WORKING paper

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Impact of the ECB Quantitative Easing on the French International Investment Position[♦]

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ABSTRACT

This paper aims at estimating the impact of the recent Asset Purchase Programs implemented by the ECB - known as Quantitative easing (QE) - on external assets and liabilities recorded in one economy's International Investment Position (IIP). Our analysis focused on the case of France. We start by describing the recent evolution of the four main items constituting the French IIP; namely Portfolio Investments, Other Investments, Derivatives and Direct Investments. We observe ample, albeit temporary, variations of these items surrounding QE programs. This analysis is complemented by an econometric approach in which we consider as QE variables both the announcements of the programs and their actual implementation. QE measures do impact all the items of the French IIP. Announcements –and particularly the one of January 2015– play a stronger role compared to the amounts purchased. We also decompose changes in the IIP into flows and valuation effects and show that the latter is the most reactive to QE measures. Finally, we establish counterfactual scenarios to quantify what France's IIP would have been in the absence of QE. The strong impact observed following the announcement of January 2015 is rapidly counterbalanced; which suggests an over-adjustment phenomenon at the beginning of the program. This analysis allows estimating the outcome of the policy on the net IIP and thus on international wealth transfer. Consistently with our previous findings, we observe a robust impact at the beginning of the program which is then partly offset.

Keywords: Monetary policy, Quantitative Easing, Balance of payments, International investment position.

JEL classification: E52, F32, G15.

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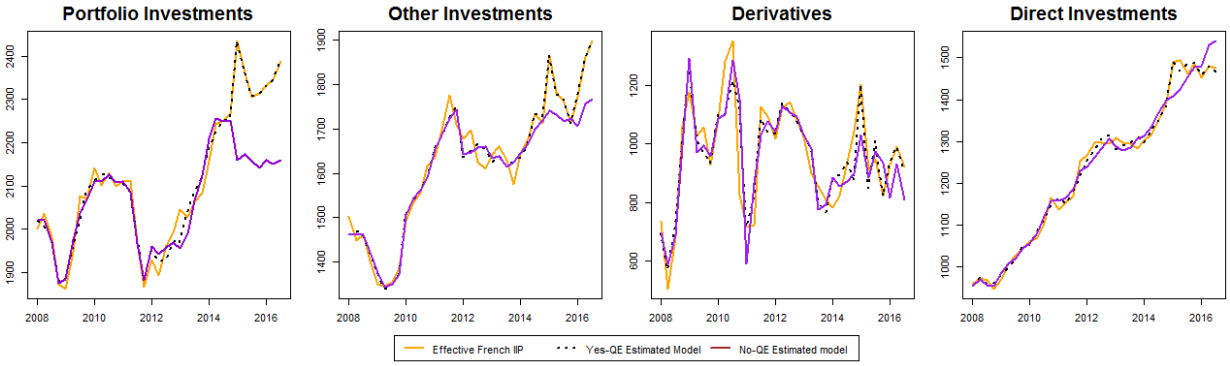
NON-TECHNICAL SUMMARY

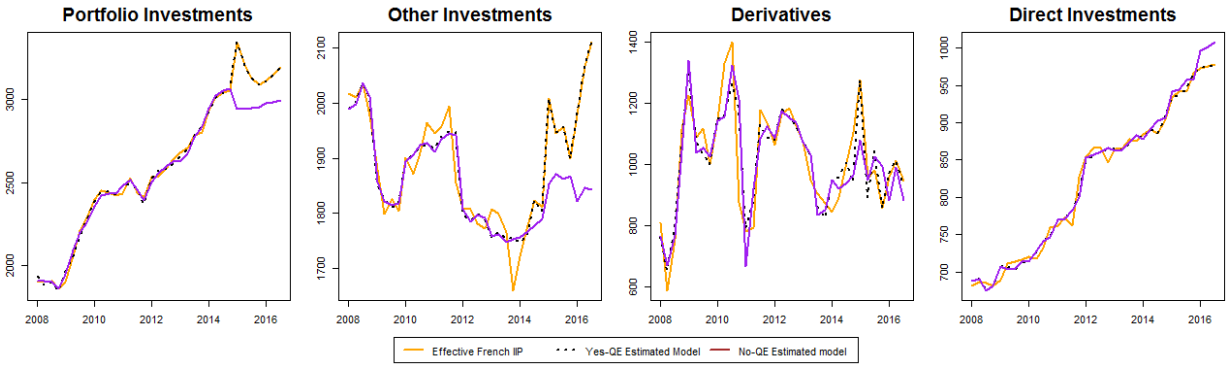
In this paper we estimate the impact of the Quantitative Easing (QE) led by the European Central Bank (ECB) since the end of 2014 on French external assets and liabilities recorded in its International Investment Position (IIP). The IIP is an indicator of one economy's net external debt towards the rest of the world and therefore reflects its financial health. In addition, net changes in the external position may be analyzed in terms of wealth transfers (Gourinchas and Rey 2012).Whereas a large literature has emerged on the impact QE programs have on macro-financial variables such as interest rates, prices or exchange rates; to our knowledge, the critical issue to what extent these measures could affect one economy's IIP has so far been ignored. Our paper contributes to fill this gap.

French effective (yellow line) and under no Quantitative Easing counterfactual scenario (purple line) International Investment Position

i) Assets



ii) Liabilities



Source: Authors' calculation (for "Estimated models") and Banque de France (for the "Effective French IIP").
Note: Amounts expressed in billions of euros.

We first lead a descriptive analysis to establish the evolution of the four main items of the IIP– Portfolio Investments, Other Investments, Derivatives and Direct Investments. We are particularly interested by a potential breakpoint on the first quarter of 2015 during which the *Expanded Asset Purchase Program* (EAPP), seen as the most important one in terms of amplitude and extent, has been both announced and officially launched. We do observe large disruptive movements on the various lines of the position - especially on Portfolio and Other Investments - during this specific quarter. The effect is temporary as movements in the opposite direction are observable on the following quarters. To better understand the mechanisms at play, we decompose the changes in the position into financial flows (composition effect) and price movements in the foreign exchange rates and security markets (valuation effect). Exchange rate and price

effects seem more sensitive to the monetary policy; with highly volatile values around the first quarter of 2015.

To confirm and extend these results we econometrically test the relationship. We distinguish in our QE variables the main announcements of the programs from their actual implementation. QE measures do significantly impact all the items of the French IIP; with a predominant impact on Portfolio Investments. If both announcements and implementation matter, the former have a stronger impact. In particular, the January 2015 announcement has substantial and robust effects on the various items. For instance, the sole EAPP announcement increased foreign Portfolio assets by around 257 EUR billion, whereas the total amount purchased impacted this item by barely 120 EUR billion during the whole analyzed period. We also run distinct regressions on the three elements driving the changes in the external position –flows, price and exchange rate valuation components. All of them react to at least one of the QE measures. The price valuation component seems nonetheless the most sensitive for Portfolio Investments and Derivatives; whereas the effects transmit more through flows for Other Investments.

We finally build counterfactual scenarios to estimate what the French IIP would have been in absence of QE. This exercise enables to gauge the total impact of the purchase program and its evolution over time. We demonstrate that the strong impact observed on the first quarter of 2015 is rapidly counterbalanced for all the lines of the position except Other Investments; which could indicate an over-adjustment phenomenon at the beginning of the program. This approach also allows to estimate the outcome on the net IIP and thus on the international wealth transfer. Consistently with our previous findings, we observe a robust impact at the beginning of the period which is then partially offset. If the whole period is taken into account the program results into a weak and negative transfer from France to the rest of the world.

L'impact du quantitatif easing de la BCE sur la position extérieure française

RÉSUMÉ

Ce papier vise à estimer l'impact des récents programmes d'achat d'actifs –communément appelés Quantitative Easing (QE) - mis en place par la BCE sur les avoirs et engagements d'une économie vis-à-vis du reste du monde enregistrés dans la position extérieure (PE). Notre analyse porte sur le cas de la France. Nous commençons par décrire l'évolution récente des quatre principaux éléments constitutifs de la PE ; à savoir les investissements de portefeuille, autres investissements, dérivés ainsi que les investissements directs. Nous observons des variations importantes, bien que temporaires, de ces éléments autour des programmes de QE. Cette analyse est complétée par une approche économétrique dans laquelle nous considérons comme variables de QE les annonces des programmes et leur mise en œuvre réelle. Ces mesures affectent toutes les lignes de la PE française. Les annonces des programmes, notamment celle de janvier 2015, jouent un rôle plus important que les montants achetés. Nous décomposons également les variations de la PE en effets flux et valorisation et montrons que ce dernier est le plus réactif aux mesures de QE. Enfin, nous établissons des scénarios de contrefactuels pour déterminer ce qu'aurait été la PE française en l'absence du QE. L'impact important observé après l'annonce de janvier 2015 est rapidement contrebalancé, ce qui suggère un phénomène de sur-ajustement au début du programme. L'analyse permet d'estimer le résultat de la politique sur la PE nette et donc sur le transfert international de richesse. Conformément aux résultats précédents, nous observons un impact robuste au début du programme, qui est ensuite partiellement compensé.

Mots-clés : Politique monétaire, assouplissement quantitatif, balance des paiements, position extérieure.

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I. Introduction

In the aftermath of the last recent financial crises interest rates have progressively reached the zero lower bound, constraining major central banks to implement a large set of unconventional monetary policies. Notably, most of them have launched large scale asset purchases programs – commonly known as *Quantitative Easing* (QE) – to provide further liquidity to financial institutions and affect the yields curve. It was first the case of the Federal Reserve Bank of the United States as a response to the great financial crisis. The European Central Bank followed during the sovereign debt crisis that affected the Eurozone countries.

An abundant literature has emerged on the effects of these exceptional measures on various macro-financial variables. The broad conclusion is that QE has triggered a reduction in interest rates, including on assets that were not included in the purchase programs, as well as a depreciation of the domestic currency (Gagnon et al. 2011, Joyce et al. 2011, Neely 2010). The programs also tend to alter the magnitude and/or the composition of international capital flows (Forbes et al. 2016, Ahmed & Zlate 2014, Fratzscher et al. 2016). These effects mainly operate through the portfolio and signaling channels. If Portfolio Investments, which are short-term driven, are generally seen to be more sensitive to monetary policies; results provided by recent contributions are more mixed suggesting that at least a part of Direct Investments respond to more speculative incentives (Blanchard et al. 2016).

Interestingly, these impacts of QE on such macroeconomic variables are likely to be reflected in one economy's International Investment Position (IIP thereafter), which describes the value and composition of one economy's stock of external assets and liabilities *vis-à-vis* the rest of the world. The position is decomposed into four main items[1]: Portfolio Investments, Other Investments, Derivatives and Direct Investments. Changes in the IIP are driven either by financial flows (composition effect) or by price movements in the foreign exchange rates and security markets (valuation effect). Thus, if the Quantitative Easing does alter asset prices and exchange rates, it translates into a change in the valuation of the position. Similarly, if these programs lead to massive international capital flows, it triggers changes in the composition of the position. In both cases, it would affect the IIP of one's economy.

Given the importance of this concept, it's crucial to monitor changes. Indeed, IIP is an indicator of one economy's net external debt towards the rest of the world, and thus provides a signal of one country's financial health. As an illustrative example, the 2010-2011 crisis was preceded in several euro area countries by a sharp weakening in their external position (IMF 2012). Consequently, as monetary policies impact one economy's external position, it would also affect its financial stability. In addition, net changes in the IIP may be analyzed in terms of wealth transfers: a net deterioration of the external position could be seen as a wealth transfer from the domestic economy towards at least one of its partner and conversely in case of improvement (Gourinchas & Rey 2012).

However, as far as we are concerned, the crucial issue of how unconventional (and even conventional) monetary policy measures could affect one economy's IIP has so far been ignored. The aim of this work is to fill this gap by estimating the impact of the ECB QE on France's IIP. We consider as such measures all the assets purchase programs started with the *Asset Based Securities Purchase Program* announced in September 2014. Our analysis is based on disaggregated and quarterly frequency data covering the period between 2008 and the third quarter of 2016. Data is produced by the Banque de France that officially publishes the French IIP.

[1] We exclude "Reserve assets" as being mainly an exogenous policy item of the IIP.

Our paper first provides a descriptive analysis to establish the respective evolution of the four main items in the French IIP. We are particularly interested by a potential break point on the first quarter of 2015 during which the *Expanded Asset Purchase Program* (EAPP), seen as the most important one in terms of amplitude and extent, has been both announced and officially launched.[2] We do observe large disruptive effects of the QE on the various lines of the position, especially on Portfolio Investments and to a less extent on Other Investments. Interestingly, this potential impact may be temporary as movements in the opposite direction are observable on the following quarters. This may suggest an over-adjustment due to changes in market anticipations. To better understand which mechanisms have been at play, we then use desegregated data to decompose the position into the so-called flows and valuation components. Our analysis shows that exchange rate and price effects seem more sensitive to the monetary policy; with highly volatile values around the first quarter of 2015. The dynamics for flows is more cyclical but we do observe larger movements for most of the items.

Going one step further we turn to an econometric approach. Our QE variable distinguishes the announcements of the programs from their actual implementation. Results indicate that QE measures do significantly impact all the items of the French IIP. Both announcements and the actual amount purchased affect the French external position; announcements presenting a stronger impact while actual purchases play a narrow role. Portfolio Investments are the most affected by both QE measures. For instance, the sole EAPP announcement increased foreign Portfolio assets by around 257 EUR billion, whereas the total amount purchased impacted this item by barely 120 EUR billion during the whole analyzed period. Among the announcements, the one that officially launches the EAPP (often seen as "QE" per se) is the most disruptive with a large, positive and significant impact on the position. In line with the descriptive analysis, the following announcement has on the contrary a negative impact on the different items.

