



Quantitative Easing and Portfolio Rebalancing

Micro Evidence from Irish Resident Banks

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Abstract

This *Economic Letter* examines whether the portfolio rebalancing channel has been effective for Irish resident banks after the introduction of the ongoing Extended Asset Purchasing Programme (EAPP) initiated by the European Central Bank (ECB) in March 2015. Using a unique security level dataset on the programme's purchases and banks' holdings, I find that banks did not change purchasing trends regarding securities eligible to be bought under the EAPP. This is consistent with the hypothesis about exogenous constraints that might limit the pass-through of asset purchases to the real economy through the banking system.

1 Introduction

Asset purchasing programmes have become an increasingly popular tool of unconventional monetary policy after the recent Global Financial Crisis. Besides effects on exchange rates and asset prices, this measure should help to restore credit supply to firms and households. Given that (1) European banks hold relatively sizable portfolios of assets bought under the EAPP and (2) firms in Europe rely heavily on funding through bank credit (Langfield and Pagano, 2015), an important transmission channel could operate through the banks'

balance sheets. In theory, portfolio rebalancing occurs as banks experience an increase in liquidity and/or capital as a result of asset purchasing programmes. Increased liquidity for banks can result from two channels: first, the central bank can buy securities from commercial banks directly. Secondly, when securities are bought from non-banks, these can deposit the proceeds of these sales at their banks. At higher levels of liquidity, banks might then have incentives to rebalance their portfolios into riskier assets such as loans to firms and households. On the other hand, quantitative easing has been shown to push up asset prices

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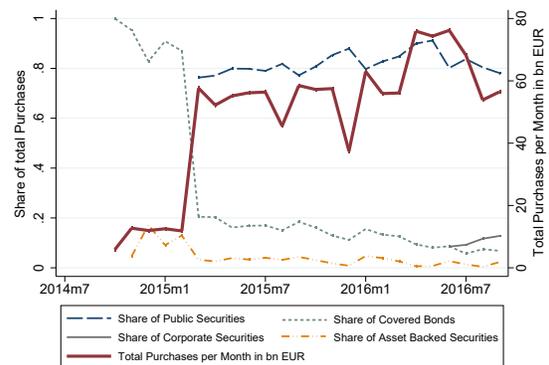
so that holders of these assets experience an increase in capital through valuation gains. In the same manner, this extra capital might then enable institutions to invest into riskier assets. While Bua and Dunne (2017) show patterns of rebalancing for investment funds, this letter analyses whether either of these channels lead to portfolio rebalancing for Irish resident banks.

2 Institutional Setting

The ECB's Asset Purchases

Figure 1 shows the relative share of the different programmes under the Asset Purchasing Programme (APP) as well as the sum of total purchases. These started in October 2014 when the third covered bond purchase programme (CBPP3) and the programme for asset-backed securities (ABSPP) were initiated, summing up to approximately €10 billion per month. In March 2015, the extended asset purchase programme (EAPP) was introduced which adds the extensive public sector purchase programme (PSPP). Representing around 80% of total purchases, this is by far the largest out of the four programmes. It is split into purchases of debt of supranational institutions located in the euro area (12%)² and governments (88%). Thereby, the latter are allocated to bonds issued by euro-area governments according to the so-called capital key, which reflects the GDP and population share of each member state. These two determinants have equal weighting so that countries with a large population and high GDP have a relatively high share compared to smaller countries, such as Ireland (2% in 2015). From June 2016 onwards,

Figure 1: The EAPP Programme



Source: Central Bank of Ireland

the ECB increased the total amount of purchases to €80 billion per month, adding another programme consisting of highly rated corporate securities (CSPP) which represented around 10 % of total purchases in the months following its introduction.

