 2014Q1-Q3). We examine total spending as well as the decomposition of spending into out-of-pocket spending (cash, card payments) and other spending (wire transfers).

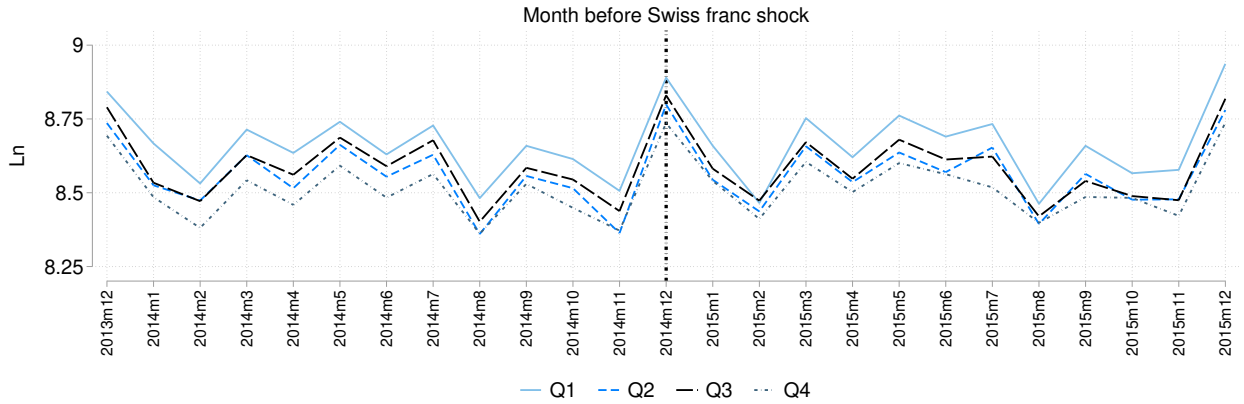
We estimate the model with the following first-difference OLS regression:

$$\Delta Spending_i = \alpha + \beta_1 \Delta Valuation_i + \gamma X_i + \varepsilon_i,$$

where, $\Delta Spending_i$ is the change in log spending between 2015Q1 and 2014Q1 ($\times$ 100), $\Delta Valuation_i$ is the January 2015 valuation change (in % of 2014 wealth). The control variables X_i capture pre-shock income changes, wealth flows as well as mortgage debt and age.

The main identification assumption underlying this model is that of parallel trends: In absence of the Swiss franc shock, the spending of clients with low vs. high valuation losses would have developed similary in 2015 compared to 2014. Figure 5 shows that pre-treatment trends in spending are broadly similar across quartiles of valuation changes.

Figure 5: Total spending by groups



This plot shows the mean log(spending) by quartile groups of valuation losses. Individuals are sorted into quartiles (Q1-Q4) based on their portfolio valuation changes in January 2015, normalized by total financial wealth in 2014. Based on a balanced panel of 4,178 bank clients. The vertical line marks December 2014, the month before the Swiss franc shock.

3.3 Continuous treatment analysis

In our second empirical exercise we examine whether the response of consumer spending to asset valuation losses depends on the magnitude of that valuation loss. To this end, we use the continuous treatment difference-in-difference estimator as proposed by Callaway et al. (2024a).

3.3.1 Parameters of interest

Following the notation in Callaway et al. (2024a), we denote G as the period in which individuals, indexed by i, receive the treatment, and t as the index time. The treatment is continuous, and D represents treatment intensity, with d indexing a particular treatment dose. Dropping the subindex i to simplify notation, the potential outcome in period t under treatment dose d is denoted by $Y_t(d)$: the outcome that individual i would experience in period t if they were exposed to dose d. X denotes a vector of observed covariates. The average treatment effect (ATE) is defined as

$$ATE(g,t,d) = E[Y_t(g,d) - Y_t(0) \mid X = x, G = g]$$

which measures the average effect in period t of being treated in period g with intensity d relative to the path that would have prevailed absent the treatment. The framework of Callaway et al. (2024a) allows for multiple timing groups (i.e., staggered treatment adoption), but in our setting, there is only one timing group. For a high (h) and low (ℓ) level of the dose, i.e., large loss and small loss, we

can estimate and compare $ATE(g,t,h)$ to $ATE(g,t,\ell)$ under the assumptions described below. We define the low-dose group (d_ℓ) as the top quartile of valuation changes in January 2015 (clients with valuation changes between -0,1% and +5.4%), as the empirical counterfactual and identify

$$ATE_X(d) = E[\Delta Y \mid X, D = d] - E[\Delta Y \mid X, D = d_\ell].$$

$\Delta Y = Y_1 - Y_0$ is the change in the outcome between periods $t = 0$ and $t = 1$. In our application, Y_t denotes the logarithm of spending in period t, and $\Delta Y = Y_1 - Y_0$ represents the change in log spending between the pre-treatment (January-March 2014) and post-treatment (January-March 2015) periods. The treatment variable D captures the portfolio valuation loss in January 2015 as a percentage of financial wealth in 2014. The vector of covariates X includes the pre-treatment change in log income and change in log wealth, as well as age group (in ten-year bins) and a mortgage ownership indicator. Spending, income, and wealth changes are winsorized at the 1st and 99th percentiles. The ATE describes how average spending changes with treatment intensity conditional on covariates.

3.3.2 Estimation assumptions

The assumptions that we need for this estimator to be valid are a) that we have a random sample that is independent and identically distributed, b) the continuous treatment dosage has support $\mathcal{D}$, conditional on covariates X, c) no anticipation, and d) strong conditional parallel trends. Assumption a) implies that we have a panel of iid data. While observations within a client are correlated over time, this is addressed by clustering standard errors at the client level. Assumption b) requires that, conditional on observable characteristics, individuals with different degrees of exposure to the shock share common support in their covariates. In the Appendix Figures A3 and A4 we verify this overlap graphically by comparing the distribution of key control variables and predicted outcomes across the lower three quartiles and the top quartile of wealth changes, finding substantial overlap. Assumption c) seems plausible since, as discussed in section 1, we can think of the 2015 policy shock as largely exogenous and unexpected. With one treatment time and multiple observation periods, assumption d) is expressed as follows:[12]

[12]This corresponds to the "Strong Parallel Trends" assumption (Assumption 5-MP) in Callaway et al. (2024a), adapted to the case with a single treatment timing and continuous variation in treatment intensity.

$$\text{For all } t = 2, \ldots, T,\ d \in \mathcal{D},$$

$$E[Y_t(d) - Y_{t-1}(d) \mid X] = E[Y_t(d) - Y_{t-1}(d) \mid X, D = d],$$

$$\text{and} \quad E[Y_t(0) - Y_{t-1}(0) \mid X] = E[Y_t(0) - Y_{t-1}(0) \mid X, D = d].$$

Therefore, we assume that, on average, treated individuals would have followed the same outcome paths under any treatment dose as those who actually received that dose and that the path of untreated potential outcomes across all dose groups is the same. Under this assumption, $ATE(g, t, d)$ is identified from observed data as the difference between the mean change in spending for individuals with dose d and the predicted change for the low-dose group given the same covariates.