After looking at the global effect on the gross position we lead a similar analysis alternatively for the flows and the valuation components. All the three components of the four items in the position (also for both claims and liabilities) react to at least one of the QE measures. For Portfolio Investments the three components are significantly affected, but the main driver remains the price valuation effect. Derivatives are also mainly affected by the same price effect. Exchange rate is the most sensitive to the QE in Direct Investments. Finally, the impact on Other Investments transmits essentially through changes in the flows component.

Moreover, we undertake a counterfactual methodology to quantify the total impact of QE on the IIP and its evolution over time. The first scenario – with QE policy – aims at predicting the effective IIP, and thus ensures that our model correctly fits the effective data. The second scenario estimates what the IIP would have been without the QE program. We then measure the global impact of the ECB QE policy on the French IIP by subtracting this last estimate from the effective position. All in all the method confirms the main results highlighted before. The analysis also shows more clearly that the impact observed in the first quarter of 2015 is rapidly counterbalanced.

Finally our analysis allows estimating the outcome of the policy on the net IIP and thus on the international wealth transfer. In line with the temporary effect previously observed, ECB QE translates into a wealth transfer during its implementation that has been partly counterbalanced in the following quarters. Thus if the whole period is taken into account the program results into a weak and negative transfer from France to the rest of the world.

This paper is organized as follows. The next section provides an overview of the French International Investment Position and the mechanisms through which monetary policies influence it, together with a

[2] The EAPP has been announced on January 22, 2015 and launched on March 9, 2015.

review of the literature. The third section presents a descriptive analysis and the evolution of the IIP. Then, the forth section develops our empirical approach composed by econometrical and counterfactual methodologies; and also describes the data used in the analysis. Finally, the fifth and the sixth sections present the main empirical results of the impact of ECB QE on the French IIP, including a decomposition of the channels through which the impact is transmitted. A last section concludes the analysis.

II. International investment position and monetary policy

We first provide an overall description of International Investment Position to then analyze the mechanisms through which monetary policies and large scale asset purchases more specifically are able to influence this position.

II.A. An overview of the International Investment Position

The international investment position (IIP) is an economy's financial statement, showing the value and composition of its positions in external assets and liabilities *vis-à-vis* the rest of the world at a specified date (the net IIP is computed as a nation's stock of foreign assets minus its foreign liabilities and gives an idea of a nation's balance sheet with the rest of the world). In the IIP, assets are divided into five categories: Portfolio Investments, Other Investments, Derivatives, Direct Investments and Reserve assets. Liabilities are reported with the same classification except for Reserve assets, which have no equivalent. The amounts recorded under most balance of payments items are broken down by type of transactions as well as by institutional sector of the resident party (i.e. Central bank, monetary financial institutions, general government sector and other sectors).

Changes in the IIP are driven by financial flows (change in the composition of external assets and liabilities) as well as by price movements in the foreign exchange and securities markets (valuation effect). Following Gourinchas & Rey (2013), we could express these mechanisms as follows:

$$EP_q^i = EP_{q-1} + FX_q^i + VX_q^i + OX_q^i \qquad (1)$$

Where EP_q^i stands for the position at the end of the period t for each item i reported in the disaggregated IIP for gross claims or gross liabilities. FX_q^i stands for the flows recorded in the Balance of payments in period q and VX_q^i represents the valuation gain/loss that can be attributed to currency and asset price movements. OX_q^i includes other changes and can be seen as an error term.

II.B. Impact of unconventional monetary policies on the IIP

Following the global financial crisis, short-term nominal interest rates have progressively been driven to the zero lower bound. Deprived of their traditional tools, major central banks have progressively begun adopting unconventional measures. In the euro-area, after purchasing euro-area sovereign debt through the *Securities Market Program* and the *Outright Monetary Transactions* program, the European Central Bank has provided long-term financing at attractive conditions to credit institutions and given them incentives to increase their credits to real economy. As credit dynamics were still unsatisfactory, in September 2014 the ECB announced an *Asset-Backed Securities Purchase Program* (ASBPP) and a third *Covered Bond Purchase Program* (CBPP3), which were supplemented by the *Expanded Asset Purchase Program,* announced in January

2015 and officially launched in March 2015. The ECB has therefore started buying for monthly €60 billion sovereign bonds from euro-area as well as debt securities from European institutions. More recently, these programs have been extended in terms of size (to €80 billion, including purchases of corporate sector bonds since June 2016) and duration (lastly extended until 2018) before returning to the initial level in the first quarter of 2017.

Unconventional monetary measures have given rise to an abundant literature on the way and the extent by which these policies may have been affecting macro-financial variables; such as prices, interest rates or foreign exchange rates (see Campbell et al. 2012 or Krishnamurthy et al. 2011 for a review of the transmission channels). The bulk of the literature has focused on the Fed, with some noteworthy exceptions (Rogers et al. 2014, Fraztscher et al. 2016b, Creel et al. 2016 or Koijen et al. 2017 for the ECB; Joyce et al. 2011 or Rosa 2012 for the Bank of England; Bowman et al. 2011, Saito and Hogen 2014 or Schenkelberg and Watzka et al. 2013 for the Bank of Japan). Researches are generally consensual that the principal impact of QE is to reduce interest rates on an extended range of securities, including securities that were not comprised in the programs (Gagnon et al., 2011). The decrease also passes on foreign securities through international spillover effects (Neely 2015, Bauer and Neely 2014). Changes in international interest rates differentials also affect exchange rates; leading to a depreciation of domestic currencies (Glick and Leduc 2012, Neely 2010). Another strand of the literature has tried to estimate the impact of these unconventional monetary measures on international capital flows with the broad conclusion that QE did alter their magnitude and (or) their composition, especially for flows to (and from) emerging economies (Forbes et al. 2016, Ahmed & Zlate 2014, Byrne and Fiess 2011, Fratzscher et al. 2017, Tillman 2016, Lim et al. 2014).

As indicated in Equation 1 above, the evolution of the IIP is conducted by international capital flows as well as changes in valuations. In view of previous remarks, these flows and valuation effects are likely to be impacted by QE measures. If Quantitative Easing leads to massive international capital flows it affects the flow component FX_q^i; and if it alters exchange rates and asset prices, it translates into a change in the valuation of the position VX_q^i.

There are several channels through which QE affect these two components and thus one country's IIP:

For the international capital flows (and thus the FX_q^i component), literature highlights the role of the Portfolio rebalancing channel (Bernanke et al. 2004, Ugai 2007, Joyce et al. 2011). QE measures influence the available supply of Treasury securities and more broadly of all securities targeted by the different asset purchase programs. These measures tend to take away duration risks from investors and pushes yields downwards, reducing expected returns (Krishnamurthy and Vissing-Jorgensen, 2011). In turn, it gives them incentives to shift their holdings towards close substitutes searching for higher perspective of returns elsewhere – including outside the domestic economy – leading to potential international capital flows (d'Amico & King 2013, Joyce et al. 2011, Breedon et al. 2013).

Another channel plays through confidence. If QE measures are perceived as a sign of worsening economic conditions compared to what has been previously anticipated it would lead to a "flight to safety" and thus influence FX_q^i. This mechanism occurred in the aftermath of the first QE round in the US (Neely 2010, Fratszcher et al. 2013). [3] In the case of ECB, whether a flight-to-safety phenomenon leads to a flight out or in French bonds depends on the degree on which such securities are seen as "safe" by investors.

[3] We observed a portfolio rebalancing from the rest of the world into the US, which contrasts with the massive outflows following QE2 and QE3 programs.

Risk taking and bank lending channels are also put on evidence for such unconventional policies. An accommodative monetary policy offers broader financial conditions that give incentives to banks – and specifically to thinly capitalized ones – to finance riskier investments through the risk-taking channel (Borio & Zhu 2012, Jimenez et al. 2014). More generally, as QE improves the liquidity of the banking sector it may encourage banks to finance larger volumes of new loans, including cross-border loans, through an (international) bank lending channel. In both cases, it could translate into changes in FX_q^i. Notice however that this transmission channel may be restricted in turbulent times if institutions prefer holding liquidities as a cushion rather than passing liquidity onto real economy. In that case, the impact on flows (FX_q^i) would be instead mainly driven by the portfolio rebalancing and confidence channels (Bubeck et al. 2017).

In addition, QE policies may affect the valuation component VX_q^i again through distinct channels. First, QE is likely to trigger changes in the price valuation. Indeed, Portfolio rebalancing (including Central Bank's portfolio) modifies supply and demand of securities and therefore changes their prices (d'Amico and King 2013). Furthermore, QE programs may be perceived as a signal that short-term interest rates are expected to remain low in the future; otherwise Central Banks would suffer huge losses on the assets they purchased under QE (signaling channel as highlighted by Clouse et al. 2000 or Bauer and Rudebusch 2013). Thus, it affects their expectations of long term interest rates and therefore security prices. This effect on prices may be reinforced by liquidity and confidence channels since broader monetary conditions and potentially restored confidence decrease the liquidity and term premiums (Gagnon et al. 2011, Krishnamurthy and Vissing-Jorgensen 2011).

QE measures could also affect the exchange rate component. Indeed, uncovered interest parity would predict a depreciation of the domestic currency in response to lower domestic interest rates. This depreciation increases the value in euros of securities denominated in foreign currencies; and impacts the exchange rate component in VX_q^i (Joyce et al. 2011).

Finally, this potential valuation gain attributed to a depreciation of the domestic currency as well as the "wealth effect" generated by higher prices may increase the value of the collateral, and then finance even more loans and investments (Bruno and Shin 2015); reinforcing the effect on flows FX_q^i.

To our knowledge, no other research has applied these mechanisms to estimate the effects of unconventional monetary measures on the whole IIP. Analyses tend to be more partial; often focusing on the sole Portfolio Investments. For this item, papers often study the response of some specific asset prices surrounding QE announcements generally through "*event study approaches*" (Gagnon et al. 2011, Rosa 2012) or look at the impact on either gross or net capital flows in the view of the international spillovers literature (Forbes et al. 2011, Ahmed and Zlate 2013, Fratzscher et al. 2016, Lim et al. 2014). Results tend to confirm the impact of QE measures on this item. However, analyses of the effects on the flow and valuation components are rare. Some recent researches are closer to ours in spirit but still emphasize on Portfolio securities. Distinguishing between flows and valuation effects, QE measures are seen to affect more strongly the latter; supporting the idea of a "passive" rather than "active" rebalancing portfolio rebalancing channel (Bubeck et al. 2017).

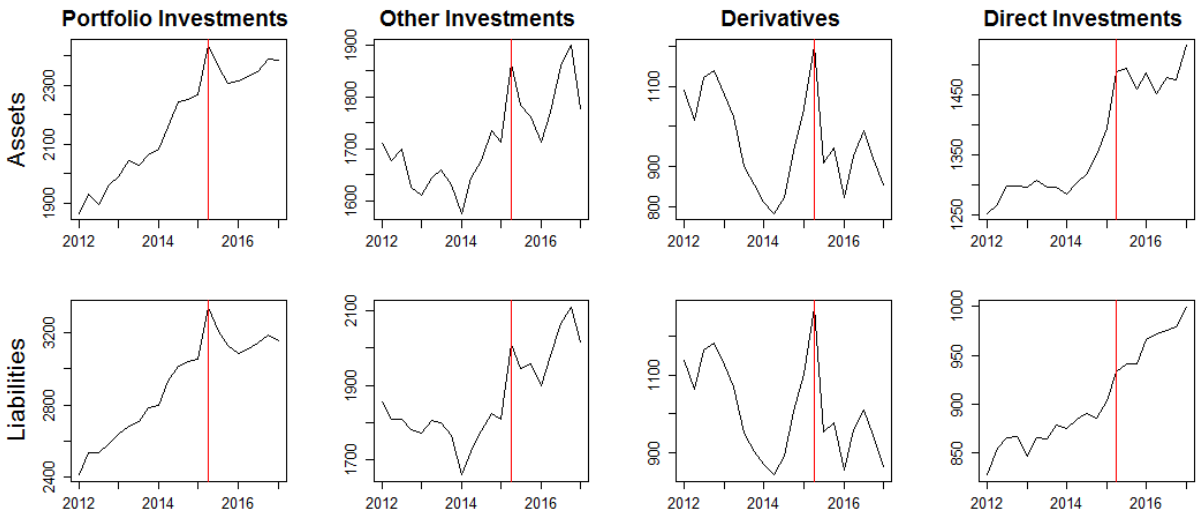
For Direct Investments the literature is much less abundant. Recent papers (Blanchard et al. 2017 and Fratzscher et al. 2013) show that a part of these investments – especially intra-group loans – tends to respond to short-term incentives, leading to potential effects on flows. For instance, multinational firms can take benefit from broader monetary conditions to increase their investments abroad (Cezar et al. 2017). Furthermore, the "wealth effect" (as previously mentioned) may increase the value of the collateral and then further increase the financing of investments.

Finally, the literature is still embryonic on Other Investments and Derivatives. For the former category – that includes bank-to-bank loans and borrowings as well as intra-group loans in the financial sector – we could nonetheless expect effects of the monetary policy essentially through the (international) bank lending channel. In addition, banks can benefit from interest rate differentials between economies to borrow at very low interest rates and lend to their foreign affiliates located in economies where interest rates are higher. For Derivatives, QE could affect the price of underlying assets and then the one of derivative financial instruments.