The Banks' Security Holdings

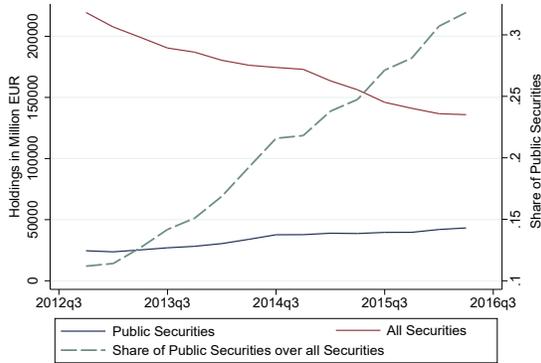
As a next step, I analyse the banks' balance sheets and whether one can observe a change in the type of securities around the introduction of the EAPP. In Figure 2, one can see that the share of public securities increased steadily up to 32% (of total securities) by June 2016.³ This is the result of two factors: overall, total security holdings decreased while holdings of public securities increased, especially in the period preceding the EAPP.⁴ This suggests that banks shifted their portfolio of security holdings towards public securities before, as well as after, the introduction of EAPP.

²Supranational institutions in the euro area include the European Financial Stability Facility, the European Investment Bank, the European Stability Mechanism, the European Union, the European Atomic Energy Community, the Council of Europe Development Bank, and the Nordic Investment Bank.

³All values are nominal as reported by the banks.

⁴The decrease of security holdings is in line with the general shrinking of balance sheets in this period (35 % on average).

Figure 2: Banks' Holdings



Source: Central Bank of Ireland, Datastream

3 Empirical Analysis

Data and Sample

In order to be able to pin down the effect of the EAPP on a bank's portfolio, it is necessary to obtain its balance sheet as well as the ECB purchases on a security level, where every security is uniquely identified by an International Securities Identification Number (ISIN). As some institutions do not hold securities with ISIN numbers⁵, the sample consists of 32 institutions listed in the Appendix.⁶ In addition, I obtain security-per-security daily purchases of the ECB under the EAPP. This confidential data is enriched with banks' balance sheet characteristics from bankscope and security-specific information from Datastream.

⁵Another possibility is that banks do not report the ISIN of a security. However, the value of public securities reported without an ISIN is negligible.

⁶I consolidate banks to a group level on national basis as can be seen in the Appendix.

⁷As ECB holdings are only positive after the start of the programme in October 2014, our time frame for this regression is October 2014 until June 2016.

⁸The exact calculations of the dependent variables are provided below Table 1 at the end of the letter.

⁹Total assets are taken from Bankscope at the most consolidated national level.

¹⁰Part of the ECB's purchases are mechanically executed through commercial banks. However, banks have the option to replace the securities so that no "net sale" is visible in the data of quarterly security holdings.

Empirical Approach

The following regression captures the portfolio rebalancing channel:

$$\Delta Holdings_{i,j,t} = \alpha + \beta ECB \Delta Holdings_{j,t} + \gamma_{i,j} + \rho_{i,t} + \epsilon_{i,j,t}$$

where the dependent variable is the quarterly change in holdings of security j by bank i . The independent variable of interest is the change of ECB holdings of security j between quarter t and quarter $t - 1$.⁷ In the most conservative specification, the regression is saturated with bank-security and bank-time fixed effects. To show the robustness of the results, the change in holdings of security j by bank i in quarter t is measured in three different ways.⁸ Following Crosignani et al. (2017), panel A of Table 1 uses the quarterly change in holdings of security i scaled by total bank assets.⁹ Panel B uses banks' *Net Buys* (following Peydro et al., 2016) defined as

$$\frac{Holdings_{i,j,t} - Holdings_{i,j,t-1}}{1/2 * (Holdings_{i,j,t} + Holdings_{i,j,t-1})}$$

Finally, Panel C scales the change in the holdings of security i by the total amount outstanding of security i .

I would find portfolio rebalancing in a traditional sense where $\beta < 0$. This would mean that the banks are the net sellers of securities purchased by the ECB.¹⁰ If this is the case, constrained banks could possibly free up money in order to be able to grant new loans to firms and households.