3.3.3 Estimation method

Estimation proceeds in two steps. First, we estimate $E[\Delta Y \mid X, D = d_\ell]$ using the low dose group (clients with valuation changes in January 2015 between -0.1% and +5.4%) as the control sample, where X includes only pre-treatment covariates. This regression provides the predicted counterfactual change in spending for each individual based on pre-shock characteristics.

Second, we compute the modified outcome $ddY = \Delta Y - \widehat{E}[\Delta Y \mid X, D = d_\ell]$ and regress ddY on a cubic B-spline of the dose variable D for the high-dose sample defined as clients with valuation changes in January 2015 between -37.3% and -0.1%. The estimated response curve is

$$\widehat{ATE}_K(d) = \psi^K(d)'\widehat{\beta}_K,$$

where $\psi^K(d)$ denotes the spline basis and $\widehat{\beta}_K$ is obtained by OLS. We compute cluster-robust influence-function standard errors using the covariance matrix of $\widehat{\beta}_K$ clustered at the individual level. The main challenge of this method is to select the type of transformations $\psi^K(d)$ and the number of terms K. We follow Callaway et al. (2024b) in using cubic splines with internal knots at the 25th, 50th, and 75th percentiles of the dose. This estimator recovers the time-averaged response curve of spending to valuation losses, allowing for flexible non-linear effects of treatment intensity.

4 Results

4.1 First-difference regression

The estimated coefficients from the benchmark two-way fixed-effects model are reported in Table 3. They indicate a sizeable and statistically significant impact of wealth valuation changes on total spending: On average in our sample, a 1% decline in the valuation of financial wealth in January 2015 is associated with a 0.7 percentage-point decline in spending in 2015Q1 compared to 2014Q4 (Panel A. Column 1). The second and third columns show that the decline in spending from valuation losses is driven entirely by other spending (wire transfers) while out-of-pocket spending is largely unaffected. This suggests that the average investor-consumer response to wealth valuation effects is related to a drop in large-ticket spending. The results in Panels B and C show that wealth effect on consumer spending fades out quickly. Over a six month horizon the magnitude of the effect on total spending decreases by half and is less precisely estimated. Over the nine months horizon the effect disappears. These findings are consistent with recent evidence on the short-lags of monetary policy (Buda et al., 2025).

The Table 3 results allow us to compare the impact of valuation changes on spending to that of monthly income. A 1 percentage-point increase in monthly income between 2014Q1 and 2015Q1 is associated with a 0.3 percentage-point increase in spending (Panel A). The effect is sizeable for both out-of-pocket spending and other spending. Moreover the magnitude of the effect increases at longer time horizons. Note that in our sample average financial wealth (193,333 CHF) is roughly twenty times average monthly income (9,783 CHF). By comparison, even in the short-run the response of spending to a 1 percentage-point change in wealth valuation is at most 3 times that of a response to a 1 precentage-point change in income. Our results are thus consistent with previous evidence (Di Maggio et al., 2020) which shows that the response of spending to capital gains is weaker than the response to (capital) income.

Table 3: Wealth valuation changes and spending

	Outcome: $\Delta \ln(\text{Spending}) \times 100$		
	Total	Out-of-pocket	Other spending
Panel A. 3-month horizon			
Δ Valuation (%)	0.719**	0.309	0.997*
	(0.254)	(0.581)	(0.469)
$\Delta \ln(\text{Income}) \times 100$	0.271***	0.245***	0.317***
	(0.030)	(0.053)	(0.044)
Adj. R^2	0.044	0.006	0.025
Panel B. 6-month horizon			
Δ Valuation (%)	0.384*	-0.264	0.418
	(0.176)	(0.436)	(0.286)
$\Delta \ln(\text{Income}) \times 100$	0.329***	0.303***	0.428***
	(0.029)	(0.056)	(0.045)
Adj. R^2	0.077	0.012	0.051
Panel C. 9-month horizon			
Δ Valuation (%)	0.100	-0.245	0.211
	(0.140)	(0.398)	(0.258)
$\Delta \ln(\text{Income}) \times 100$	0.375***	0.304***	0.507***
	(0.029)	(0.055)	(0.045)
Adj. R^2	0.096	0.011	0.070
Controls	yes	yes	yes
Observations	4,178	4,178	4,178

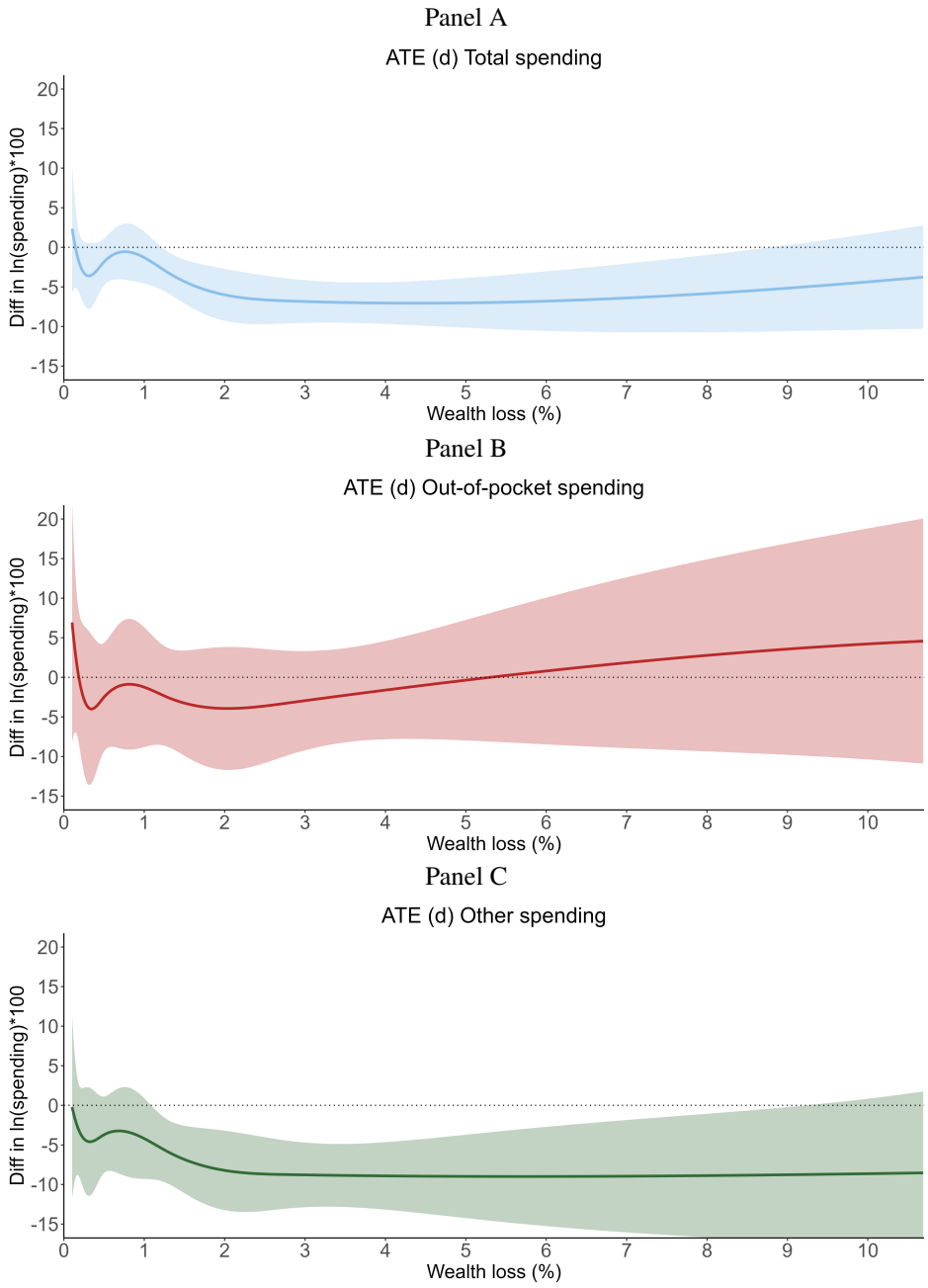
This table presents estimates for the OLS regression: $\Delta \ln Y_i = \beta_1 D_i + X_i'\gamma + \varepsilon_i$. X_i includes the change in log income and change in log wealth (both measured between the corresponding pre- and post-shock periods and scaled by 100), a mortgage dummy, and 10-year age buckets. $\Delta \ln Y_i$ denotes the change in log spending between the corresponding pre- and post-shock periods and scaled by 100. Panel A uses a 3-month horizon (2015Q1 vs. 2014Q1), Panel B a 6-month horizon (2015Q1-Q2 vs. 2014Q1-Q2), and Panel C a 9-month horizon (2015Q1-Q3 vs. 2014Q1-Q3). D_i measures the January 2015 valuation change normalized by mean 2014 financial wealth (in percent). All variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered at the individual level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels.