III. Descriptive analysis: Evolution of the French IIP

We are first interested by the evolution of the assets and liabilities for each of the four main items of France's International Investment Position since 2012, namely Portfolio Investments, Other Investments, Derivatives and Direct Investments. We use disaggregated data of the French International investment Position produced by the Banque de France. Our dataset is available at quarterly frequency from the first quarter 2008 to the fourth quarter of 2016.

<u>Figure I.</u> Evolution of the French IIP by item



Source: Banque de France.
Note: ***Amounts are expressed in billions of euros.*** In the charts, ***the red line*** indicates the main announcement of implementation of the ECB's QE - namely *Expanded Asset Purchase Program* - followed by the start of this program in the same first quarter 2015. The EAPP is still ongoing.

In Figure I, we report the evolution of the position with a specific highlight on the first quarter 2015, which corresponds to the announcement and the start of the *Expanded Asset Purchase Program* (EAPP), the largest QE program set by the ECB and with the highest economic strike force. Importantly the ECB's asset purchase program seems to have had large disruptive effects for almost all items of the position. Nonetheless this potential impact may be temporary as movements in the opposite direction are observable on the following quarters. This dynamic is especially salient for Portfolio Investments. More precisely, this item assets and liabilities strongly increased during the first quarter of 2015 before diminishing during the following two quarters.

To better understand what drives this movement, we then decompose the variation of the gross position (assets and liabilities) into the evolution of flows and the evolution of the valuation effect (as in Equation

1). For the valuation effect, we report the exchange rate valuation in Figure II.a and the price valuation in Figure II.b. Flows are represented in Figure III.

Figure II.a: Exchange Rate Valuation Effect in the French IIP by item

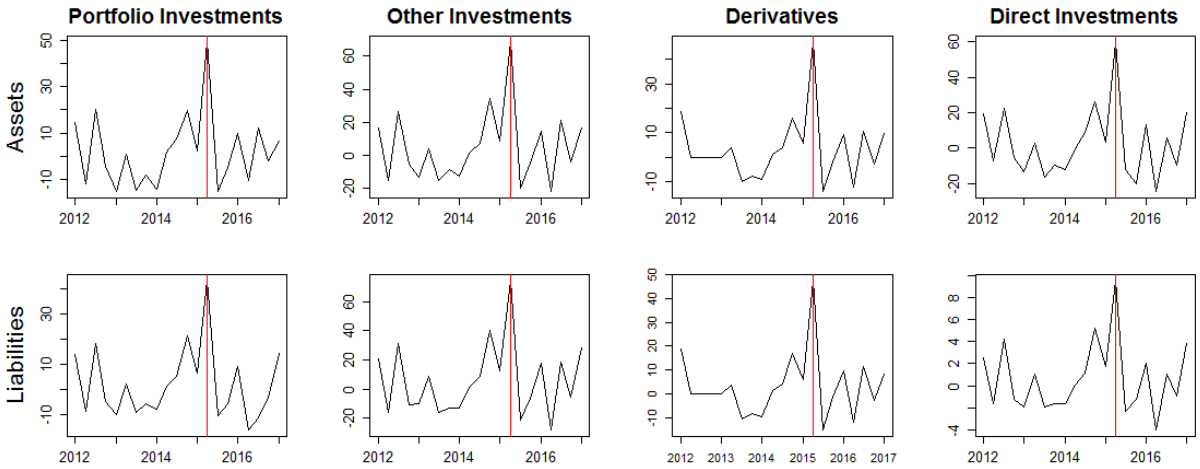
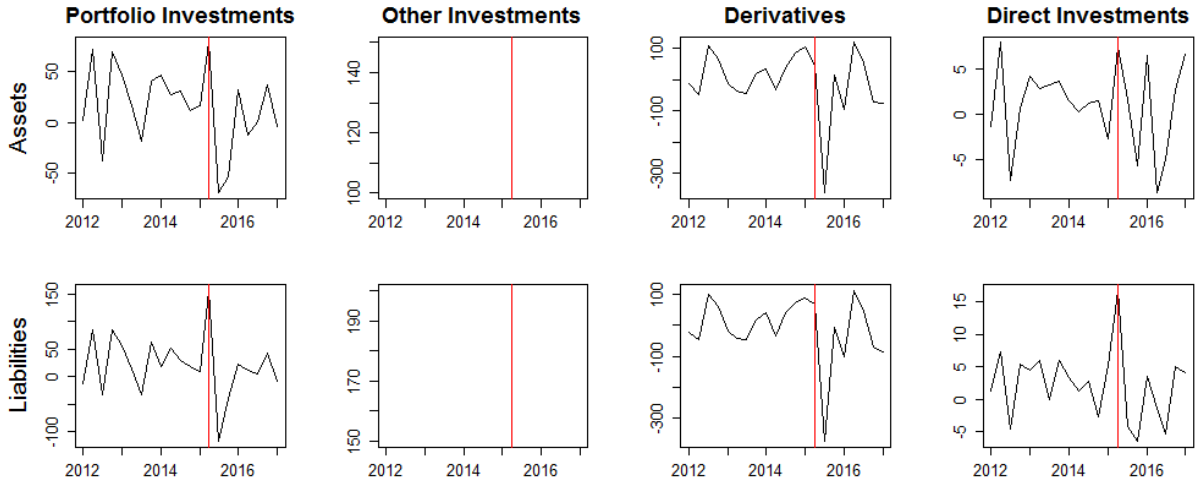


Figure II.b: Price Valuation Effect in the French IIP by item



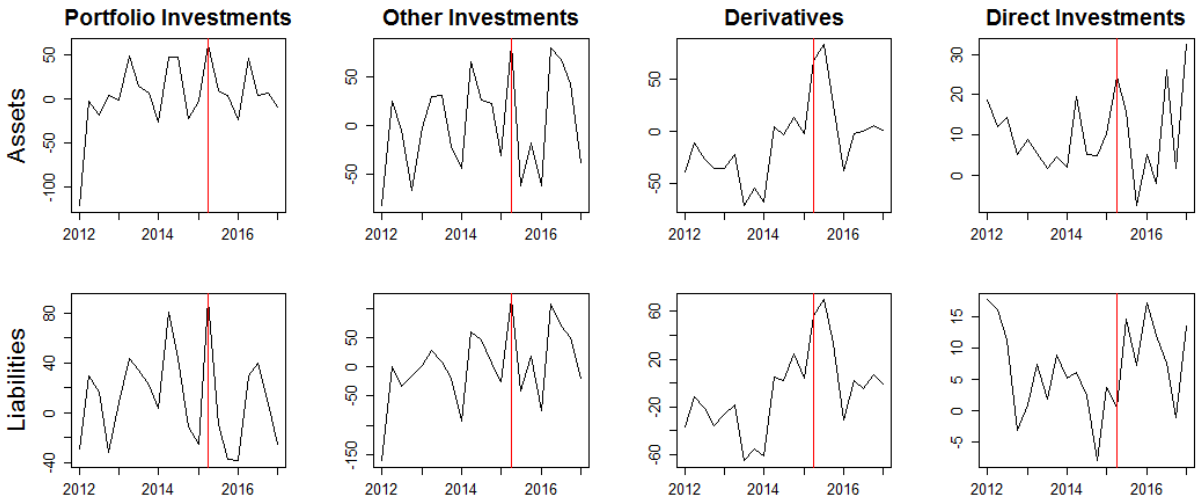
Source: Banque de France.
Note: ***Amounts are expressed in billions of euros.*** In the charts, the ***red line*** indicates the main announcement of implementation of the ECB's QE - namely *Expanded Asset Purchase Program* (EAPP) - followed by the start of this program in the same first quarter 2015. The EAPP is still ongoing. **Other Investments are not subject to price valuation changes and are therefore not reported.**

All the three components seem to contribute to this initial increasing dynamic of Portfolio Investments (Figure I). First, the decrease in interest rates triggered by the anticipation of the EAPP tends to raise the price of the corresponding securities, hence an initial positive price effect (Figure II.b). Then, lower interest rates tend to depreciate the euro, which raises the value in euros of French assets denominated in other currencies, explaining a positive exchange rate effect (Figure II.a). Finally, the unconventional measures trigger portfolio rebalancing which leads to large inflows and outflows (Figure III). During the next two quarters, reversal movements occurred: i/ prices decreased, ii/exchange rate contributed negatively to the evolution of the stock, and iii/ flows diminished.

This a priori counter-intuitive evolution may actually reflect what is better known as the "Bund Tantrum" episode (Boermans et al. 2016).[4] From April to July 2015, markets started anticipating an early termination of the EAPP hence a revision of the anticipations which translated into an increase of securities interest rates. In turn, it explains the negative price effect in the aftermath of the implementation of the EAPP and thereby the negative flows and exchange rate effects that followed. Note that the over-adjustment observed on prices is even larger than what has been identified for bund yields during the "Bund Tantrum" episode; possibly due to changes in the stock market valuation that are part of the price valuation component. Returns to previous levels occur after 2 quarters.

The three other items of the position also present some interesting features: Other Investments have followed a rising trend since 2014 both for assets and liabilities – that may be partly explained by the launch of the TLTRO on the first semester of 2014 – but we do observe an acceleration of this trend at the end of the same year that could result from growing market expectations of EAPP. Changes seem to be driven chiefly by valuation effects, which for this item entirely reflects variations in exchange rates.[5] For Direct Investments the effect seems to be far more pronounced for outward rather than inward investments. As for Other Investments, exchange rate valuation effects are at play for changes in assets; whereas price valuation effects seem to carry changes in the liability side. Finally, Derivatives stocks surged until the end of the second semester of 2015 mainly through changes in exchange rate valuation.

<u>Figure III.</u> Flow Effect in the French IIP by item



Source: Banque de France.
Note: ***Amounts are expressed in billions of euros.*** In the charts, the ***red line*** indicates the main announcement of implementation of the ECB's QE - namely *Expanded Asset Purchase Program* (EAPP) - followed by the start of this program in the same first quarter 2015. The EAPP is still ongoing.

Looking more closely into the flow and valuation effects, the exchange rate effect seems to be the most sensitive to ECB's measures: highly volatile values are indeed observable around the January 2015 announcement. Interestingly, the peaks reached on the first quarter of 2015 are observable for the four categories of investments. Peaks in price effect are also observed, especially for the Portfolio Investments

[4] In reference to the "Taper Tantrum" that occurred in the US in November 2010 after the announcement of the QE2 (Moriayama et al. 2014; Eichengreen & Gupta 2015). Several reasons have been provided to explain why markets started doubting the Eurosystem would implement its purchase program until the pre-announced end. Among others, ECB QE "Tapering Talks" from some of the Governing council members as well as higher inflation figures fueled the observed bond sell-off (see Arrata & Nguyen 2017).
[5] Other investments are not subject to price changes.

and Derivatives. The dynamics for the flow component is more cyclical. However we do observe larger movements for most of the items especially for Other Investments and Derivatives.

IV. Empirical approach

In this part, we present the methodology used to study and quantify the impact of Quantitative Easing policies on the France's external position. We consider as QE measures all the assets purchase programs started with the *Asset Based Securities Purchase Program* announced in September 2014 (as in Marx et al. 2016). First, the section presents the econometrical strategy and then the counterfactual method. Data used in the analysis is also described.

IV.A. Econometrical Methodology

The relation between unconventional monetary policies and one's country international investment position has not been deeply studied yet. Papers generally focus their analysis on the impact of these policies on international capital flows (Forbes et al. 2011, Ahmed and Zlate 2013, Fratzscher et al. 2016). These studies serve as a starting point for our econometric model. We also follow Lim et al. (2014) and Blanchard et al. (2016) who estimate how QE measures impact both portfolio and direct investment flows controlling for the multiple channels through which monetary policies are transmitted, such as interest or exchange rates. Our approach is close to theirs, nonetheless we aim at measuring the global impact attributed to QE measures regardless the various transmission channels. Thereby our explanatory variables should not include these transmission channels but also not be directly affected by the ECB policy.

Specifically, for each of the main items composing the French IIP our baseline specification is as follows:

$$EP_q = \beta_1 EP_{q-1} + \beta_2 QE_q + \beta_3 K_q + \rho_y + \varepsilon_q \qquad (2)$$

Where EP_q successively stands for the gross claims or liabilities at the end of quarter *q*.

QE_t represents our Quantitative Easing variables. In line with the literature (Joyce et al. 2014, Carpenter et al. 2014, Saito and Hogen 2014), we decide to include in these QE variables i/ the total amount of asset purchased by the ECB by quarter *q* and ii/ three dummy variables on quarters during which the three main announcements on Asset Purchases Programs were made by the ECB council (see the subsection Data for the details of the announcements retained). Each of these dummies takes a value of unity the quarter during which the announcement was made and zero otherwise. This choice refers to the well-known debate on the relative impact of central banks' announcements compared to their actual implementation. A strand of the literature considers that announcements alone are likely to contain new information (Demiralp and Jorda 2004, D'Amico and King 2013, Gagnon et al. 2011); whereas other studies show that effective purchases have comparatively bigger effects (Ahmed & Zlate 2014; Fratzscher et al. 2016). We therefore decide to include QE variables that encompass potentially both effects.