Results

Table 1 shows that the holdings of Irish resident banks correlate positively with the purchases conducted under the EAPP. This means that these banks are not net sellers of securities eligible for the program.¹¹ On the contrary, they seem to target their purchases at the same assets. This confirms the finding of Figure 1 where a sharp increase of holdings of public securities can be observed. This result is in line with the existing literature in many ways. First, Chakraborty et al. (2016), Di Maggio et al. (2016), and Rodnyanski and Darmouni (forthcoming) show that the portfolio rebalancing channel was not effective when the Federal Reserve bought mainly public securities during the second round of their most recent large scale asset purchases. Secondly, Kojen et al. (2017) find that banks in Europe are not the major net sellers of securities bought under the EAPP.

4 Why did banks not rebalance?

The finding above implies that banks prefer to hold European public securities rather than selling them to the ECB and re-investing into higher yielding assets. In the following, I illustrate some possible explanations for the banks' motivation to resist searching for greater yields.

The Regulatory Aspect

Banks optimise not only capital but also risk weights according to regulation (Basel II and III). Within this framework, there are consequences of replacing risk free assets, such as European sovereign bonds, by more risky assets, such as loans. For the latter, higher risk

weights are required. Even though Irish resident banks are currently well above the regulatory thresholds, it is assumed that banks are still targeting low risk weights and high capital ratios within their profit optimization as this might have other advantages, such as lower funding costs. Furthermore, when safe assets are scarce, banks might need sovereign bonds for interbank repo transactions.

Gains from Public Securities

Kojen et al. (2017) find a further decrease of yields of 13bp after the introduction of the EAPP which implies an increase in the price of these securities. This results in an appreciation of the banks' portfolio. Considering the low-interest rate environment in Europe around the time of the announcement of EAPP, this aspect seems even more important. In addition, yields of securities purchased under the EAPP are still higher than the deposit facility rate.¹²

Banks buy pro-cyclically

Considering the increase in the assets' prices, our finding is in line with the literature on investment behaviour of different institutions. Theoretically, De Long et al. (1990) show that it may be rational to buy when prices rise and sell when prices fall so that prices can be pushed away from fundamental values. Most recently, Timmer (2016) shows that in contrast to insurance companies and pension funds, banks respond pro-cyclically to price changes and therefore buy securities that trade at a premium. The analysis shows that banks increase their holdings at a faster pace when prices had gone up in the previous quarter. This concludes that banks might speculate that the price will appreciate further in the future. As banks do not anticipate EAPP to end in the short-term, this mechanism might be at work.

¹¹For robustness, we run this regression again just for banks that issue credit to firms and households in Table 2 in the Appendix.

¹²This is mechanical as the ECB has only purchased securities above the deposit facility rate in the observed period.

No Need for Recapitalization

Portfolio rebalancing will only occur if the portfolio is sub-optimal for the bank in the period before the intervention. As a result of the bail-out of Irish banks in 2011, these are currently well-capitalized. If capital is already at optimal levels, a further increase through valuation gains due to an overall increase in asset prices after the EAPP will not necessarily incentivise portfolio rebalancing.

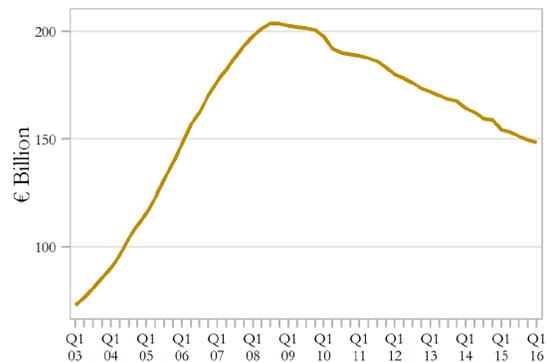
No Need for Liquidity

The same argument can be made for liquidity. Furthermore, there were forms of liquidity injection which already helped to restore the ability of banks to issue new credit before EAPP. Carpinelli and Crosignani (2017) suggest that the ECB 3-Year LTRO program was successful as troubled banks expand credit supply after the central bank liquidity provision.