4.2 Continuous treatment analysis

Figure 6, Panel A displays the dose-response curve for total spending for the sample of clients with valuation losses between -0.1 and -10.7 percent. Total spending in 2015Q1 declines compared to 2014Q1 throughout this range of valuation losses. However, the figure reveals that the relationship

between valuation losses and the spending decline is not linear. Instead, it appears that the impact on spending peaks at wealth valuation losses of 4-5 percent and is almost flat thereafter.

Figure 6: Continuous treatment estimates - 2015Q1 vs. 2014Q1



This plot shows ATE estimated using the time-averaged response curve from Callaway, Goodman-Bacon, and Sant'Anna (2024b). Outcome: log mean spending. Controls: change in log income, change in log wealth, mortgage dummy, and 10-year age buckets. Spending, income, and wealth changes are winsorized (1st-99th percentiles). Pre-period: 2014:01-2014:03; post-period: 2015:01-2015:03. Shaded areas show 95% pointwise confidence intervals based on cluster-robust influence-function standard errors.

Figure 6, Panels B and C disaggregate the effect by spending category. In line with our linear two-way effects estimates, we find that the overall decline is driven by other spending (wire transfers), while out-of-pocket spending (cash, debit card, credit card) shows statistically insignificant changes. The wealth effect on other spending peaks at moderate wealth valuation losses of 3 percent and is almost flat thereafter.

Table 4 summarizes the distribution of treatment effects for this group of clients with valuation losses between -0.1 and -10.7 percent. The estimated ATE for losses in this range (compared to the control group) suggests that total spending decreased by 3.8 percent in the first quarter of 2015 relative to the same period in 2014. The minimum ATE for total spending of -7.06 is reached when the wealth loss is 4.4%. In this sample, out-of-pocket spending decreased by 1.6 percent, while other spending fell by 5.9 percent.

Table 4: Estimated treatment effects for clients with valuation losses between -0.1 and -10.7%

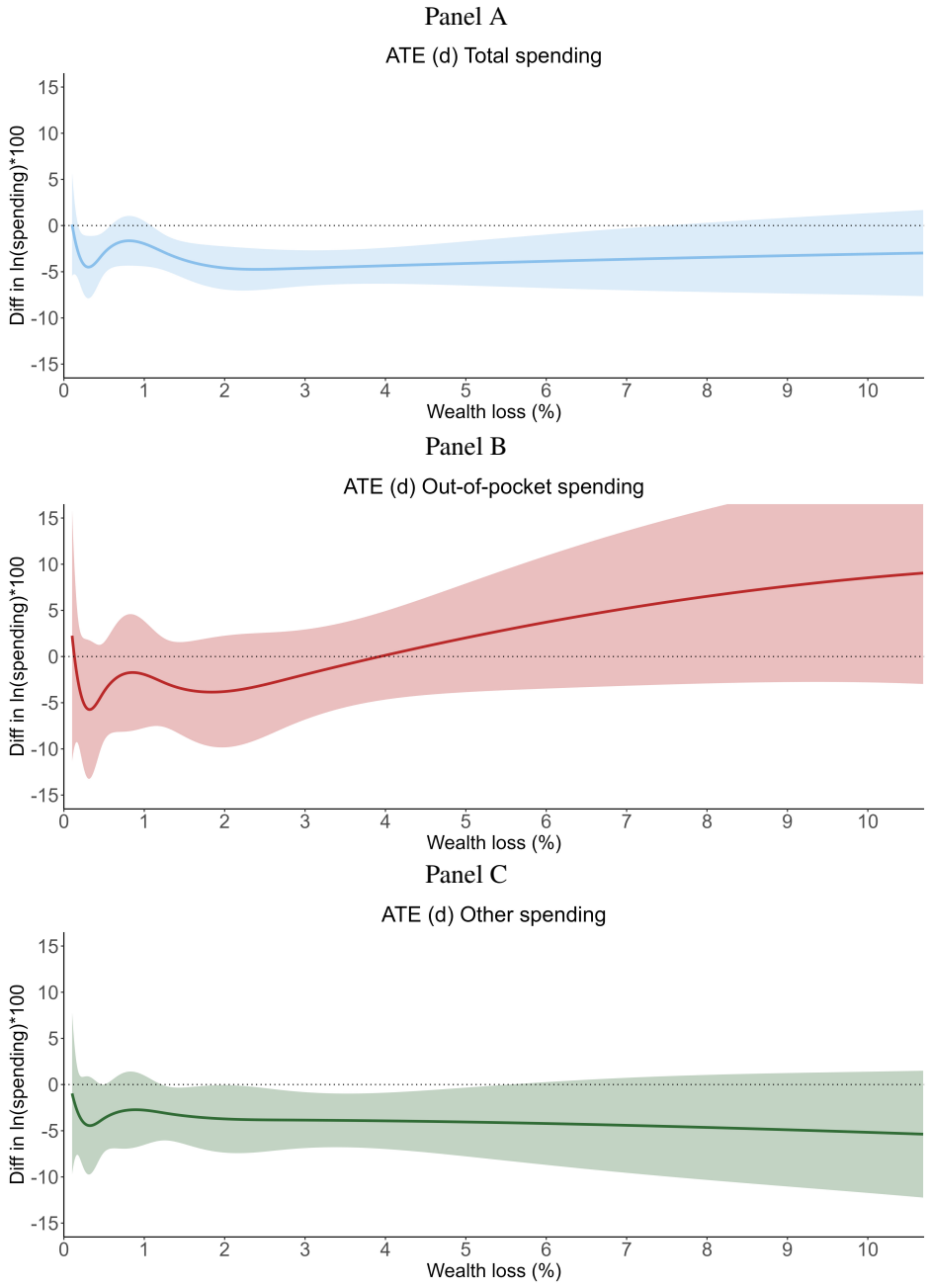
	Mean	Median	Min	Max
		3-month horizon		
Total spending	-3.79	-3.56	-7.06	2.36
Out-of-pocket spending	-1.62	-2.15	-4.00	6.93
Other spending	-5.93	-5.68	-8.99	-0.21
		6-month horizon		
Total spending	-3.41	-3.77	-4.74	0.11
Out-of-pocket spending	-1.97	-2.56	-5.74	9.04
Other spending	-3.51	-3.70	-5.37	-0.96
		9-month horizon		
Total spending	-1.81	-2.11	-4.25	0.69
Out-of-pocket spending	0.04	-0.02	-4.42	7.63
Other spending	-2.39	-2.28	-6.54	1.27

