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The effect of Eurosystem asset purchase programmes on euro area sovereign bond yields during the COVID-19 pandemic


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This policy brief note is based on a study that investigates the effect of Eurosystem Asset Purchase Programmes (APP) on the monthly yields of 10-year sovereign bonds for 11 euro area sovereigns during January-December 2020. The analysis is based on time-varying coefficient methods applied to monthly panel data covering the period 2004m09 to 2020m12. During 2020 asset purchases are estimated to have contributed to a cross-country average decline in yields by 76 bps. In December 2020 the effect per EUR trillion ranged between 34 bps in Germany and 159 bps in Greece. Stronger effects generally display diminishing returns. Our findings suggest that a sharp decline in the size of the APP in the aftermath of the COVID-19 crisis could lead to very sharp increases in bond yields, particularly in peripheral countries. The analysis additionally reveals a differential response to global risks between core and peripheral countries, with the former enjoying safe-haven benefits. Markets' perceptions of risk are found to be significantly affected by credit ratings.

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Introduction

The ESCB's Asset Purchase Programme (APP) is part of a package of non-standard monetary policy measures initiated in mid-2014 in the context of the historically low rates following the global financial crisis. Outright purchases, often referred to as quantitative easing (QE), have been employed also by other major central banks, namely the Federal Reserve Board, the Bank of England and the Bank of Japan. The Statute of the ESCB (Article 18.1) provides for the purchase of instruments such as government bonds, as long as they are bought on the secondary market from investors and not directly from Member States. The Governing Council expects asset purchases *"to run for as long as necessary to reinforce the accommodative impact of its policy rates, and to end shortly before it starts raising the key ECB interest rates"*.

The Eurosystem's APP was expanded following the COVID-19 outbreak, with the launch of the pandemic emergency purchase programme (PEPP) in March 2020. The PEPP is a temporary asset purchase programme of private and public sector securities, with an initial envelope of €750 billion, which was subsequently increased by €600 billion in June and by a further €500 billion in December, bringing the total to €1,850 billion. The Governing Council "*will terminate net asset purchases under the PEPP once it judges that the COVID-19 crisis phase is over, but in any case not before the end of March 2022"*.

In view of the stated intention to eventually terminate these policies, quantifying the effect of APP is important for assessing the likely implications of its termination, or reversal. A large body of literature has documented sizeable and persistent effects of central bank asset purchase programmes on various financial market variables. Here we study the effect on the 10-year sovereign bond yields of 11 euro area sovereigns.[2] The analysis is based on time-varying parameter methods, which allow us to zoom in to the period between January and December 2020, covering the outbreak of the COVID-19 pandemic and the launch of the PEPP. Earlier econometric analyses of panel data using time-varying coefficient methods like Bernoth and Erdogan (2012) tend to involve smaller sets of explanatory variables and permit a smaller degree of heterogeneity, while the time-varying parameters tend to follow a-theoretical specifications, such as a random walk process in D'Agostino and Ehrmann (2014). More recently, Paniagua et al. (2017) and Monteiro and Vasicek (2019) allow for greater heterogeneity and provide for greater economic interpretation of the variation exhibited by the time-varying parameters. While the former authors focus on spreads against Germany, the latter look directly at sovereign bond yields and expand the set of explanatory variables with, inter alia, the inclusion of APP. Our approach follows closely Paniagua et al (2017) and Monteiro and Vasicek (2019).

We differ from Paniagua et al. (2017) in that we don't look at spreads but like Monteiro and Vasicek (2019) we focus on individual sovereign bond yields, we allow for greater heterogeneity in the specification of the time-varying coefficients and use an extended set of explanatory variables that includes APP. We differ from Monteiro and Vasicek (2019) by expanding further the explanatory variables through the inclusion of credit ratings, while allowing perceptions of risk to be driven by differences in credit rating compared to the anchor country, Germany, as well as by macroeconomic misalignment. Also, we employ a one-step estimation procedure, instead of the two-step procedure employed by Monteiro and Vasicek (2019).

Methodology

The empirical analysis is based on time-varying parameter methods, which allow us to zoom in to the period between January and December 2020, covering the outbreak of the COVID-19 pandemic and the

[2] Belgium, Germany, Ireland, Greece, Spain, France, Italy, Netherlands, Austria, Portugal and Finland.

launch of the Pandemic Emergency Purchase Programme. In particular, 10-year government bond yields are estimated as a time-varying function of the following explanatory variables: the short-term risk-free rate (measured by the EONIA overnight rate); the slope of the yield curve (measured by the spread between the 10-year and the one-year bonds of AAA-rated euro area sovereigns); the debt-to-GDP ratio; the unemployment rate; a global risk factor (measured by the logged VIX index);[3] an indicator capturing the role of liquidity of the assets considered (measured as the volume of gross debt in euros at country level relative to the euro area total); the aggregate value of securities held by the Eurosystem for monetary policy purposes (APP); and the average credit rating by Moody's, Fitch and S&P. A positive effect on the 10-year bond yield may generally be anticipated from increases in the risk-free rate, the yield slope, debt and the unemployment rate, while a negative effect can be expected from higher liquidity, increased asset purchases and improved rating. The effect of global risk is more ambiguous, as the literature reports evidence of both positive and negative feedbacks, the latter denoting benefits from "flight to safety".