K_q is a matrix of control variables varying in *q*. To correctly capture the whole impact of our QE variables on the French IIP – so that our estimated impact is not too much diluted by control variables affected by this policy – K_q should include explanatory variables not affected by the QE. As in Carpenter et al. (2015) and Joyce et al (2014) we integrate to our model mainly US financial variables. These variables include: the VIX index as indicator of global uncertainty; return on the S&P500; the US 10-year government bond (as

the Federal fund rate are close to the Zero Lower Bond since 2008); the net outstanding amount to control for debt issuance that is not due to active monetary policy decisions; a "Brexit" dummy on the quarter during which the referendum took place (Q2 2016). Notice that for Direct Investments, instead of following the financial literature above, we draw near the FDI literature and include the US GDP as a proxy for global demand (see Cezar & Escobar, 2015). ρ_y controls for all effects varying in time by yearly dummies.

IV.B. Counterfactual Method

Our empirical approach is followed by the estimates of counterfactual scenarios. These scenarios try to reproduce what the French IIP would have been without the QE policy. To gauge the specific impact of the policy, we compare the actual value of each item composing the French IIP with the estimates got under no-QE scenarios. This exercise allows estimating the total impact of the QE policy on the French IIP without distinguishing between announcements and the actual implementation of the program (whose effects can counterbalance each other) and its evolution over time.

For our baseline model we start by following Pesaran & Smith (2012). They develop a methodological background showing that a simple conditional model with parameters invariant to the policy change is sufficient to correctly estimate the impact of economic policies on macroeconomic variables, instead of a full structural model. Indeed, in conditional models of the impact of a policy variable (x_t) on an dependent macroeconomic variable (y_t), they discern control variables (z_t) that may not be invariant to the policy variable and control variables (w_t) that affect the dependent variable but are unaffected by the policy variable. Only the latter type of control variables is relevant in evaluating the effects of the policy variable. Thus, their baseline model is given by:

$$y_t = \alpha + \gamma w_t + \pi x_t + \varepsilon_t \tag{3}$$

Where ε_t is the error term and the z_t term is left out of the equation.

The main difficulty lies in the choice of these w_t explanatory variables of the French IIP that are not directly impacted by QE measures. Indeed, such constraint is difficult to respect as the Euro area is the second biggest monetary zone in the world and may affect other financial variables worldwide. As argued before and in line with the literature, we assume that the US financial variables are the best proxy for such exogenous variables (Joyce et al. 2014). We consider that, given their size and position of core country, the US are likely to influence the French external position but are little sensitive to monetary policies led by other economies (Carpenter et al. 2015).

We take back our model in (2) and get the following 2 equations:

$$\widehat{EP}_q^{yes-QE} = \hat{\beta}_1 EP_{q-1} + \hat{\beta}_2 QE_q + \hat{\beta}_3 K_q + \rho_y + \varepsilon_q \tag{4a}$$

$$\widehat{EP}_q^{no-QE} = \hat{\beta}_1 \widehat{EP}_{q-1} + \hat{\beta}_2 (QE_q = 0) + \hat{\beta}_3 K_q + \rho_y + \varepsilon_q \tag{4b}$$

Equation 4a aims at predicting the effective IIP during the whole period. This guarantees that our model correctly fits the effective data. Equation 4b aims at predicting the position under the no-QE policy

scenario. To this end, our QE variables (for both, announcement dummies and total amount purchased) are set equal to zero. This enables to estimate the counterfactual scenario of what the French IIP would have been without the QE measures given our set K of exogenous variables. Furthermore, in the spirit of our paper, the lagged dependent variable used in both Equations is logically endogenous, which could bias our estimates of the impact of QE policies. To solve this problem, we use the estimated values of the French IIP in the previous quarter instead of effective data in Equation 4b. This explains why estimates of the external position are not perfectly equal before the implementation of the QE.

Finally, the specific impact of QE policy on the French IIP is computed as the difference between the effective position published by the Banque de France and its estimated value under the counterfactual scenario predicted from Equation 4b, as follows:

$$QE_{Effect} = EP_q - \widehat{EP}_q^{no-QE} \tag{5}$$

IV.C. Data

Our data on the French IIP are available at quarterly frequency from 2008 to 2016. They are disaggregated and we dispose of the ventilation by country and by type of instruments; as well as the breakdown of changes in IIP between flows and valuation components. These data are produced by the Banque de France.

For our QE variables, the ECB purchases are the total amount in billions of euros purchased by the European System of Central Banks in monthly frequency and data are provided by the ECB. To be consistent with the frequency of the French IIP, we sum the amounts purchased by the ECB to get quarterly series. In addition, the three announcements are constructed from information taken directly from the ECB website. We consider as QE announcements the communications made by the ECB on the implementation and on important modifications of the Asset Purchase Programs, which starts by the ABSPP (Asset Based Securities Purchase Program) announced in September 2014 (Q3); followed by the EAPP announcement in January 2015 (Q1) and the announcement in December 2015 (Q4) [6] that contains important changes in the PSPP (Public Sector Purchase Program, included in the EAPP).[7]

Contrarily to daily data that capture the "surprise" component of the announcement, quarterly series take into account both the anticipations and the revisions of anticipations relative to purchase programs. Besides, our measure of actual implementation enables to control for the specific cases in which announcement and start of purchases occur at the same quarter (as for the EAPP, announced in January and officially launched in March 2015).

Our control variables mainly come from public sources, published by the Banque de France, Chicago Board Option Exchange, Eurostat, the European Central Bank and Datastream.

V. Main results

The section first discusses how the ECB QE impacts the French IIP differentiating between the main announcements and actual purchases. As the effects of the different measures potentially compensate or

[6] On 3 December 2015, the Governing Council decided that regional and local government issuers should be eligible for the PSPP. In addition, the Asset Purchase Program was extended until the end of March 2017.
[7] We decide not to include the announcement of April 2016 (Q2) that details the CSPP (Corporate Sector Purchase Program) because of the Brexit referendum, seen as highly disruptive, occurred at the same quarter.

counterbalance each other, it is useful to complement this econometric approach by a counterfactual analysis. Besides, it also enables to evaluate the evolution of the impact over the time. We finish by analyzing the net impact (difference between assets and liabilities) of the QE measures and its implications in terms of international wealth transfer.

V.A. How QE impacts France's IIP?

Estimates of Equation (2) of the impact of QE measures on the four main items of French IIP are reported in Table I and Table II for assets and liabilities respectively. Several interesting results emerge from it.

First, results indicate that QE measures do significantly impact all the items of the external position. The total amount purchased seems to play a narrow role on the different lines compared to the different announcements. The effective program impacts two of the four items for both assets (Portfolio and Other Investment) and liabilities (Other Investments and Direct Investments); whereas if taken together the announcements impact all the items.

Furthermore, when significant, the impact of the effective amount purchased is generally smaller compared with those of the announcements. For instance, the sole EAPP announcement (An. 2 in the tables) increases French Portfolio assets by around 257 EUR billions; Other Investments by 115, Derivatives by 217 and Direct Investments by 89 EUR billions. Yet, actual purchases impacted only the two first items and have a *total* impact on the whole period of 116 and 111 EUR billion on Portfolio and Other Investments respectively (from Q3 2014 to Q3 2016). These findings are in line with a growing strand of the literature that gives more weight to announcements compare to effective implementation (Rosa 2011, Demiralp and Jorda 2004, D'Amico and King 2013, Gagnon et al. 2011).

If taken separately, among the three main announcements considered, the one of January 2015 relative to the official launch of the EAPP (often seen as "QE" per se) is the most disruptive. The announcement has a large and positive significant effect. According to our estimates, the sole EAPP announcement would have increased Portfolio Investments, Other Investments and Derivatives liabilities by 399, 132 and 243 EUR billion respectively. This announcement has also the most significant impact on the four main items composing the French IIP among our different measures of the QE program; impacting the whole assets and 3/4 of the liability side.

In addition, despite the outsized positive effect of the January 2015 announcement, the following announcement generally presents negative coefficients. This result may be due to the correction of anticipations observed in the descriptive analysis (Section III) in the aftermath of the first quarter of 2015.

More specifically, Portfolio Investments are substantially affected by QE measures but impacts differ depending on the side of the position. Assets react to both, announcements and actual purchases, whereas the liabilities are only sensitive to the EAPP announcement. This seems to confirm the idea that QE measures push (French) investors to seek higher return elsewhere following the decrease in interest rates of a certain range of securities. This finding is in line with the extensive literature on the impact of unconventional monetary policies on portfolio rebalancing (Albagli et al. 2015, Tillman 2016). For the liability side, it also attests that at least a part of foreign investors may see French securities as a guarantee of quality and safety; compare to the bonds issued by some peripheral euro area countries, hence an increase in the French liability position.

Table I. Effect of QE on French IIP Assets

	(1) Portfolio I.	(2) Other I.	(3) Derivatives	(4) Direct I.
QE: Purchases	0.0885***	0.0849**	0.0936	-0.0310
	(0.002)	(0.027)	(0.704)	(0.409)
QE An. 1	11.02	33.01***	54.27	-6.901
	(0.500)	(0.006)	(0.488)	(0.433)
QE An. 2	257.1***	114.9***	217.3**	89.09***
	(0.000)	(0.003)	(0.014)	(0.000)
QE An. 3	27.05**	-72.57***	-182.2**	25.35**
	(0.041)	(0.000)	(0.037)	(0.021)
VIX	0.239	0.228	-0.640	-1.010*
	(0.826)	(0.792)	(0.893)	(0.054)
S&P 500	0.176*	0.166	-0.530	-0.0530
	(0.062)	(0.420)	(0.273)	(0.493)
Brexit	-4.182	20.45***	79.66***	38.86***
	(0.632)	(0.000)	(0.000)	(0.000)
US 10y	62.92***	-49.37	-270.8***	
	(0.010)	(0.310)	(0.000)	
Tot. Outstanding	0.0953**	-0.0210	-0.0312	
	(0.049)	(0.512)	(0.692)	
US GDP				0.0881**
				(0.049)
Lag(IIP)	0.580***			
	(0.001)			
		0.168		
		(0.544)		
			-0.387	
			(0.210)	
				0.659***
				(0.001)
Year-control FE	Yes	Yes	Yes	Yes
Observations	35	35	35	35
R^2	0.976	0.973	0.779	0.993
R^2 adjusted	0.949	0.942	0.531	0.986

P-values in parentheses. *** indicates the coefficient significance level at 1%, ** at 5% and * at 10%. T-statistics are based on Newey-West heteroskedasticity consistent standard errors

Other Investments systematically react to QE measures, not only to purchases but also to the three announcements considered. The largest impacts are for actual purchases on the liability side of the line and following the EAPP announcements on both asset and liability sides. It is all the more interesting than this line of the position has often been neglected by the literature. These changes may reflect international capital redeployment – notably from the financial system – through loans, borrowings or deposits following new credit conditions and spreads of interest rates. This line of the position also incorporates the payment system of the Eurosystem – TARGET2[8]. Indeed this TARGET2 balance is the counterpart of international financial transactions that may occur in other items of the IIP, notably Portfolio Investments, and has been largely impacted since the beginning of the ECB exceptional measures.

Results for Derivatives are even more specific. The variable deeply reacts to the two announcements that occurred in 2015 but does not react to the actual implementation of the program. This item is furthermore the most affected by QE measures in relative terms, i.e. in proportion to the total gross stock. This line takes into account the price of derivative financial instruments (but not the ones of the underlying assets). Monetary policy can thus influence economic conditions and therefore change the behavior of agents in

[8] TARGET2 stands for Trans-European Automated Real-time Gross settlement Express Transfer system.

regards to risk hedging. These policies may also affect the price of underlying assets (interest rates, exchange rate, stock index) and hence that of derivative financial instruments.

Finally, Direct Investments are also sensitive – albeit to a lesser extent – to QE measures. Again, the impact is much differentiated between assets and liabilities. For the former, the last two announcements affect this item; whereas for the latter actual purchases do have an impact in contrast to the EAPP announcement. The fact that outward Direct Investments positively react to the EAPP announcement may reflect the international capital redeployment through intra-group loans mentioned before. Indeed, the easing in financial conditions may encourage borrowings at very low interest rates by firms located in euro area countries and fuel intra-group loans towards firms located in places where returns may be higher and financial conditions further constrained.

Table II. Effect of QE on French IIP Liabilities

	(1) Portfolio I.	(2) Other I.	(3) Derivatives	(4) Direct I.
QE: Purchases	0.0751	0.184***	0.0464	-0.0263**
	(0.133)	(0.001)	(0.842)	(0.022)
QE An. 1	-6.755	44.79***	58.10	-17.60***
	(0.853)	(0.000)	(0.450)	(0.000)
QE An. 2	399.1***	132.1***	243.3***	-4.807
	(0.000)	(0.000)	(0.005)	(0.702)
QE An. 3	-21.64	-98.52***	-182.8*	23.84***
	(0.606)	(0.000)	(0.053)	(0.000)
VIX	0.353	1.459	-0.378	-0.633
	(0.822)	(0.235)	(0.937)	(0.144)
S&P 500	0.0203	0.0844	-0.484	-0.0363*
	(0.887)	(0.549)	(0.303)	(0.086)
Brexit	-10.89	22.44***	74.34***	2.086*
	(0.468)	(0.000)	(0.001)	(0.090)
US 10y	88.24*	-27.08	-253.2***	
	(0.067)	(0.220)	(0.000)	
Tot. Outstanding	0.0405	0.0108	-0.0350	
	(0.409)	(0.656)	(0.650)	
US GDP				0.0598**
				(0.010)
Lag(IIP)	0.587**			
	(0.010)			
		0.125		
		(0.209)		
			-0.360	
			(0.280)	
				-0.125
				(0.780)
Year-control FE	Yes	Yes	Yes	Yes
Observations	35	35	35	35
R^2	0.997	0.912	0.767	0.992
R^2 adjusted	0.993	0.814	0.506	0.984

P-values in parentheses. *** indicates the coefficient significance level at 1%, ** at 5% and * at 10%. T-statistics are based on Newey-West heteroskedasticity consistent standard errors.