This table reports summary statistics of the estimated treatment effects across spending categories at the three-, six-, and nine-month horizons. Estimates are reported for clients with wealth valuation changes between -0.1% and -10.7% in January 2015 (normalized by 2014 financial wealth).

Figures 7 and 8 present the estimated response curves for the six- and nine-month horizons. The overall pattern of the spending response remains similar across horizons. However, the magnitude of the spending decline is attenuated at the six- and nine-month horizon compared to the three-month horizon. Table 4 reports the corresponding summary of the estimated ATEs for losses between 0.1 and 10.7 percent of 2014 financial wealth. At the six-month horizon, total spending declines by an

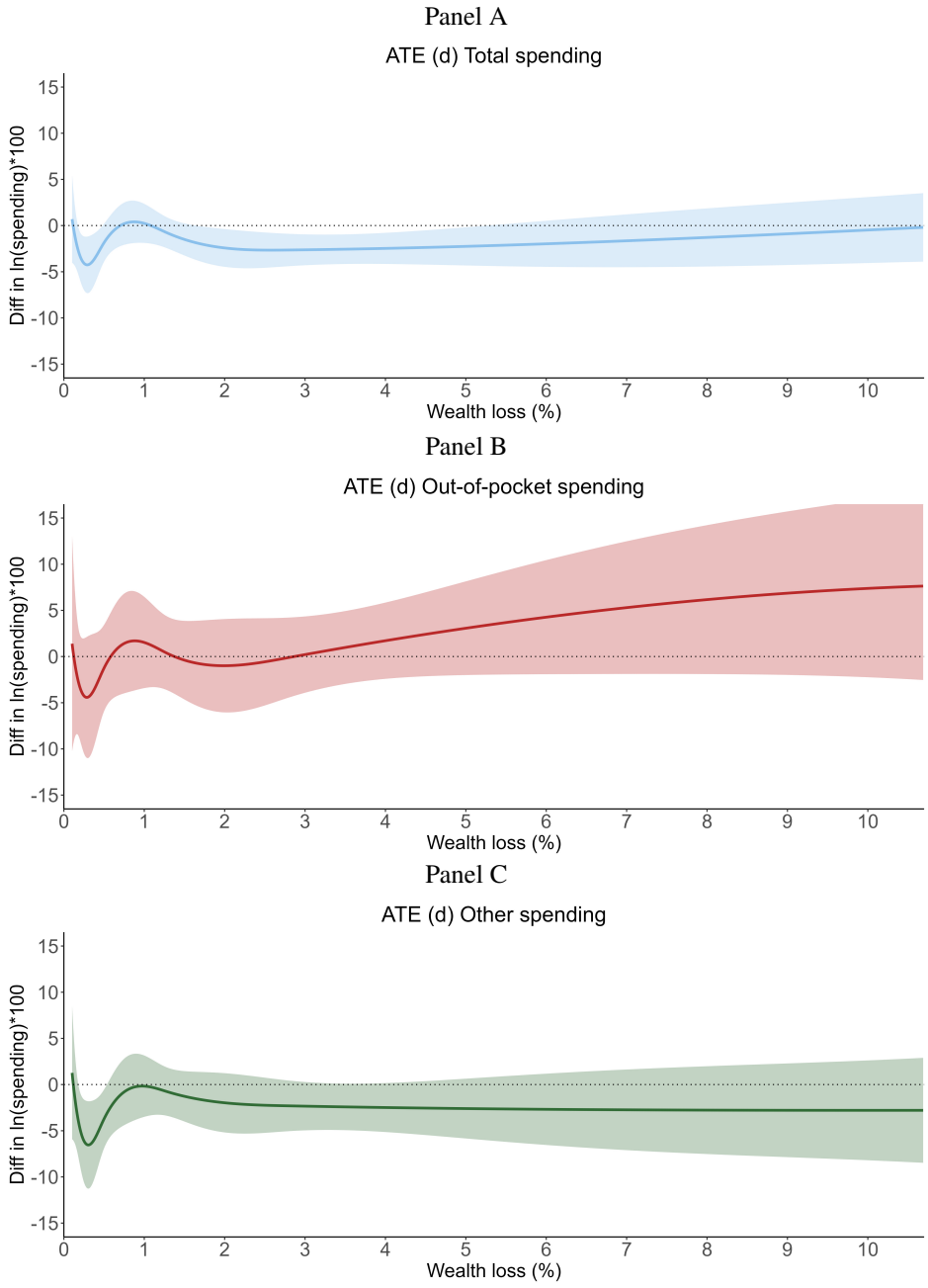
average of 3.4 percent among these clients, with a substantial contraction in other spending of 3.5 percent. At the nine-month horizon, the magnitude of the effects is even smaller, with total spending falling by 1.8 percent and other spending by 2.4 percent on average. Overall, the results indicate that the spending response to valuation losses induced by the Swiss franc shock was immediate and significant, but also phased out rapidly over the medium term. These findings are consistent with recent evidence on the short-lags of monetary policy (Buda et al., 2025).