Lack of Demand for Credit

One option for the bank to shift investment towards riskier - and therefore higher yielding assets - is the “bank lending channel” where banks sell public sovereign debt or exploit an appreciation of their portfolio to issue more credit to households and firms. However, this is constrained by the demand for credit in a domestic economy. Shirai (2017) argues that this prevented the full success of Quantitative Easing in Japan where credit demand is naturally low due to its aging population. In Ireland, households and firms are also deleveraging. Figure 3 shows that the total credit outstanding to households has been decreasing since the crisis. Although we observe positive growth in issuance of new loans since the start of EAPP, this remains relatively subdued and below levels needed to offset loan redemptions. The same trend can be observed for corporate credit.

Figure 3: Household Credit Outstanding



Source: Household Credit Market Report 2016H2

5 Conclusion

One of the main channels of transmission of asset purchasing programmes is the so-called portfolio rebalancing channel. In reaction to decreasing yields of securities bought by the central bank, investors have incentives to shift their investments towards assets with higher expected returns. Using a unique security level dataset on ECB purchases and banks' holdings, however, I find that banks did not change purchasing trends regarding securities eligible to be bought under the EAPP.

As a potential explanation, I propose that this is due to the presence of exogenous constraints that are crucial for policy decisions. Institutional or country-specific characteristics such as a lack of demand for credit or the regulatory environment might make portfolio rebalancing sub-optimal for investors. The findings are in line with the literature which shows that (1) the ECB buys securities mainly from foreign investors instead of Euro Area banks (2) asset purchasing programmes of public securities do not lead to significant portfolio rebalancing of banks, and (3) banks buy securities pro-cyclically.

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	(1)	(2)	(3)	(4)
	Δ Sec.	Δ Sec.	Δ Sec.	Δ Sec.
Panel A				
ECB Purchases	0.21049*** (6.21)	0.07961** (2.05)	0.09885*** (3.26)	0.10815*** (3.67)
R2	0.009	0.327	0.453	0.449
N	4996	4870	4870	4825
Panel B				
ECB Purchases	3.19688*** (7.59)	2.63362*** (4.96)	2.33235*** (4.32)	2.35603*** (4.31)
R2	0.018	0.311	0.354	0.378
N	6004	5881	5881	5820
Panel C				
ECB Purchases	0.04081*** (7.00)	0.03216*** (4.14)	0.03213*** (4.17)	0.03251*** (4.20)
R2	0.010	0.337	0.376	0.367
N	6065	5935	5935	5873
Time Fixed Effects	YES	YES	NO	NO
Bank Fixed Effects	NO	YES	NO	NO
ISIN Fixed Effects	NO	YES	YES	NO
Bank-Time Fixed Effects	NO	NO	YES	YES
Bank-ISIN Fixed Effect	NO	NO	NO	YES

Table 1: **Panel Fixed Effects Regression** Source: Central Bank of Ireland, Bankscope, and Datastream. Our sample for this regression includes the majority of all observations where bank level information was available on Bankscope (national consolidation) and ISIN level information was available on Datastream.

For robustness, we consider different definitions of portfolio rebalancing following the literature:

- Panel A: In an attempt to control for the total amount outstanding and the size of the banking sector we follow Crosignani et al. (2017) and define the dependent variable as

$$\frac{\Delta \text{Security}_{i,j,t}}{\frac{\text{Total Amount Outstanding}_{j,t}}{\frac{\text{Total Assets}_i}{\text{Size Banking Sector}_t}}}$$

- In Panel B, we follow Peydro et al. (2016) and define the dependent Variable as:

$$\frac{\text{Holdings}_{i,j,t} - \text{Holdings}_{i,j,t-1}}{1/2 * (\text{Holdings}_{i,j,t} + \text{Holdings}_{i,j,t-1})}$$

- In Panel C, we simply use the change of the holdings over the total amount outstanding:

$$\frac{\Delta \text{Security}_{i,j,t}}{\text{Total Amount Outstanding}_{j,t}}$$

In the same manner, the independent variable is scaled by the Total Amount Outstanding of each security j in time t obtained from Datastream.