The estimated model distinguishes between influences related to fundamentals and to changes in market perceptions of risk. The explanatory variables represent a set of observable sources of risk that markets price-in when determining the yield of the 10-year sovereign bonds. The coefficient on each explanatory variable denotes the weight that markets place on the different sources of risk, i.e. the market perceptions of risk. In constant parameter analyses, market sensitivity to individual sources of risk is assumed to remain unchanged. In contrast, the econometric framework employed here permits market perceptions of risk to continuously vary through time. In the benchmark model we allow market perceptions of risk to be influenced by credit ratings, in line with recent evidence provided in the literature by Georgoutsos and Migiakis (2018) and Malliaropoulos and Migiakis (2018).

We use monthly observations for the following 11 members of the euro area: BE, DE, IE, GR, ES, FR, IT, NL, AT, PT, FI. The data are commonly available during 2004m09 – 2020m12. Exceptions are debt, the unemployment rate and liquidity, which are available at quarterly frequency and only until 2020Q3. The last quarter of 2020 has been completed based on the winter forecast of the European Commission and the December 2020 BMPE forecast of the eurosystem. The quarterly series have been transformed into monthly frequency.

There are potentially important caveats, most of which are discussed by Monteiro and Vasicek (2019). Most importantly, 10-year bond yields are likely to reflect expectations on the future value of macroeconomic aggregates, rather than historical realizations used here. However, the use of historical data is a common compromise, as high-frequency data on long-term expectations are typically not available.

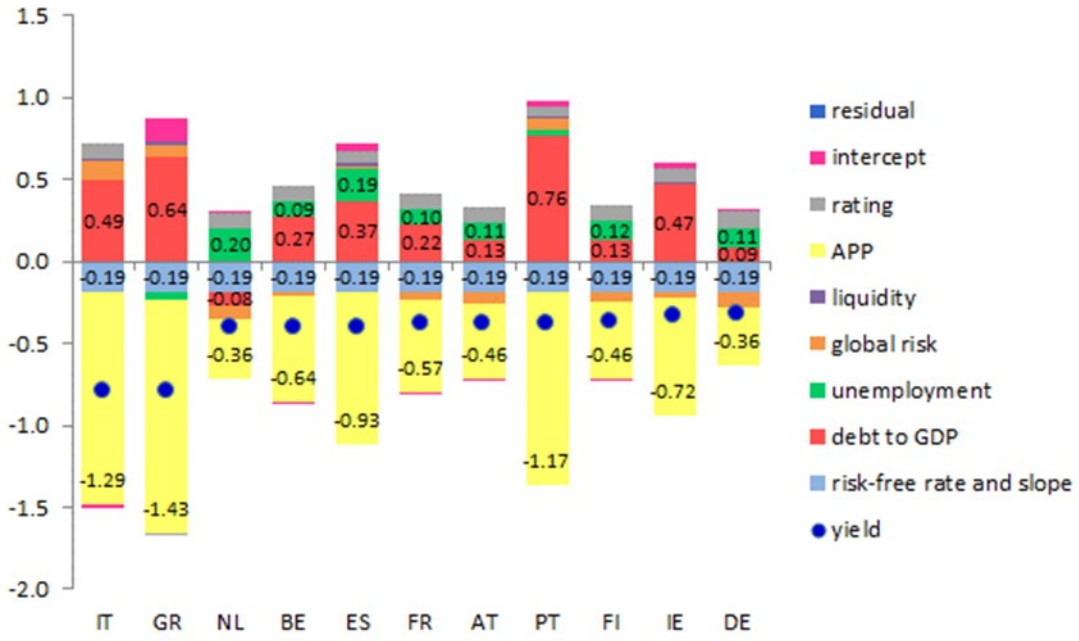
Main results

During 2020, asset purchases are estimated to have contributed to a cross-country average decline in euro area 10yr sovereign bond yields by 76 bps, ranging between 36 bps in Germany to 143 bps in Greece. Chart 1 depicts the estimated contribution of each determinant to the change in the yields between January and December 2020. The change in yields, denoted by the blue dots, indicate that during 2020 there has been a decline for all countries, which was more pronounced for Italy and Greece, where yields declined by around 80 basis points. Positive contributions mainly from public debt were more than offset, predominantly by the decreasing effect of the asset purchase programmes (yellow bars), with the more sizeable benefits estimated for peripheral countries (GR, IT, PT and ES).