The differences observed within each item for the asset and liability sides may have several origins. It can first reflect specific mechanisms at play. For instance, French and foreign investors may react differently to the same policy changes, depending on the force of their *home bias* or more generally to the nature of their *preferred habitat* (Vayanos and Vila 2009, Nguyen et al. 2017). It can also attest differences in terms of composition of risk position. Indeed, advanced economies such as France tend to be long on equities – riskier by nature – and short on debt securities (Gourinchas et al. 2012, Habib and al. 2010). But it can

also merely result from a "volume effect". Indeed, as all the items – except Direct Investments – present a net debtor position, we may expect a larger impact of QE measures on this side of the position, and hence larger estimated coefficients. That is why comparisons of the force of QE impacts on both sides of the French position should be interpreted carefully. For instance, the EAPP announcement has increased Portfolio Investments by 257 and 399 EUR billion for the assets and liabilities respectively, which reflect barely the same proportion of the total gross stocks (10.6% and 11.9% resp.).

Similarly, the differences in our estimates observed between items are subject to another "volume effect". Indeed, the relative weight of each item in the French position significantly differs. Portfolio Investments and in a less extent Other Investments constitute the core of the French position, whereas Derivatives and Direct Investment amounts are less substantial. Thus, Portfolio Investments liabilities are more than 3 times larger than Derivatives liabilities on the third quarter of 2016. As a result, the EAPP announcement has triggered an increase of Derivatives liabilities by 243 EUR billion that represents 19% of the gross total stock of this item, a much higher proportion than the 11.9% associated to the Portfolio Investments. Taking these different remarks into account, Portfolio Investments and Derivatives appear to be the most affected by the unconventional policy.

V.B. Decomposing the Impact of QE on France's IIP

Following Equation 1, the IIP can be decomposed into the so called flows and valuation components (exchange rate and price effects). Thus, we go one step further and try to better understand which of these components has been the most affected by the QE program and has therefore driven changes in the French position. To do so we run separate regressions on these three components in line with the descriptive analysis. In our baseline model EP_q in Equation (2) is therefore successively replaced by $Flows_q, ValExchangeRate_q, ValPrice_q$, that respectively stands for flows, exchange rate valuation and price valuation in quarter *q*. As flows display cyclical variations, we also add quarterly fixed effects to this equation and control dummies for both the great financial crisis (Q3/2008-Q2/2009) and for the European debt crisis (Q4/2009-Q4/2012) in all other models.

Results are reported by item in Tables III to VI in Appendix A. All the three components of the four items in the position react to at least one of the QE measures. However, the global impact of QE on the French IIP mainly operates through valuation changes rather than flows, except for Other Investments.

For Portfolio Investments, all the three components react to QE measures, but the effect on stocks remains mainly driven by changes in prices (these changes lead to portfolio rebalancing - as confirmed by the impact on flows -, which in turn reinforces the effect on the valuation component). Regarding the signs of our estimates, actual purchases have positive effects on the price and exchange rate valuation components. This is in line with the interpretation provided in the descriptive analysis: purchases are likely to increase the price of securities (hence a positive price effect) and to depreciate the euro (hence a positive exchange rate effect). These results are very close to the main conclusions found with intraday data by Bubeck et al. (2017). Indeed, focusing on Euro Area fund investors, they show that the impact of QE on Portfolio Investments mainly operates through changes in the valuation component rather than flows; arguing for an active rather than passive rebalancing portfolio channel. For Derivatives the price valuation is also the most sensitive component to QE programs. The associated estimates are negative, suggesting that QE may affect the global macroeconomic conditions and the prices of underlying assets and thus the price of these financial instruments. For Direct Investments, the exchange rate effect is the most significant at least for the asset side (results are more balanced for the liability side with the three components being affected by such monetary policy). The impact on flows is negative for liabilities but positive for the corresponding asset side. Therefore, QE measures decrease inward flows but encourages

outward flows, which may operate through intra-group loans, as suggested before. Finally, and contrary to the three previous items, the impact of the ECB QE on the Other Investments position transmits almost exclusively through flows. This supports the idea of an international capital redeployment as well as large volume of payment transactions as counterpart of securities net purchases (for instance through the TARGET2 system for intra euro Zone).

Turning to a comparison of assets and liabilities the exchange rate effect is larger for the former than for the latter. This tends to reflect differences in the proportion of foreign currencies between the two sides of the position as assets contain larger shares of securities denominated in foreign currencies.[9] In addition, the composition in foreign currency also determines the extent of the impact since the euro can know opposite fluctuations depending on the currency. The contrary occurs for the price effect since we observe a stronger impact of QE measures on liabilities rather than assets. Indeed, ECB monetary policy affects directly securities issued by French residents, and therefore French liabilities, whereas only a portion of the French assets (issued by other euro area countries) are also directly affected by the ECB policy.[10] Finally, the effect of QE on flows is more balanced.

We complement this analysis by using further ventilation between intra- and extra- Eurozone counterpart countries. Such degree of details is available for all items except Portfolio Investment liabilities. The corresponding graphs are reported in Appendix B. Results are in line and confirm our previous main findings. The dynamic of flows is systematically stronger when considering extra- rather than intra-Eurozone counterparts, despite a quite balanced position (highlighting the importance of portfolio rebalancing). As the QE policy mainly affects euro area countries, effects are expected to be greater on these same countries. A similar logic applies to the valuation effects. Exchange rate is more important for extra Eurozone countries; whereas price effect is normally greater for intra euro counterparts, notably for Portfolio Investments. Nonetheless Derivatives present atypical dynamics and price effect is larger for extra Eurozone, which can be attributed to the size of the London and Chicago financial markets. For Direct Investments, price valuation effect concerns only firms listed in foreign stock exchange markets and thus, as for Derivatives, the importance of foreign stock markets drives most of the effects.

V.C. Robustness

To check the robustness of the results issued from our baseline model (cf tables I and II), this section estimates a set of alternative models. Results are presented in Appendix C.

First, our baseline model controls for year time effects through a year dummy variable. To guarantee that such control variable does not capture an important part of the QE impact, we re-estimate Equation (2) without integrating such variable. Results are reported in the Table VII of Appendix C (alternative model 1**)**. Our main conclusions are confirmed: we still measure a larger impact due to announcements rather than effective purchases. Besides, the January announcement keeps having the most effective effect compared to other announcements. This result is even more pronounced than before for derivatives.

Furthermore, our identification strategy to measure the effects of the main monetary policy announcements on the French IIP could lack precision due to data constraints on the external position, produced and published at quarterly frequency. Our estimated effect of QE announcements on the IIP could therefore encompass other major macroeconomic events occurring at the same quarter and affecting the French IIP. To lessen this risk, we re-estimate our baseline Equation (2) replacing the QE announcements variables by a unique variable that includes all announcements together (namely, it equals

[9] Notice that an important part of French liabilities is also denominated in foreign currencies. For instance, Other Investments have a debtor position in foreign currencies.
[10] Other securities may be indirectly affected through spillover effects.

one on the quarters of these announcements and zero otherwise). However, this variable does not enable to distinguish - and therefore compare - the respective impact of each announcement (explaining why we have retained our approach in the baseline model). Results are reported in the Table VIII of Appendix C (alternative model 2). With this alternative variable, we capture the average effect of all announcements. Hence, as the two announcements following the main announcement tend to (negatively) offset its effect; the impact coefficient of our new variable is smaller than the one associated to the January announcement in our baseline estimates. The average announcement impact in this alternative model is broadly comparable to the one of actual purchases. This confirms that the relative importance of announcements compared to the effective launch of the program is mainly driven by the January announcement.

Finally, our baseline model is estimated from exogenous explanatory variables of the external position (not affected by the ECB's QE measures), mainly US financial variables (cf section IV.A). To verify if our results are sensitive to the choice of these variables, we decide to replace them by their European equivalents. Indeed, if the EUR/USD exchange rate, French interest rates or European stocks indexes are more likely to influence the French IIP than US variables exclusively, these European financial explanatory variables directly suffer from the ECB monetary policy decisions (Bubeck et al. 2017, Rogers et al. 2014, Fratzscher et al. 2016b). Integrating these variables in Equation (2) as such could thus underestimate the impact of our monetary variables on the French IIP. Thereby, we lead a 2-step approach: we first regress the European variables (Eurostoxx, exchange rate and 10-year French government bond) on the QE variable and then use the residuals of these estimates as explanatory variables in Equation (2) instead of US variables. These residuals are the exogenous part of the European explanatory financial variables, not affected by the ECB monetary policy (Bloom, 2009). Results are reported in the Table IX of Appendix C (alternative model 3). The impact of QE measures are broadly consistent with our previous tables and remarks, except for derivatives. We conclude that the impact of the January announcement on the French Portfolio Investments is by far the most robust result.

VI. Counterfactual analysis

In this section we estimate Equation 4a to predict the effective French IIP (with actual QE measures) and Equation 4b to predict what the French IIP would have been without the QE program. The first scenario is established to ensure that our model correctly fits the effective data. The second scenario enables to measure the global impact of the ECB QE policies on the French IIP by subtracting this estimate from the effective position. It's important to notice that these estimates present the full impact of the QE regardless the differences between announcements and actual implementation. In addition, the method allows accounting for the outcome at each period during the implementation of the program.

Figures IV.a and IV.b represent estimates provided by our models with (black dashed line) and without (purple line) QE measures. The effective position is also represented in the figures (orange line). The impact of the unconventional monetary policy is given by the difference between the observed IIP and the estimated IIP from the no-QE model.

All in all the method confirms the main results highlighted before. The full model with QE variables fits the effective data and thus provides a good estimate of the French IIP. Comparing the actual data with the no-QE scenario confirms that the policy does impact the French external position for almost all items and for both assets and liabilities. Portfolio and Other Investments are the most impacted. In both cases the liability side is more sensitive, with deep and lasting observed effects. The impact of the EAPP announcement and official launch (Q1 2015) seems particularly strong for almost all items. In some cases – for Derivatives as well as for Other and Direct Investments – most of the effect is attributed to this particular quarter.

However, some exceptions are observable. For Derivatives, our model does not present a clear impact except for the first quarter of 2015. This result supports the previous findings in which particularly large coefficients were associated to the EAPP announcement. It is also the case for inward Direct Investments, for which the full- and no- QE models present close estimates and therefore do not allow drawing precise conclusions; except at the end of the period.

Figure IV.a: Counterfactual scenarios on Assets for the French IIP, by item

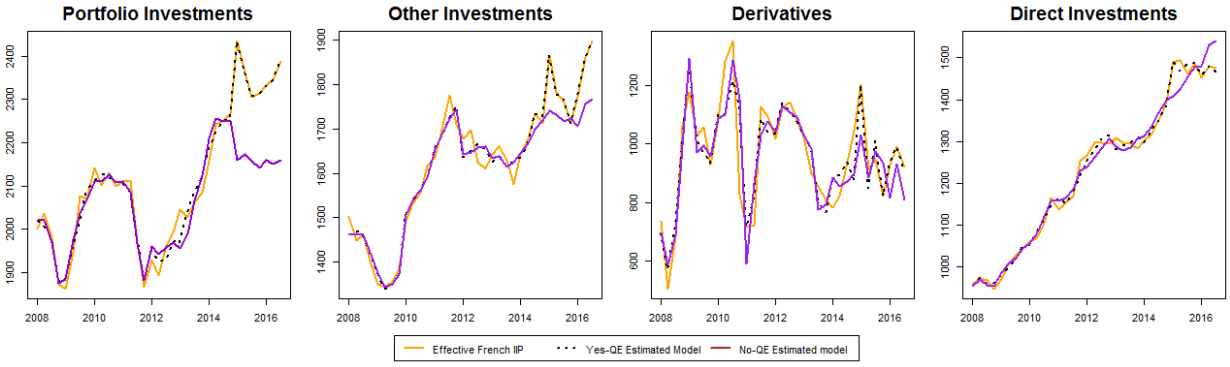
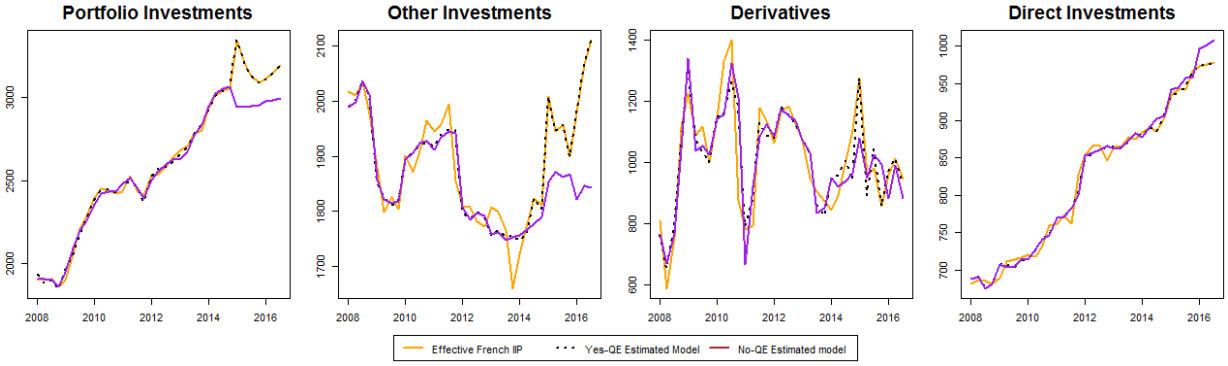


Figure IV.b: Counterfactual scenarios on Liabilities for the French IIP, by item



Source: Authors' calculation (for "Estimated models") and Banque de France (for the "Effective French IIP").
Note: Amounts expressed in billions of euros. *Dashed black* lines show estimates provided by our full model (Eq. 4a); *Purple* lines represent our counterfactual scenario without the QE policy (Eq. 4b).