Figure 7: Continuous treatment estimates - 2015Q1-Q2 vs. 2014Q1-Q2



This plot shows ATE estimated using the time-averaged response curve from Callaway, Goodman-Bacon, and Sant'Anna (2024b). Outcome: log mean spending. Controls: change in log income, change in log wealth, mortgage dummy, and 10-year age buckets. Spending, income, and wealth changes are winsorized (1st-99th percentiles). Pre-period: 2014:06-2014:06; post-period: 2015:06-2015:06. Shaded areas show 95% pointwise confidence intervals based on cluster-robust influence-function standard errors.

Figure 8: Continuous treatment estimates - 2015Q1-Q3 vs. 2014Q1-Q3



This plot shows ATE estimated using the time-averaged response curve from Callaway, Goodman-Bacon, and Sant'Anna (2024b). Outcome: log mean spending. Controls: change in log income, change in log wealth, mortgage dummy, and 10-year age buckets. Spending, income, and wealth changes are winsorized (1st-99th percentiles). Pre-period: 2014:01-2014:09; post-period: 2015:01-2015:09. Shaded areas show 95% pointwise confidence intervals based on cluster-robust influence-function standard errors.

5 Financial Asset Valuation and Consumption

Is the short-run response of consumer spending to wealth valuation effects triggered by the Swiss franc shock specific to this natural experiment? Or does this response mirror that of any market driven change in asset prices and portfolio valuations? In this section, we validate the wealth effects induced by the Swiss franc shock on consumer spending. We estimate the contemporaneous marginal propensities to consume out of monthly asset valuation changes over a 48-month observation period (2013m1 to 2016m12) for the same sample of clients.

5.1 Estimation

Following the empirical literature (see e.g. Di Maggio et al. (2020)), we specify a linear regression model in which changes in consumption are explained by contemporaneous changes in financial wealth valuations and income. We also include lagged values of changes in financial wealth as a control variable. All variables are expressed as first differences in CHF values. Descriptive statistics of these transformed variables are reported in Appendix Table A2. Specifically, we estimate the following OLS regression equation

$$\Delta\text{Spending}_{it} = \beta_1 \Delta\text{Valuation}_{it} + \beta_2 \Delta\text{Income}_{it} + \beta_3 \Delta\text{Wealth}_{it-1} + \delta_t + \epsilon_{it}$$

Where $\Delta\text{Spending}_{it}$ denotes the monthly change in spending for individual i in period t; ΔValuation captures capital gains or losses due to asset revaluation; ΔIncome_{it} refers to monthly changes in total income; and $\Delta\text{Wealth}_{it-1}$ is the lagged monthly change in total wealth level, controlling for potential wealth effects beyond valuation changes. Year-month fixed effects δ_t absorb common macroeconomic shocks and seasonal patterns in spending. The coefficient of interest is β_1, which captures the MPC out of valuation changes in financial wealth.

5.2 Results

Table 5 presents our full-sample regression results. We find that the contemporaneous MPC out of valuation changes in financial wealth is on average 8% in our sample. This estimate implies that, on average, a 100 CHF loss in financial wealth leads to a decline in monthly total spending of 8 CHF. Our analysis of the Swiss franc shock revealed that the response of total spending was

driven by other spending (wire transfers) while out-of-pocket spending (cash and card payments) was not affected. We confirm this finding in our analysis of contemporaneous MPC for our full observation period. Column (2) of Table 5 shows that out-of-pocket spending exhibits negligible responsiveness to wealth shocks. By contrast, column (3) of Table 5 shows that other spending is responsive to financial wealth shocks, with a magnitude nearly identical to total spending.

Our MPC estimates for the full observation period compare well to our two-way fixed-effects estimates for the response to the January 2015 Swiss franc shock. Consider a client with average financial wealth in our sample (193,000 CHF) and average total spending (9,305 CHF). A 1% valuation loss on this average wealth implies a reduction in wealth by 1,930 CHF. At an average MPC of 8 cents per 1 CHF, this implies a reduction in spending by 154 CHF per month, which corresponds to a 1.6% immediate decline in monthly total spending. By comparison, our two-way fixed-effects estimates in Table 3 reported a 0.7% decline in total spending in the 3 months following the Swiss Franc shock. However, as revealed in that table, the effect of the shock on spending attenuates rapidly over time.

Our estimated MPC compare well to estimates reported by Galli (2019), who uses annual aggregate Swiss data and finds that a 1 CHF increase in financial wealth raises next-year consumption by about 1.3-1.6 cents. Our estimates also compare well to those based on survey data (Paiella and Pistaferri, 2017) and annual administrative (Di Maggio et al., 2020), which report MPC of 3% out of capital gains for Italian and (wealthy) Swedish households.[13] In comparison to these studies which calculate capital gains from annual administrative data and measure consumption response over long horizons our estimates capture short-run spending responses to contemporaneous passive valuation shocks.

To further facilitate comparability of our estimates with the literature, in Table 6 we split the sample into wealth deciles. We report separate estimates for the bottom half of the wealth distribution (deciles 1 to 5), the middle group (deciles 6 to 8), and the top two deciles (9 to 10). The estimated MPC is 0.096 for households in the bottom half of the wealth distribution, 0.059 for those in deciles 6-8, and 0.062 for the top two deciles. This decreasing pattern of the MPC by wealth

[13]Larger MPCs are found when dividends are separated from capital gains, with values of 16 cents in Baker et al. (2006) and 40-60 cents in Di Maggio et al. (2020).

level is consistent with prior work such as Di Maggio et al. (2020). Across all regressions, the estimated MPC out of income changes is also sizable, ranging from 0.253 to 0.354, and consistently statistically significant.

Table 5: Marginal propensity to consume by spending category

	Outcome: Δ Spending (CHF)		
	Total	Out-of-pocket	Other spending
Δ Valuation (CHF)	0.080***	0.001	0.079***
	(0.016)	(0.002)	(0.016)
Δ Income (CHF)	0.318***	0.005***	0.310***
	(0.008)	(0.001)	(0.008)
Control for lagged change in wealth	yes	yes	yes
Time FE	yes	yes	yes
Number of months	48	48	48
Number of individuals	4,178	4,178	4,178
Adj. R2	0.225	0.023	0.221
Obs	192,188	192,188	192,188

This table presents estimates for the OLS regression $\Delta\text{Spending}_{it} = \beta_1\Delta\text{Valuation}_{it} + \beta_2\Delta\text{Income}_{it} + \beta_3\Delta\text{Wealth}_{it-1} + \delta_t + \epsilon_{it}$. All variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered at the individual level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels. Data for the period 2013:01-2016:12.