[3] Chicago Board Options Exchange (CBOE) Volatility Index.

Marginal effects per unit of asset purchases are estimated to be inversely related to credit ratings.[4] This indicates that markets' perceive a given increase in asset purchases to reduce more strongly the risk of sovereigns with lower credit rating.[5] In December 2020 the marginal effect of asset purchases per EUR trillion ranged between 34 bps in Germany and 159 bps in Greece. Stronger marginal effects generally display diminishing returns over time.

Chart 1 – Decomposition of changes in 10yr bond yields between January and December 2020



The positive contributions of the debt-to-GDP ratio in the course of 2020 do not so much reflect increases in the level of the debt ratio itself, but arise instead due to increases in the markets' perception of risk. In this respect, it is estimated that markets partly corrected the pricing of this risk in June and in subsequent months, following the announcement of the extension of the PEPP. As in the case of asset purchases, we find evidence that markets' perceive the risk associated with the debt-to-GDP ratio to be inversely related to the credit rating. That is, markets perceive any given debt-to-GDP ratio to be more (less) risky the lower (higher) the credit rating.

Peripheral economies are exposed to global risks paying a positive premium, while highly rated core countries enjoy safe-haven benefits. In line with evidence reported in the literature, we find that global risk has heterogeneous effects across euro area countries. The large increases in global risk in February and especially in March had a strong upward effect on the yields of peripheral countries and a downward effect in core countries, reflecting safe-haven benefits. These effects were largely netted out in subsequent months, as global uncertainty subsided, and are therefore not picked up by the yearly decomposition in Chart 1, which reports modest contributions over the whole year. Exposure to global risk is estimated to be inversely related to credit ratings.

[4] Using event study analysis, Fengel and Neugebauer (2020) similarly report that countries with lower credit ratings experience more pronounced declines in 10yr sovereign bond yields following APP announcements.

[5] Focusing on the four largest euro area members (Germany, France, Italy and Spain), Corradin, Grimm and Schwaab (2021) similarly find evidence that unconventional monetary policy announcements had more beneficial effects on the 5-year bond yields of Italy and Spain.

The above findings are generally robust to different model specifications that allow, inter alia, for market perceptions to be influenced by macroeconomic performance instead of credit ratings. We also find the predictive performance of the time-varying model under the benchmark and alternative specifications to clearly outperform standard constant-parameter benchmarks.

Conclusion

We investigated the effect of Eurosystem asset purchase programmes on the 10-year sovereign bond yields of 11 euro area sovereigns. The analysis was based on time-varying parameter methods, which allow us to zoom in to the period between January and December 2020, covering the outbreak of the COVID-19 pandemic and the launch of the Pandemic Emergency Purchase Programme. The employed empirical models include a non-trivial set of macroeconomic, fiscal and financial explanatory variables and distinguish between influences related to fundamentals and markets' perceptions of risk.

A sharp decline in the size of Eurosystem asset purchase programmes in the aftermath of the COVID-19 crisis could exert significant upward pressure on government bond yields, particularly in peripheral countries. Eurosystem asset purchase programmes are found to have a significant downward effect on euro area bond yields. Stronger marginal effects are concentrated in low rated peripheral countries and generally display diminishing returns over time. In December 2020 the effect per EUR trillion ranged between 34 bps in Germany and 159 bps in Greece.

Our analysis additionally highlights the importance of continued commitment to improving the fundamentals of the more vulnerable economies. Restoring sustainable fiscal positions in the aftermath of the pandemic and investing in raising the growth potential remains key in order to contain the anticipated upward pressures on borrowing costs, as inflation returns close to 2% and the monetary policy stance shifts. The analysis identifies two channels: First, by directly reducing fundamental sources of risk, like the debt-to-GDP ratio. Second, stronger economic fundamentals may lead to upgrades in sovereign credit ratings, which are estimated to reduce markets' perceptions of risk and sovereigns' exposure to international shocks.

The analysis provides also a number of additional insights. Coefficients are found to exhibit very persistent deviations from their long-term mean. This is in line with evidence reported in the literature and highlights the limitations of constant parameter methods, which rely on the assumption that coefficients are on average at their time-invariant mean. A differential response to global risks is identified between core and peripheral countries, with the former enjoying safe-haven benefits. Safe-haven status can vary through time and is found to depend significantly on misalignment compared to the anchor country Germany, with respect to the unemployment rate and credit rating. Markets' perceptions of risk are found to be significantly affected by credit ratings, which is in line with recent evidence based on constant parameter methods. The sensitivity of bond yields to the debt level can be very volatile and is significantly affected by country-specific conditions. This is not captured by simple threshold effects typically used in risk assessment exercises.

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