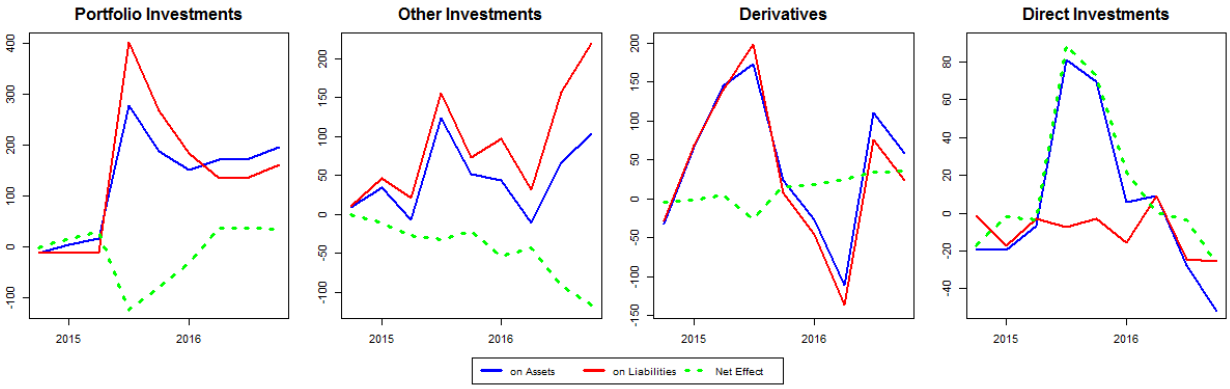
Then, to provide a better representation of the impact of QE measures analysed above, we compute the value of the specific effect of the unconventional policy on the French IIP using Equation 5. This effect is given by the difference between the observed and the estimated positions issued from the no-QE model (Equation 4b). The effects on Assets (blue line) and Liabilities (red line) for each item are represented in Figure V.

For Portfolio Investments, we observe more clearly the large effect of the EAPP announcement and official launch that occurred on the first quarter of 2015. This effect is then mostly counterbalanced for both assets and liabilities in the following quarters. Other Investments present an uneven profile with also a strong impact of QE measures on the same quarter which is then perfectly counterbalanced , before being emphasised again at the end of the period. Derivatives are successively strongly positevely and negatively affected by the program. However, effects are of similar magnitude for assets and liabilities, certainly due to a well balanced position (held by investors). Direct Investments also react to QE measures but almost exclusively through the asset side of the item and just during a temporary period.

These results highlight the idea of an over-adjustment phenomenon already put on evidence in the descriptive analysis. Indeed, the large positive effect observable at the first quarter of 2015 is rapidly followed by movements in the opposite directions for all the lines of the position except outward Direct Investments. This supports the idea that anticipations relative to QE program has evolved following the first announcement; and the "Bund Tantrum" episode (Section III).

Finally, the impact of the ECB policy on the French net IIP – namely on the country's net international wealth – is computed as the difference between the estimated effects on Assets and on Liabilities. This impact is represented in Figure V (green dashed line).

<u>Figure V.</u> The impact of QE on the net external position



Source: Authors' calculation.
Note: Amounts expressed in billions of euros.

In the spirit of Gourinchas et al. (2012), changes in the net IIP can be seen as way of analyzing International Wealth Transfers. Indeed, when one country reduces its foreign liabilities, it decreases the value of the assets of at least one of its partner. The external position of this country improves and we observe potential wealth transfer from one economy to another. The size of these transfers crucially depend on the composition of the gross external positions: the type of assets, their duration and their currency-denomination particularly matter. For instance, advanced economies such as France tend to be long on equities and short on other securities. Following economic downturn, changes in valuation on risky assets are deeper whereas the value of safe assets tends to remain relatively stable, so that we do generally observe wealth transfers from advanced economies to emerging ones in crisis periods (whereas the contrary generally occurs during boom periods due to higher yield spread on risky assets). In our case, QE policies may have generated wealth transfers from France to the rest of the world or conversely: for instance, increase in the value of French assets can be assimilated to a wealth transfer to France.[11]

All in all, we observe a weak and negative net impact on the whole position that suggests a low wealth transfer from France to the rest of the world assigned to the ECB policy. This transfer is mainly due to the progressive net negative impact on Other Investments. Indeed, the impact observed on other items is either zero due to a symmetric position between assets and liabilities (as for Derivatives) or quite significant but temporary (as for Portfolio and Direct Investments). Especially, the net negative effect on Portfolio Investments disappears after 2 quarters, which is in line with the phenomenon of over adjustment put on evidence in the previous descriptive analysis.

[11] We could temper the previous comments by highlighting that changes in valuations do not necessary reflect an effective "wealth transfer" between France and another counterpart country. It's notably the case of debt securities hold by non-residents for which changes in valuation affect neither the value of the principal nor of the coupon.

VII. Conclusions

This paper proposes a first analysis of the impact of QE programs on one economy's International Investment Position. Using disaggregated quarterly data of the French IIP from Banque de France, we demonstrate that ECB QE measures do impact the external position.

A preliminary descriptive analysis shows abrupt movements during the first quarter of 2015, which is concomitant with the announcement and official launch of the QE program by the ECB. Decomposing the changes in the external position into flows and valuation components reveals that price and exchange rate valuation effects seem to be especially subject to the ECB unconventional policy.

To confirm and extend these results, we econometrically test the relationship, distinguishing between announcements and actual implementation. Our approach suggests that QE measures affect all the lines composing the position; mainly through announcements rather than effective purchases. In particular, the January 2015 announcement has substantial and robust effects on the various items especially on Portfolio Investments and Derivatives. If both flows and valuation components are affected by the QE, the effect on the valuation components and especially on prices is more pronounced.

We finally build counterfactual scenarios to estimate what the French IIP would have been in absence of QE. This exercise enables to gauge the total impact of the purchase program and its evolution over time. We demonstrate that the strong impact observed in the first quarter of 2015 is rapidly counterbalanced for all the lines of the position except Other Investments; which could indicate an over-adjustment phenomenon at the beginning of the program. This approach also allows to estimate the outcome on the net IIP and thus on the international wealth transfer. Consistently with our previous findings, we observe a robust impact at the beginning of the period which is then partially offset.

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Appendix A: Breakdown of the QE effect on French IIP into flow and valuation components

Table III. Breakdown of the effect of QE on the French Portfolio Investments Position

	(1)	(2)	(3)	(4)	(5)	(6)
		Assets			Liabilities	
	Flows	Valuation: Exchange rate	Valuation: Price	Flows	Valuation: Exchange rate	Valuation: Price
QE: Purchases	0.0168	0.00958***	0.0480**	0.0274*	0.000440	0.00871
	(0.171)	(0.002)	(0.016)	(0.093)	(0.793)	(0.781)
QE An. 1	-19.72**	-2.581	41.21	-8.258	0.421	52.03**
	(0.013)	(0.422)	(0.117)	(0.511)	(0.848)	(0.047)
QE An. 2	51.30***	29.01***	105.1***	61.71***	23.41***	182.4***
	(0.002)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
QE An. 3	-3.619	2.242	54.50***	-24.95**	6.058***	46.39**
	(0.667)	(0.129)	(0.000)	(0.024)	(0.000)	(0.020)
VIX	-0.828	-0.00218	-3.299***	-2.256**	-0.306	-2.387
	(0.128)	(0.986)	(0.001)	(0.044)	(0.144)	(0.444)
S&P 500	0.0143	0.00268	0.0594	-0.0207	-0.0000628	-0.00213
	(0.331)	(0.626)	(0.303)	(0.620)	(0.988)	(0.989)
Brexit	-17.76**	7.692***	-10.88	-5.552	-11.44***	0.510
	(0.027)	(0.000)	(0.335)	(0.646)	(0.000)	(0.983)
US 10y	21.95**	6.597**	18.17	27.36***	4.276***	-8.854
	(0.022)	(0.010)	(0.173)	(0.000)	(0.007)	(0.298)
Tot. Outstanding	0.0394**	-0.0715***	0.0283	-0.0295	-0.0592***	0.0634
	(0.012)	(0.000)	(0.577)	(0.222)	(0.000)	(0.359)
Lag(IIP)	-0.0678*					
	(0.092)					
		-0.0132				
		(0.274)				
			-0.236***			
			(0.002)			
				-0.0126		
				(0.783)		
					-0.00262	
					(0.421)	
						-0.0249
						(0.872)
Year-control FE	Yes	No	No	Yes	No	No
Observations	35	35	35	35	35	35
R^2	0.739	0.881	0.507	0.779	0.895	0.364
R^2 adjusted	0.532	0.817	0.238	0.604	0.838	0.016

P-values in parentheses. *** indicates the coefficient significance level at 1%, ** at 5% and * at 10%. T-statistics are based on Newey-West heteroskedasticity consistent standard errors.

<u>Table IV.</u> Breakdown of the effect of QE on the French Other Investments Position

	(1)	(2)	(4)	(5)
	Assets		Liabilities	
	Flows	Valuation: Exchange rate	Flows	Valuation: Exchange rate
QE: Purchases	0.0511***	0.00237	0.121***	0.0000563
	(0.005)	(0.474)	(0.001)	(0.996)
QE An. 1	55.69***	1.804	53.20**	-10.62
	(0.000)	(0.574)	(0.012)	(0.202)
QE An. 2	79.85***	38.87***	163.7***	26.20**
	(0.001)	(0.000)	(0.000)	(0.010)
QE An. 3	-64.17***	8.626***	-79.12***	3.535
	(0.000)	(0.000)	(0.000)	(0.296)
VIX	2.450***	-0.585**	4.707***	-0.227
	(0.002)	(0.041)	(0.000)	(0.707)
S&P 500	0.0950**	-0.00654	-0.0170	0.00486
	(0.046)	(0.323)	(0.510)	(0.550)
Brexit	28.99*	20.16***	42.85	15.00***
	(0.091)	(0.000)	(0.158)	(0.000)
US 10y	-23.90**	10.96***	8.095	9.894***
	(0.031)	(0.000)	(0.371)	(0.003)
Tot. Outstanding	0.0775	-0.0934***	0.150**	-0.134***
	(0.107)	(0.000)	(0.026)	(0.000)
Lag(IIP)	-0.384***			
	(0.000)			
		0.0294		
		(0.236)		
			-0.340***	
			(0.000)	
				0.00267
				(0.960)
Year-control FE	Yes	No	Yes	No
Observations	35	35	35	35
R^2	0.679	0.927	0.710	0.904
R^2 adjusted	0.425	0.886	0.482	0.852

P-values in parentheses. *** indicates the coefficient significance level at 1%, ** at 5% and * at 10%. T-statistics are based on Newey-West heteroskedasticity consistent standard errors.

Table V. Breakdown of the effect of QE on the French Derivatives Position

	(1)	(2)	(3)	(4)	(5)	(6)
	Assets			Liabilities		
	Flows	Valuation: Exchange rate	Valuation: Price	Flows	Valuation: Exchange rate	Valuation: Price
QE: Purchases	0.0216	-0.00502	-0.128***	0.0196	-0.00538	-0.159***
	(0.504)	(0.259)	(0.001)	(0.484)	(0.271)	(0.000)
QE An. 1	51.79	3.962	-68.84**	51.40*	4.773	-66.17**
	(0.123)	(0.432)	(0.031)	(0.060)	(0.364)	(0.026)
QE An. 2	69.82*	37.10***	19.23	51.83	37.60***	55.01**
	(0.054)	(0.000)	(0.421)	(0.123)	(0.000)	(0.032)
QE An. 3	-40.08**	8.128***	-49.59***	-28.63*	8.111***	-65.88***
	(0.023)	(0.001)	(0.009)	(0.097)	(0.000)	(0.000)
VIX	1.840	0.363	-0.436	1.165	0.370	0.293
	(0.293)	(0.470)	(0.772)	(0.418)	(0.457)	(0.841)
S&P 500	0.0550	-0.00503	-0.0879**	0.0584	-0.00429	-0.0624
	(0.500)	(0.575)	(0.039)	(0.395)	(0.668)	(0.118)
Brexit	-3.632	12.83***	29.30**	-10.13	13.71***	35.92***
	(0.809)	(0.001)	(0.029)	(0.514)	(0.000)	(0.004)
US 10y	11.44	-7.002**	-256.7***	14.15	-7.091**	-245.9***
	(0.583)	(0.041)	(0.000)	(0.394)	(0.033)	(0.000)
Tot. Outstanding	0.0479	-0.0343***	-0.198***	0.0396	-0.0355***	-0.189***
	(0.198)	(0.002)	(0.008)	(0.227)	(0.001)	(0.006)
Lag(IIP)	0.0451					
	(0.610)					
		-0.0191				
		(0.273)				
			-1.114***			
			(0.000)			
				0.0411		
				(0.595)		
					-0.0207	
					(0.256)	
						-1.109***
						(0.000)
Year-control FE	Yes	No	No	Yes	No	No
Observations	35	23	23	35	23	23
R^2	0.437	0.854	0.915	0.450	0.850	0.920
R^2 adjusted	-0.008	0.707	0.831	0.015	0.701	0.839

P-values in parentheses. *** indicates the coefficient significance level at 1%, ** at 5% and * at 10%. T-statistics are based on Newey-West heteroskedasticity consistent standard errors.