Table 6: Marginal propensity to consume across wealth groups

	Outcome: Δ Total spending (CHF)		
	Deciles 1-5	Deciles 6-8	Deciles 9-10
Δ Valuation (CHF)	0.096*	0.059*	0.062**
	(0.041)	(0.026)	(0.024)
Δ Income (CHF)	0.354***	0.363***	0.253***
	(0.012)	(0.015)	(0.016)
Control for lagged change in wealth	yes	yes	yes
Time FE	yes	yes	yes
Number of months	48	48	48
Number of individuals	4,178	4,178	4,178
Adj. R2	0.225	0.023	0.221
Obs	192,188	192,188	192,188

This table presents estimates for the OLS regression $\Delta\text{Spending}_{it} = \beta_1\Delta\text{Valuation}_{it} + \beta_2\Delta\text{Income}_{it} + \beta_3\Delta\text{Wealth}_{it-1} + \delta_t + \epsilon_{it}$. All variables are winsorized at the 1st and 99th percentiles. Standard errors are clustered at the individual level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels. Data for the period 2013:01-2016:12.

As a result of the January 2015 Swiss franc shock, almost all clients in our sample experienced a

substantial valuation loss to their financial assets. If the spending response of clients is asymmetric to valuation gains and losses, our estimates in section 4 may not extend to expansionary monetary shocks which induce significant positive wealth gains. To examine whether consumption reacts differently to financial wealth gains and losses, we estimate an asymmetric version of the previous equation, as follows.

$$\Delta\text{Spending}_{it} = \beta_1^+ \Delta\text{Valuation}_{it}^+ + \beta_1^- \Delta\text{Valuation}_{it}^- + \beta_2 \Delta\text{Income}_{it} + \beta_3 \Delta\text{Wealth}_{it-1} + \delta_t + \epsilon_{it}$$

Where $\Delta\text{Valuation}_{it}^+$ equals the observed change in financial wealth if it is positive and zero otherwise, and $\Delta\text{Valuation}_{it}^-$ equals the observed change if it is negative and zero otherwise. The coefficients β_1^+ and β_1^- capture the marginal propensities to consume out of wealth gains and losses, respectively. Table 7 reports separate MPC estimates for positive and negative valuation changes. On average across all clients, spending reacts only slightly more to declines in financial wealth (MPC of 0.086) than to gains in financial wealth (MPC of 0.075).

Table 7: Marginal propensity to consume under asymmetric responses to financial wealth gains and losses

	Outcome: Δ Spending (CHF)		
	total	out-of-pocket	other spending
Positive Δ valuation (CHF)	0.075***	0.001	0.074***
	(0.019)	(0.002)	(0.019)
Negative Δ valuation (CHF)	0.086***	0.001	0.084***
	(0.023)	(0.002)	(0.023)
CHF Δ Income (CHF)	0.318***	0.005***	0.310***
	(0.008)	(0.001)	(0.008)
Control for lagged change in wealth	yes	yes	yes
Time FE	yes	yes	yes
Number of months	48	48	48
Number of individuals	4,178	4,178	4,178
P-val. Wald test ($\beta_1^+ = \beta_1^-$)	0.710	0.836	0.713
Adj. R2	0.225	0.023	0.221
Obs	192,188	192,188	192,188

This table presents OLS estimates of the marginal propensity to consume out of changes in CHF valuation wealth and income. Standard errors are clustered at the individual level. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels. Data are winsorized at the 1st and 99th percentiles. Deciles are based on wealth in 2013. Sample period: 2013:01-2016:12.

6 Conclusion

This paper investigates the wealth channel of monetary policy using the unexpected removal of the Swiss National Bank's minimum exchange rate in January 2015 as a natural experiment. The sudden appreciation of the Swiss franc and accompanying policy rate cut generated sizeable valuation changes across household portfolios, allowing us to isolate the effect of policy-induced wealth shocks on consumption. Using granular administrative data from a retail bank we document substantial, but heterogeneous short-term spending responses to these valuation shocks.

Our findings yield five main insights. First, households that experienced portfolio valuation losses following the Swiss franc shock reduced their total spending significantly in the short-term. Second, the composition of spending adjustments suggests that large-ticket expenditures accounted for most of the decline, while everyday out-of-pocket consumption was less responsive. Third, the spending response attenuated quickly over time. Fourth, the response of total spending is highly non-linear: households with moderate valuation losses reduce their spending the most. Fifth, the response of consumer spending to this policy shock mirrors the response to "everyday" market driven valuation changes across our observation period.

Our results underscore that in a small open economy exchange rate movements can play a multifaceted role in monetary policy transmission. We provide direct evidence that exchange rate and interest rate conditions affect consumption not only through intertemporal substitution or the substitution between domestic and foreign goods, but also through changes in household balance sheets. More generally, these results confirm that the exposure of household balance sheets to financial markets amplifies the relevance of the wealth channel in monetary transmission.

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Appendix

Table A1: Sample selection

	Number of investors
Initial sample	22,020
Exclude:	
Not main-bank clients	9,044
Total monthly spending= 0 in at least one month	3,048
Income in at least one month= 0	912
Only CHF deposits	4,838
Final sample	4,178

This table presents the filters to the initial sample.

Table A2: Descriptive statistics: changes in spending, income and wealth

	mean	p1	p5	p25	p50	p75	p95	p99	sd	obs
Panel A: Spending changes (CHF)										
Spending										
CHF Δ total spending	69	-42,587	-13,784	-2,194	0	2,267	14,048	43,948	33,212	196,366
CHF Δ out-of-pocket spending	7	-4,052	-2,089	-500	0	519	2,097	4,052	1,410	196,366
CHF Δ other spending	62	-42,092	-13,384	-1,867	0	1,921	13,614	43,578	33,139	196,366
Panel B: Income and wealth changes (CHF)										
CHF Δ income	49	-41,403	-8,240	-550	0	569	8,591	42,794	37,991	196,366
CHF Δ valuation financial wealth	104	-10,506	-2,597	-172	0	292	3,028	11,125	8,294	200,544
CHF Δ financial wealth lag	591	-48,327	-14,503	-2,283	403	2,960	12,782	54,020	36,714	192,188

The table presents descriptive statistics for monthly changes in spending, wealth valuation, and controls, based on investor-month (N*T) data for the period 2013:02 to 2016:12.