Appendix

	(1)	(2)	(3)	(4)
	Δ Sec.	Δ Sec.	Δ Sec.	Δ Sec.
Panel A				
ECB Purchases	0.1455*** (4.63)	0.0934*** (3.06)	0.1092*** (3.75)	0.1155*** (4.04)
R2	0.004	0.377	0.401	0.374
N	3491	3399	3399	3366
Panel B				
ECB Purchases	3.0319*** (6.17)	2.4002*** (4.11)	2.3158*** (3.90)	2.3249*** (3.89)
R2	0.025	0.300	0.327	0.351
N	3554	3470	3470	3437
Panel C				
ECB Purchases	0.0378*** (5.76)	0.0301*** (3.67)	0.0310*** (3.75)	0.0311*** (3.72)
R2	0.014	0.369	0.393	0.380
N	3599	3507	3507	3474
Time Fixed Effects	YES	YES	NO	NO
Bank Fixed Effects	NO	YES	NO	NO
ISIN Fixed Effects	NO	YES	YES	NO
Bank-Time Fixed Effects	NO	NO	YES	YES
Bank-ISIN Fixed Effect	NO	NO	NO	YES

Table 2: **Panel Fixed Effects Regression** Source: *Central Bank of Ireland, Bankscope, and Datastream*. Our sample for this regression includes the five major banks in Ireland which issue the majority of total lending to firms and households for our sample period. The findings are robust to including only Irish Banks (3).

Group	Subsidiaries	Balance Sheet Variables
Allied Irish Banks	AIB Mortgage Bank Allied Irish Banks plc EBS Limited EBS Mortgage Finance	Bancscope
Aareal Bank AG		CRS2
BNP Paribas	BNP Paribas SA BNP Paribas Securities Serv Dublin	CRS2
Bank of Montreal Ireland plc		Bancscope
Barclays	Barclays Bank Ireland plc Barclays Bank plc	Bancscope
Belfius Bank, Dublin Branch		CRS2
Bank of Ireland	Bank of Ireland Bank of Ireland Mortgage Bank	Bancscope
Caisse Francaise de Financement Local		CRS2
Citico Bank Nederland NV		CRS2
Credit Suisse	Credit Suisse AG - Dublin Branch Credit Suisse International	CRS2
DZ	DZ Bank Ireland plc DZ-Bank Ireland plc WGZ-Bank Ireland plc	CRS2
Danske Bank A/S		CRS2
DePfa	DePfa ACS Bank DePfa Bank plc Depfa Public Finance Bank	Bancscope

Table 3: **Data Sources**

Group	Subsidiaries	Balance Sheet Variables
Dexia Credit Local		CRS2
EAA Covered Bond Bank plc		CRS2
Elavon Financial Serv. Des. Activity		Bankscope
Hewlett-Packard Intern. Bank plc		CRS2
Intesa Sanpaolo Bank Ireland plc	Intesa Sanpaolo Bank Ireland plc	Bankscope
Investec Bank Plc		CRS2
Irish Bank Resolution Corp. Ltd		CRS2
JP Morgan	JP Morgan Bank (Ireland) plc JP Morgan Bank Dublin plc	CRS2
KBC	KBC Bank Ireland plc KBC Bank NV Dublin Branch	Bankscope
Merrill Lynch Intern. Des. Activity		CRS2
Naspa Dublin		Bankscope
Nationwide Building Society		CRS2
Rabo Ireland DAC		Bankscope
Scotiabank (Ireland) Des Activity		Bankscope
Ulster	The Royal Bank of Scotland plc Ulster Bank Ireland Des. Activity	Bankscope
UniCredit Bank Ireland plc		Bankscope
Wells Fargo Bank International		CRS2
permanent tsb plc.		Bankscope

Table 4: **Data Sources**