Table VI. Breakdown of the effect of QE on the French Direct Investments Position

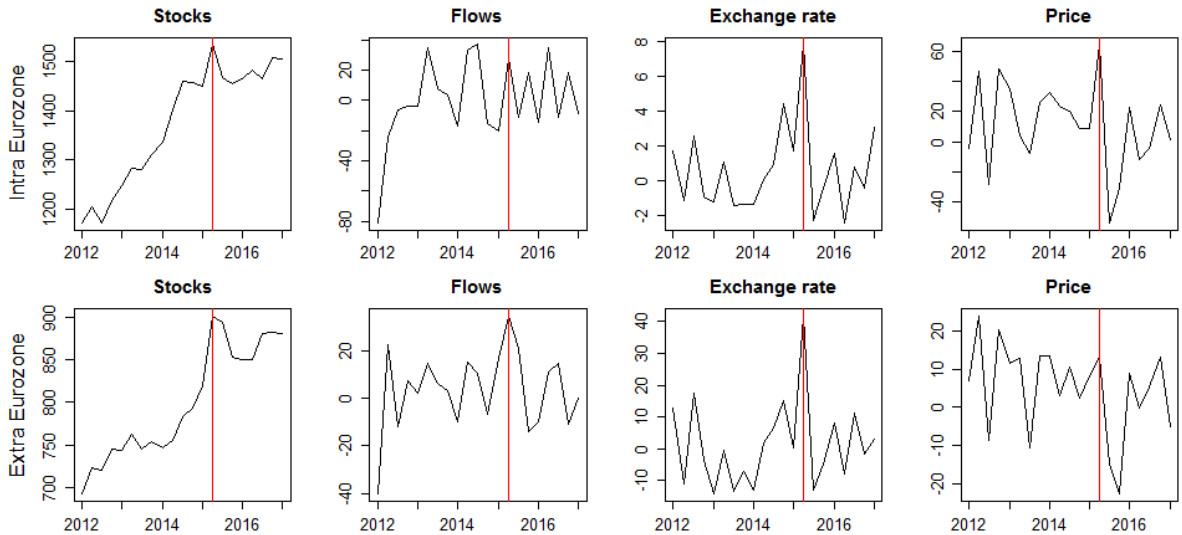
	(1)	(2)	(3)	(4)	(5)	(6)
	Assets			Liabilities		
	Flows	Valuation: Exchange rate	Valuation: Price	Flows	Valuation: Exchange rate	Valuation: Price
QE: Purchases	-0.00152	-0.0170***	0.00512	-0.00263	-0.00207*	0.00267
	(0.682)	(0.001)	(0.331)	(0.598)	(0.057)	(0.519)
QE An. 1	-4.731	16.33***	3.378**	-14.60***	4.649***	-3.767**
	(0.278)	(0.000)	(0.011)	(0.001)	(0.000)	(0.012)
QE An. 2	16.17***	65.48***	6.261***	-11.34***	9.274***	13.75***
	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)
QE An. 3	-1.276	26.89***	10.72***	7.650**	3.353***	6.771***
	(0.576)	(0.000)	(0.000)	(0.021)	(0.000)	(0.001)
VIX	0.0532	-0.309	-0.475**	-0.0835	-0.0819*	-0.791***
	(0.800)	(0.122)	(0.013)	(0.750)	(0.071)	(0.007)
S&P 500	0.0213	-0.0530	0.0283*	-0.00134	-0.00495	0.0106
	(0.408)	(0.146)	(0.084)	(0.956)	(0.380)	(0.174)
Brexit	19.69***	13.79***	-3.479*	0.435	3.533***	-7.799***
	(0.000)	(0.000)	(0.076)	(0.887)	(0.000)	(0.000)
US GDP	0.00223	0.0438**	-0.0143**	0.0116	0.00503***	-0.00377
	(0.856)	(0.014)	(0.036)	(0.158)	(0.009)	(0.265)
Lag(IIP)	-0.0763					
	(0.111)					
		-0.249***				
		(0.000)				
			0.0248*			
			(0.085)			
				-0.141**		
				(0.011)		
					-0.0612***	
					(0.000)	
						-0.0174
						(0.699)
Year-control FE	Yes	No	No	Yes	No	No
Observations	35	35	23	35	35	23
R^2	0.652	0.739	0.525	0.440	0.669	0.581
R^2 adjusted	0.408	0.615	0.128	0.048	0.510	0.232

P-values in parentheses. *** indicates the coefficient significance level at 1%, ** at 5% and * at 10%. T-statistics are based on Newey-West heteroskedasticity consistent standard errors.

Appendix B: Intra- and extra-Eurozone French IIP

Portfolio Investments

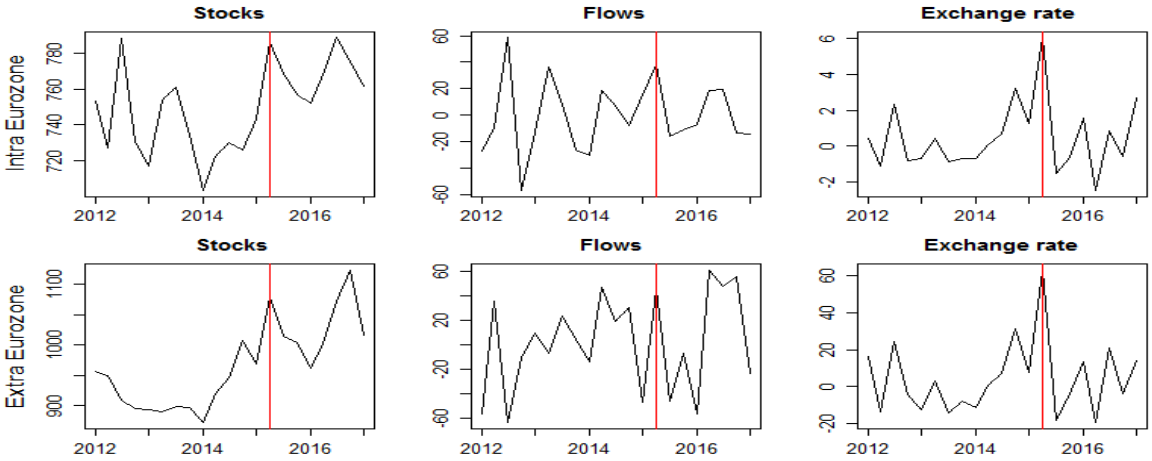
Assets



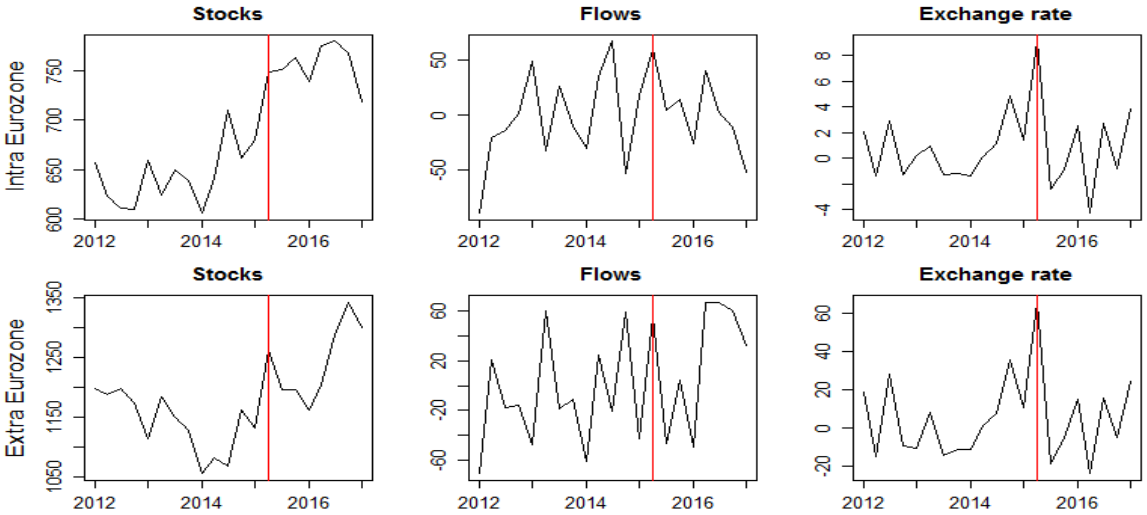
Source: Banque de France.
Note: **Amounts are expressed in billions of euros.** In the charts, **the red line** indicates the main announcement of implementation of the ECB's QE - namely *Expanded Asset Purchase Program* - followed by the start of this program in the same first quarter 2015. The EAPP is still ongoing.

Other Investments

Assets



Liabilities

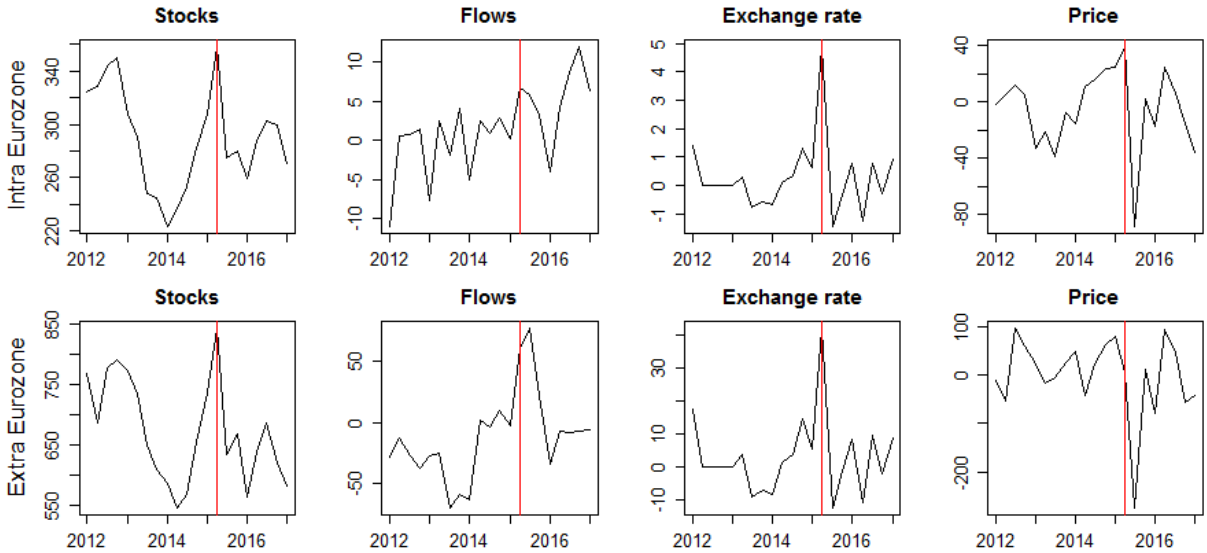


Source: Banque de France.

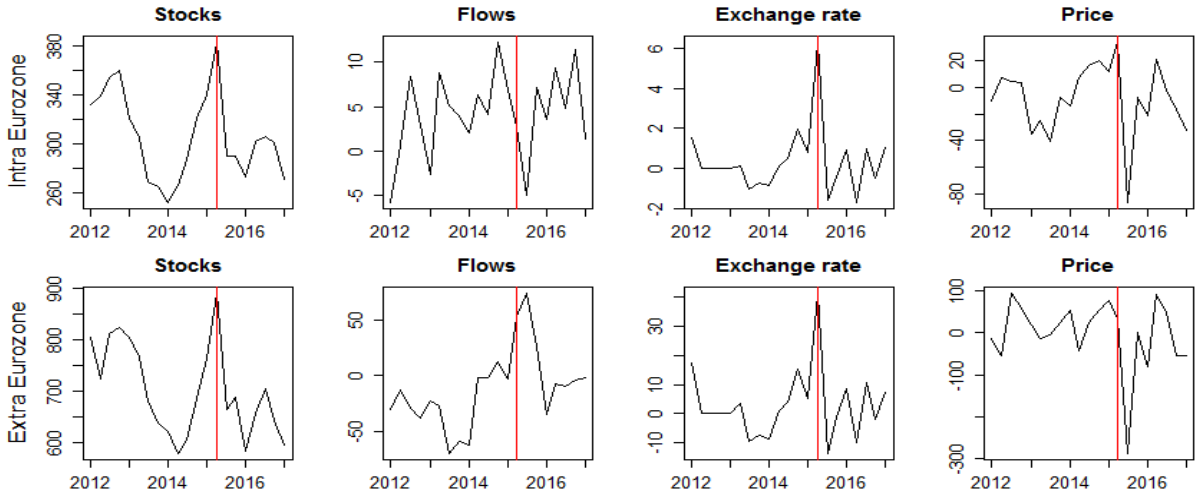
Note: **Amounts are expressed in billions of euros.** In the charts, **the red line** indicates the main announcement of implementation of the ECB's QE - namely *Expanded Asset Purchase Program* - followed by the start of this program in the same first quarter 2015. The EAPP is still ongoing.