Figure A1: Spending and incoming payments

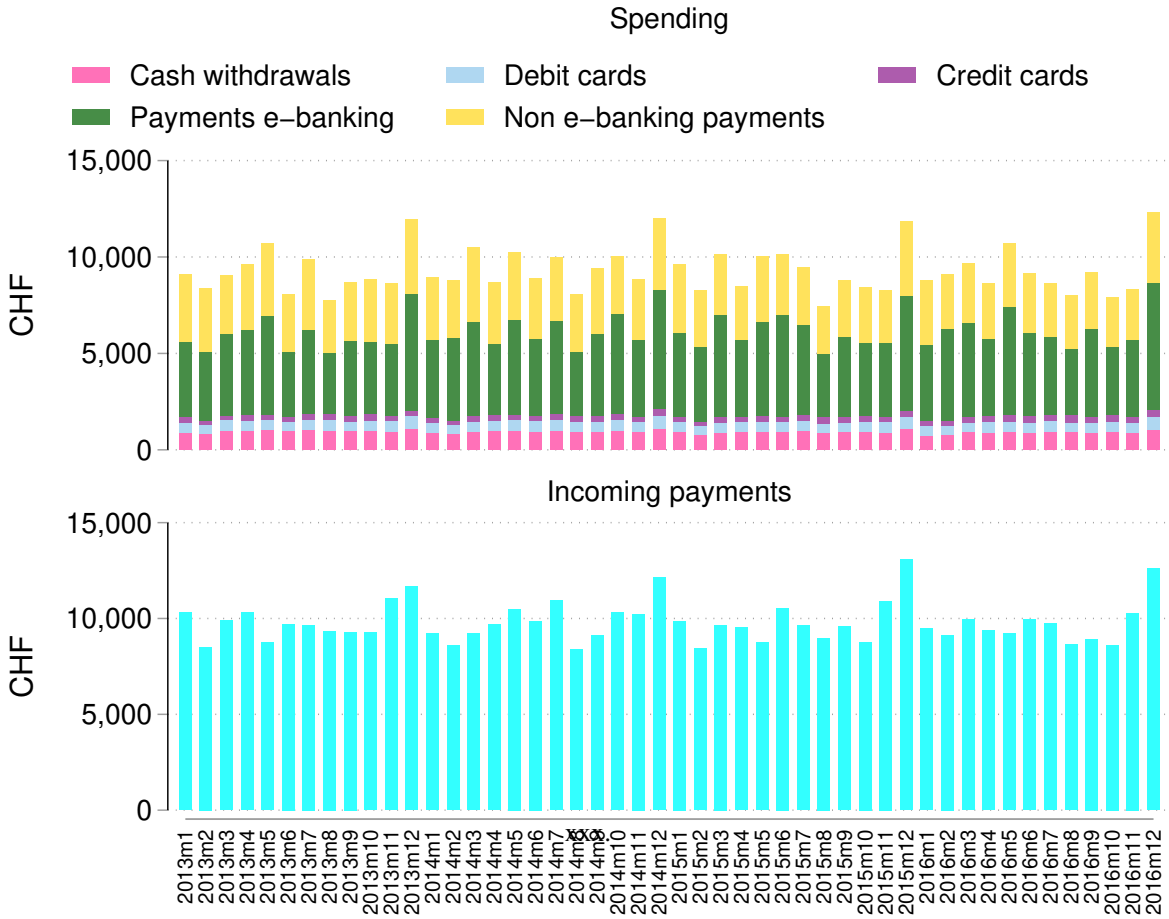
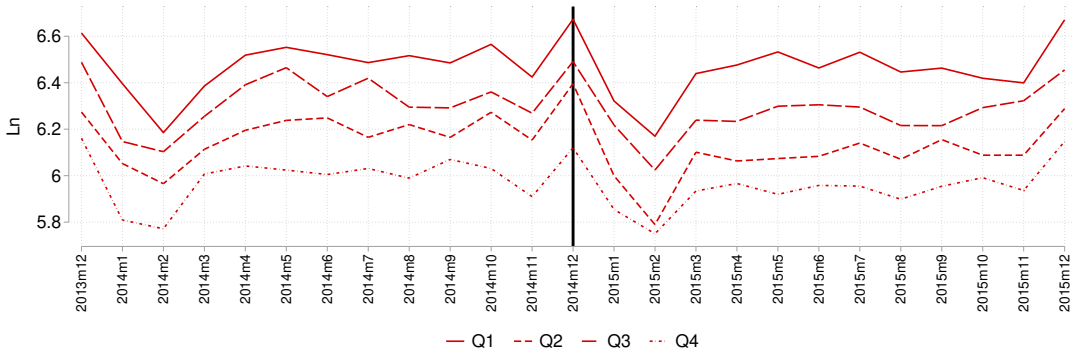
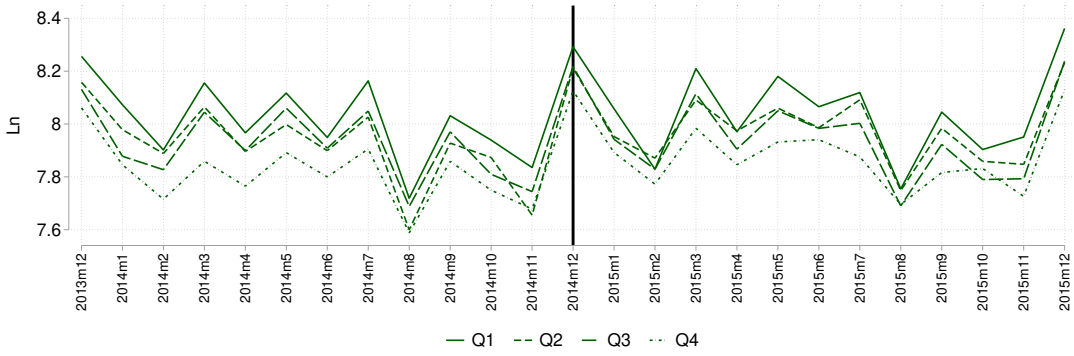


Figure A2: Trends in spending and income

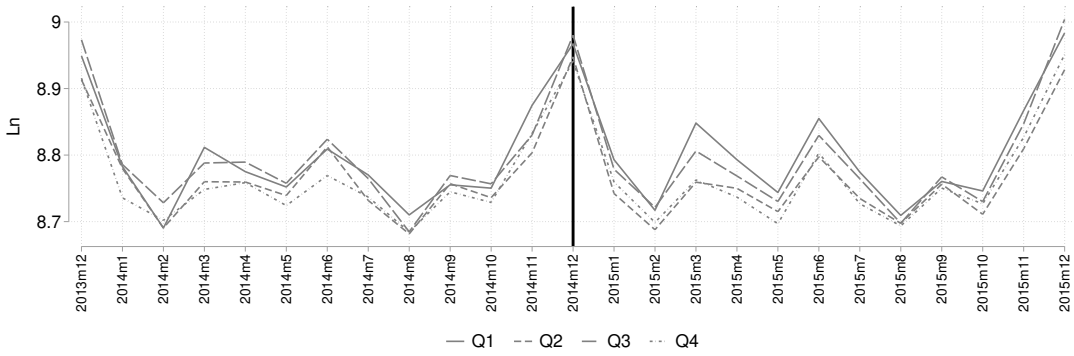
Panel A: Trends in out-of-pocket spending



Panel B: Trends in other spending

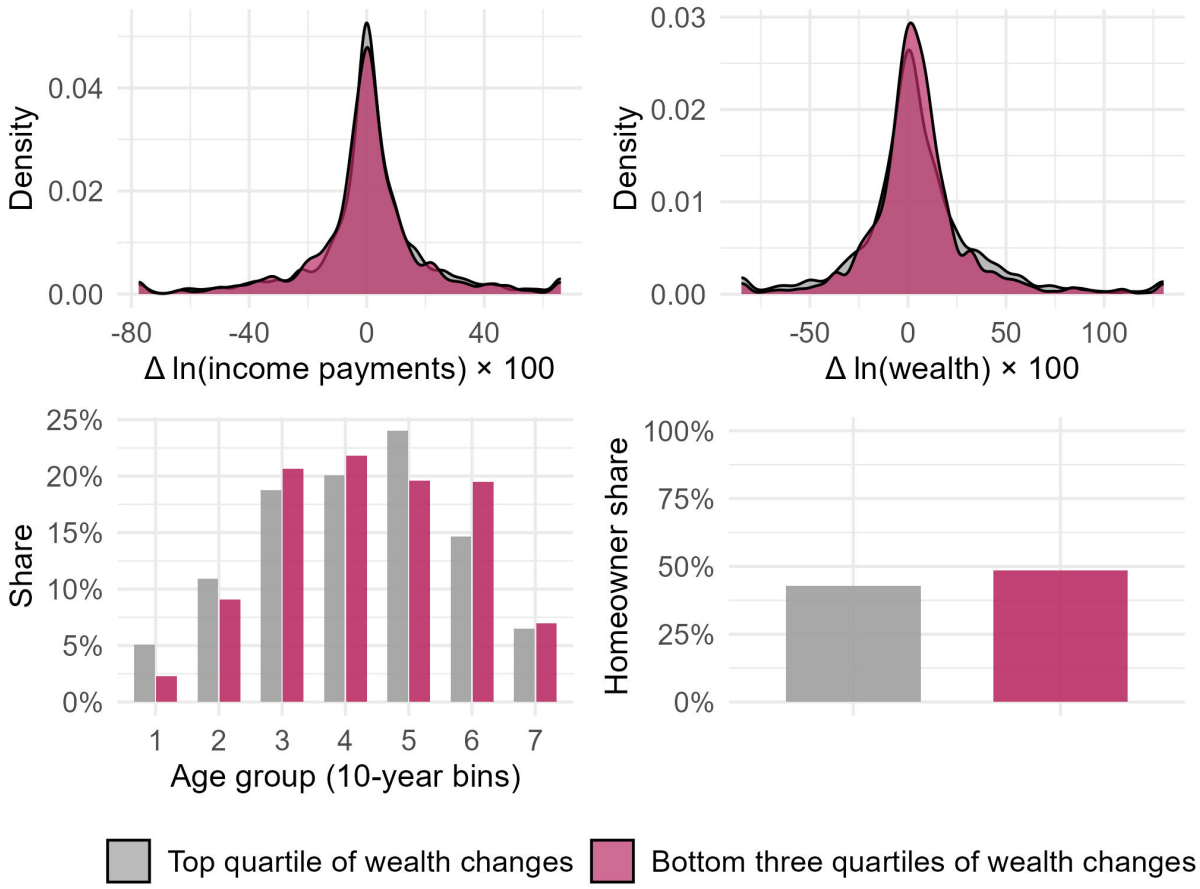


Panel C: Trends in income



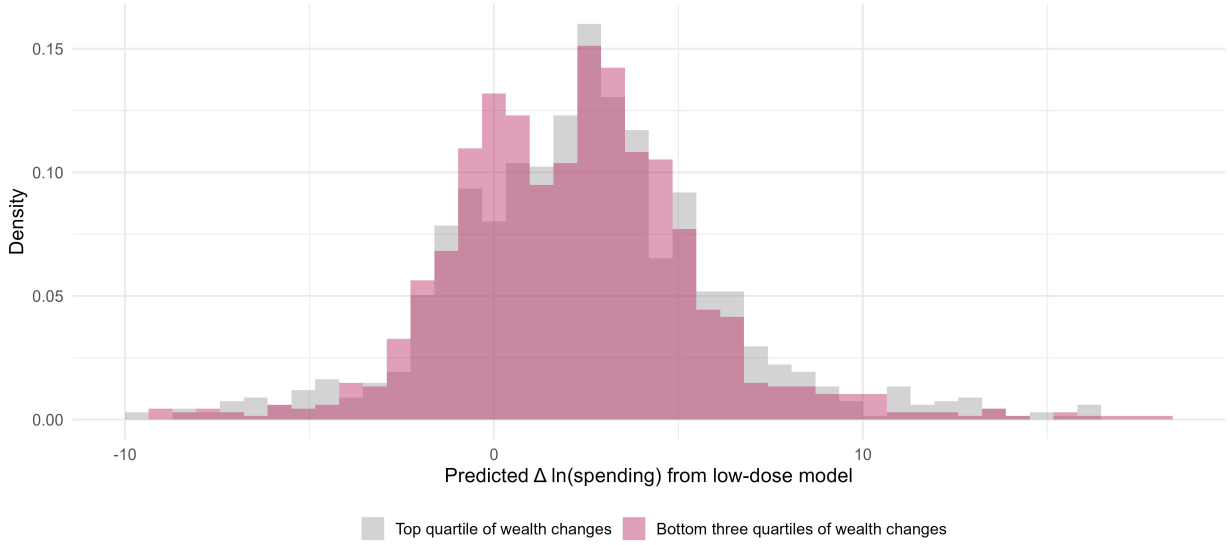
This figure shows the mean of log spending and log incoming payments for groups defined by valuation changes in January 2015. The bottom three quartiles correspond to valuation losses below -0.1% (Quartiles 1–3), while the top quartile corresponds to valuation changes above -0.1% (Quartile 4). The sample is a balanced panel of 4,178 bank clients. The vertical line marks the period before the shock is observed.

Figure A3: Covariate overlap between the three bottom and top quartile of wealth changes



This figure shows the distribution of covariates across individuals in the bottom three quartiles and the top quartile of valuation changes in January 2015. The bottom three quartiles correspond to valuation losses below -0.1% (Quartiles 13), while the top quartile corresponds to valuation changes above -0.1% (Quartile 4). Income and wealth changes are expressed as monthly log differences multiplied by 100. Age refers to 10-year bins based on age in 2013. The homeowner share denotes the fraction of individuals holding a mortgage.

Figure A4: Overlap in predicted counterfactual outcomes across treatment groups



This plot shows the distribution of predicted changes in log spending obtained from the regression $\Delta \ln(\text{spending})_i = \alpha + \beta_1 \Delta \ln(\text{income})_i + \beta_2 \Delta \ln(\text{wealth})_i + \beta_3 \text{age group}_i + \beta_4 \text{homeowner}_i + \varepsilon_i$, estimated on individuals in the top quartile of wealth changes (low-dose group). The fitted coefficients are used to predict $\Delta \widehat{\ln(\text{spending})}_i$ for all individuals in the sample. The x-axis reports predicted changes in log spending, and the y-axis shows the corresponding density.