Derivatives

Assets



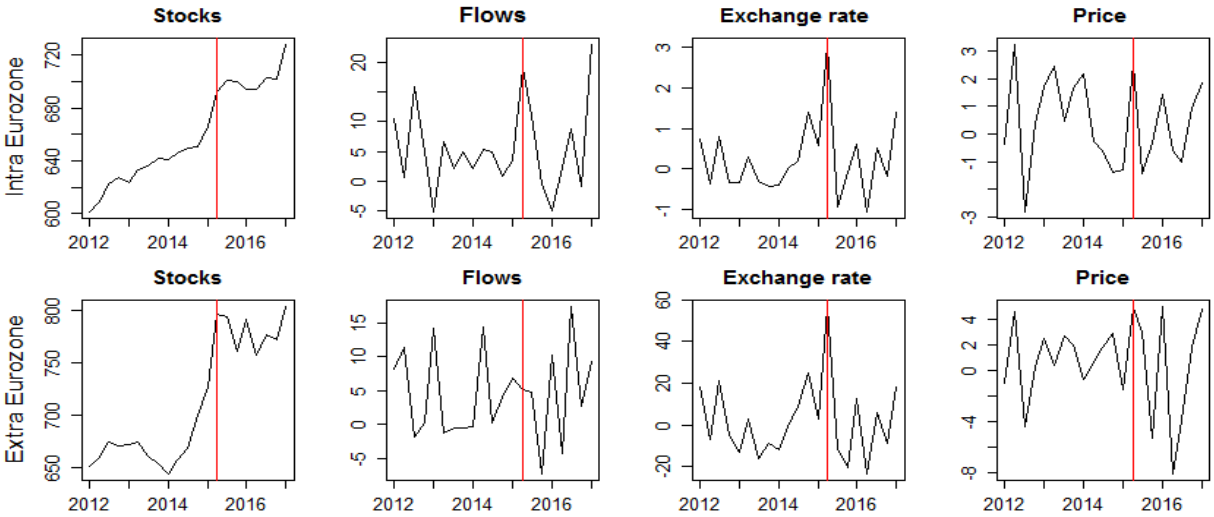
Liabilities



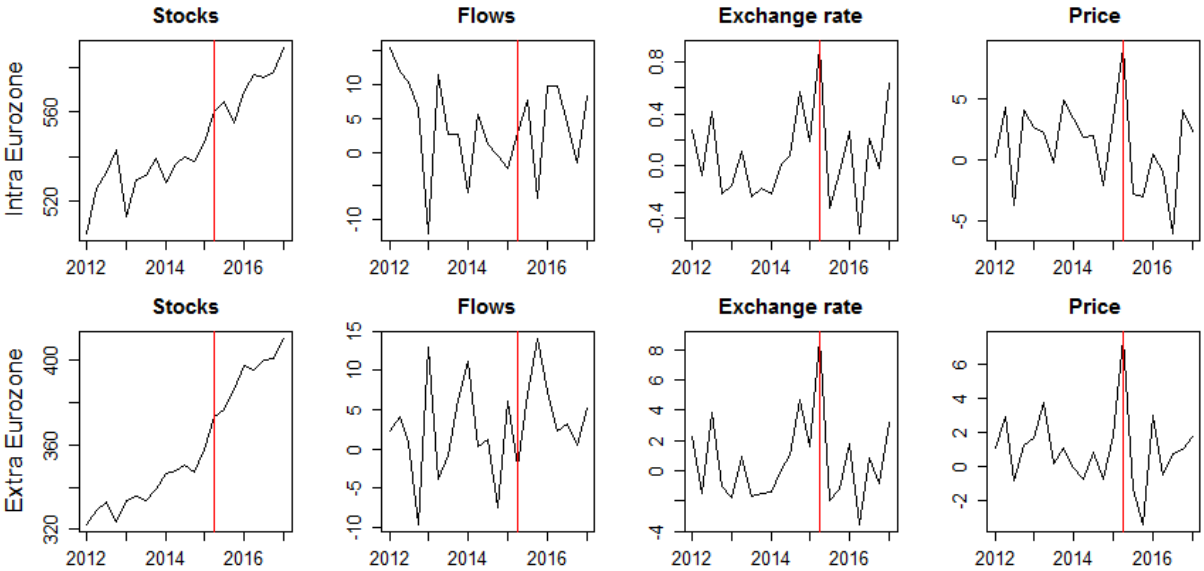
Source: Banque de France.
Note: **Amounts are expressed in billions of euros.** In the charts, **the red line** indicates the main announcement of implementation of the ECB's QE - namely *Expanded Asset Purchase Program* - followed by the start of this program in the same first quarter 2015. The EAPP is still ongoing.

Direct Investments

Assets



Liabilities



Source: Banque de France.

Note: **Amounts are expressed in billions of euros.** In the charts, **the red line** indicates the main announcement of implementation of the ECB's QE - namely *Expanded Asset Purchase Program* - followed by the start of this program in the same first quarter 2015. The EAPP is still ongoing.

Appendix C: Robustness

Table VII. Effect of QE on French IIP Assets (A) and Liabilities (L), alternative model 1

	Portfolio Investment		Other Investment		Derivatives		Direct Investment	
	A	L	A	L	A	L	A	L
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
QE: Purchases	0.0890***	0.0212	0.0627***	0.130***	0.0699	0.0530	-0.0334***	-0.0157***
	(0.005)	(0.709)	(0.005)	(0.006)	(0.348)	(0.451)	(0.001)	(0.002)
QE An. 1	36.92	32.88	35.60**	27.30	86.74	96.81	7.600	-21.26***
	(0.183)	(0.400)	(0.032)	(0.323)	(0.327)	(0.272)	(0.281)	(0.000)
QE An. 2	208.3***	297.7***	135.6***	196.0***	238.8***	261.9***	89.47***	15.18***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.008)	(0.003)	(0.000)	(0.000)
QE An. 3	15.81*	-28.08	-67.84***	-89.40***	-78.59*	-80.97*	40.02***	18.31***
	(0.071)	(0.266)	(0.000)	(0.000)	(0.094)	(0.068)	(0.000)	(0.000)
VIX	-3.302***	-3.276	-1.954***	0.817	0.00127	-0.183	-1.301***	-0.834***
	(0.002)	(0.194)	(0.001)	(0.326)	(0.999)	(0.873)	(0.001)	(0.001)
S&P 500	0.0883**	-0.0177	-0.00658	0.0101	-0.294**	-0.288**	-0.0857	-0.0722***
	(0.046)	(0.899)	(0.778)	(0.854)	(0.022)	(0.017)	(0.151)	(0.008)
Brexit	-12.09	18.25	43.18***	28.59***	26.53	23.22	34.48***	2.251*
	(0.277)	(0.562)	(0.001)	(0.008)	(0.294)	(0.301)	(0.000)	(0.068)
US 10y	53.12***	10.63	25.14	36.65*	-122.0***	-111.9***		
	(0.010)	(0.623)	(0.277)	(0.052)	(0.008)	(0.009)		
Tot. Outstanding	0.0416	0.0108	-0.0655***	-0.0102	-0.177**	-0.170**		
	(0.473)	(0.900)	(0.001)	(0.714)	(0.033)	(0.040)		
US GDP							0.0542*	0.0531***
							(0.062)	(0.001)
Lag(IIP)	0.626***	0.933***						
	(0.000)	(0.000)						
			0.901***	0.657***				
			(0.000)	(0.000)				
					0.291***	0.287***		
					(0.000)	(0.000)		
							0.711***	0.513***
							(0.000)	(0.000)
Year-control FE	No	No	No	No	No	No	No	No
Observations	35	35	35	35	35	35	35	35
R2 adjusted	0.912	0.972	0.893	0.737	0.427	0.423	0.985	0.985

P-values in parentheses. *** indicates the coefficient significance level at 1%, ** at 5% and * at 10%. T-statistics are based on Newey-West heteroscedasticity consistent standard errors.

Table VIII. Effect of QE on French IIP Assets (A) and Liabilities (L), alternative model 2

	Portfolio Investment		Other Investment		Derivatives		Direct Investment	
	A	L	A	L	A	L	A	L
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
QE: Purchases	0.0678**	-0.00706	0.0360*	0.0930**	0.0282	0.00798	-0.0302***	-0.00999**
	(0.044)	(0.893)	(0.085)	(0.015)	(0.660)	(0.895)	(0.002)	(0.046)
QE Annoncements	80.21**	82.82*	23.46	32.53	67.63	76.49	46.88***	4.577
	(0.017)	(0.082)	(0.369)	(0.378)	(0.406)	(0.350)	(0.000)	(0.492)
VIX	-3.486***	-3.627	-2.145***	0.331	-0.399	-0.562	-1.274***	-0.815***
	(0.001)	(0.196)	(0.001)	(0.672)	(0.717)	(0.597)	(0.000)	(0.001)
S&P 500	0.0857**	-0.00329	0.00940	0.0184	-0.282**	-0.273**	-0.0699	-0.0716***
	(0.040)	(0.982)	(0.724)	(0.722)	(0.021)	(0.017)	(0.264)	(0.007)
Brexit	-2.163	24.97	57.24***	48.95***	52.13***	51.21***	35.91***	-1.823
	(0.897)	(0.575)	(0.007)	(0.004)	(0.001)	(0.001)	(0.000)	(0.368)
US 10y	48.69**	0.163	18.39	34.34**	-123.1***	-112.7***		
	(0.011)	(0.994)	(0.496)	(0.044)	(0.007)	(0.009)		
Tot. Outstanding	0.0283	-0.0499	-0.0866***	-0.0403	-0.212**	-0.208**		
	(0.643)	(0.635)	(0.000)	(0.371)	(0.030)	(0.041)		
US GDP							0.0430	0.0512***
							(0.163)	(0.001)
Lag(IIP)	0.647***	0.914***						
	(0.000)	(0.000)						
			0.855***	0.673***				
			(0.000)	(0.000)				
					0.297***	0.299***		
					(0.000)	(0.000)		
							0.761***	0.531***
							(0.000)	(0.000)
Observations	35	35	35	35	35	35	35	35
R2 adjusted	0.887	0.87	0.418	0.983	0.963	0.632	0.403	0.983

P-values in parentheses. *** indicates the coefficient significance level at 1%, ** at 5% and * at 10%. T-statistics are based on Newey-West heteroscedasticity consistent standard errors.

Table IX. Effect of QE on French IIP Assets (A) and Liabilities (L), alternative model 3

	Portfolio Investment		Other Investment		Derivatives		Direct Investment	
	A	L	A	L	A	L	A	L
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
QE: Purchases	0.154***	0.100	0.154**	0.219***	-0.529***	-0.577***	-0.103***	-0.0330***
	(0.002)	(0.394)	(0.044)	(0.000)	(0.000)	(0.000)	(0.004)	(0.002)
QE An. 1	2.783	-0.955	12.38	16.62	81.05**	87.60**	3.963	-17.78***
	(0.879)	(0.971)	(0.670)	(0.310)	(0.043)	(0.025)	(0.829)	(0.004)
QE An. 2	233.8***	423.3***	74.29	81.59	494.2***	539.9***	134.2***	-17.35
	(0.007)	(0.007)	(0.506)	(0.153)	(0.002)	(0.001)	(0.008)	(0.499)
QE An. 3	20.57	-11.34	-67.59***	-99.10***	-100.3***	-103.7***	40.31***	23.79***
	(0.309)	(0.847)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
VIX	2.136	1.808	0.0915	1.665	-5.417***	-5.170***	-1.364*	-0.766
	(0.212)	(0.327)	(0.940)	(0.202)	(0.010)	(0.009)	(0.091)	(0.121)
Brexit	13.36	-1.208	74.88	67.98	-170.6**	-185.3**	-8.380	4.496
	(0.686)	(0.979)	(0.358)	(0.129)	(0.028)	(0.021)	(0.824)	(0.683)
Tot. Outstanding	0.0722*	0.0524	-0.0464	-0.00605	0.0550	0.0482		
	(0.055)	(0.376)	(0.107)	(0.752)	(0.476)	(0.514)		
US GDP							0.0705	0.0549***
							(0.137)	(0.009)
f(eurostoxx)	0.178**	0.0977	0.0414	0.0563	-0.490***	-0.459***	-0.0269	-0.0189*
	(0.025)	(0.268)	(0.395)	(0.188)	(0.000)	(0.001)	(0.413)	(0.077)
f(exchge rate)	-5.597**	-3.427	0.780	0.111	7.556**	5.966*	-0.876	0.801
	(0.016)	(0.177)	(0.730)	(0.919)	(0.026)	(0.098)	(0.559)	(0.218)
f(France 10y)	-1.121	65.97	-15.57	-33.62	-218.9***	-212.1***		
	(0.978)	(0.363)	(0.741)	(0.128)	(0.001)	(0.001)		
Lag(IIP)	0.462*	0.606*						
	(0.095)	(0.100)						
			0.497***	0.296***				
			(0.006)	(0.005)				
					-0.478*	-0.489*		
					(0.073)	(0.083)		
							0.585***	-0.143
							(0.000)	(0.763)
Year-control FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	35	35	35	35	35	35	35	35
R2 adjusted	0.951	0.991	0.934	0.811	0.683	0.668	0.988	0.984

P-values in parentheses. *** indicates the coefficient significance level at 1%, ** at 5% and * at 10%. T-statistics are based on Newey-West heteroscedasticity consistent standard errors.