

Cagnazzo, Alberto

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Sustainable mutual funds through the COVID-19: Evidence from fixed income flows to euro area

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SUSTAINABLE MUTUAL FUNDS THROUGH THE COVID-19.
EVIDENCE FROM FIXED INCOME FLOWS TO EURO AREA

Alberto Cagnazzo

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Department of Economics and Finance

LUISS Guido Carli

Viale Romania 32, 00197, Rome - Italy

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Sustainable mutual funds through the COVID-19. Evidence from fixed income flows to euro area.*

Alberto Cagnazzo
LUISS

This version: January 12, 2024

Abstract

This paper studies all open-end active mutual funds investing in euro area fixed income, taking into account the relative ESG risk exposure. Working with a novel dataset, we identify short-term determinants of individual fund flows towards fixed income euro area, finding that flows significantly react to recent past returns. Sustainable fund flows further respond to government policy intervention to contain the spread of the virus and to monetary policy announcements. We measure investor timing ability with a statistic hereafter referred to as “performance gap” and we find that, regardless of the asset class, gaps remain negative and significant. Sustainable funds exhibit the worst gap respectively equal to -0.21% per year during the COVID-19 crisis and -0.31% per year in the phasing-out period from the pandemic. Moreover, computing a simple time-weighted strategy with ESG funds, we find that buying and holding the index during the COVID-19 pandemic remains superior, even after controlling for risk, providing support against a popular hypothesis.

Keywords: Mutual funds, Market-timing, Sustainable investing

JEL Classification: G11, G23, G4, Q56

*Department of Business and Management, LUISS University, Viale Romania 32, 00197 Rome, Italy; acagnazzo@luiss.it. A previous version of this work circulated with the title “The euro area ESG fund performance and flows in the phasing-out of COVID-19 crisis”. I am grateful to Anna Agapova and Joscha Beckmann for their comments and suggestions. I am also grateful to all participants of the 2023 annual conference of the European Economics and Finance Society and of the 2023 International Conference in Finance, Banking and Accounting. Declarations of interest: none.

1 Introduction

Mutual funds represent the most relevant channel for managed savings account in the euro area particularly among non-professional investors. During the COVID-19 pandemic, in light of increased valuation uncertainty and of the instability of return on a daily basis, funds experienced a period of intense withdrawals with the redemption stress subsiding only after the intervention of Central banks. In the midst this scenario, asset managers are emerging as a key contributors to the transition of the euro area towards a more sustainable economy by Environmental, Social, and Governance (ESG) factors in their investment processes. This paper studies the performance of all open-end funds that invest in euro area fixed income taking into account the relative ESG risk exposure of each fund and shedding light on the performance of short-term market-timing strategies effectively used by investors through the COVID-19 pandemic.

Despite an increasing number of concerns about ESG investments as, for example, those related to greenwashing and the evolving regulatory environment, according to [Morningstar \(2023\)](#), the last five-year period has seen a dramatic growth in investment attitudes considering assets' ESG characteristics, and by the end of 2022, sustainability-focused funds had more than US\$ 2.5 trillion in global assets under management. Europe, in particular, represents the largest market for sustainable funds with 83% of global sustainable fund assets, remaining by far the most developed and diverse ESG market. Concerning asset allocation, [European Fund and Asset Management Association \(2022\)](#) reports that, at the end of 2021, bonds accounted for 36% of the assets managed in Europe, compared with 33% of equity. Fixed income investment reached its peak in 2018 weighting for the 40% of the total of European assets under management¹. The predominance of fixed income instruments reflects the relevance of European institutional clients, which generally consider bonds as safe instruments for preserving capital, generating income and meeting regular obligations. This growth, however, has not shielded ESG investing from the multiple shocks rippling through the global economy and by change in monetary policy stance in advanced economies. In fact, in the first semester of 2022, global assets under management in ESG strategies fell by 20%, mirroring the industry-wide trend². The downward pressure on fees, investor preference for cheaper index-tracking products and the race to keep up with the latest technology contribute to make the fund-management industry even more challenging. According to the survey report by [Capital Group \(2023\)](#), a significant majority of investors who have adopted ESG firmly believe that it has the potential to enhance returns. However, in 2022, the ten

¹The remainder of the portfolios are made up of money market, cash equivalents and other assets.

²In terms of volumes, while global non-dedicated ESG strategies experienced a net outflow of US\$ 1,144 billion over the period, ESG strategies posted only a slight outflow of US\$ 8 billion.

largest ESG funds by assets have all posted double-digit losses, with eight of them falling even more than the S&P 500's 14.8% decline (*Bloomberg, December 7, 2022*).

The intuition that ESG investors are willing to pay a higher fee to invest in funds with ESG mandate was explored by *Baker et al. (2022)* that interpret fees for ESG-oriented index funds to conclude that investors are willing to pay an average of 20 basis points³. The performance of ESG funds was analyzed by *Pastor and Vorsatz (2021)* that study the performance and flows of U.S. active equity mutual funds during the COVID-19 crisis. They find that funds with high sustainability ratings and higher star ratings perform better and that most active funds underperform passive benchmarks, contradicting a popular hypothesis⁴. Their work leaves plenty of room for research about the performance of fixed income funds.

Working with a novel dataset at daily frequency, this paper studies performance-flows relationship of fixed income investors in euro area, taking into account the relative ESG risk exposure of each fund. We find that all investment flows are driven by recent past return suggesting evidence of well-established market-timing strategies for fixed income investors. We further identify short-term determinants of individual fund flows towards ESG fixed income euro area, finding that flows significantly respond to government policy intervention to contain the spread of the virus and to monetary policy announcements. We measure investor timing ability with a statistic hereafter referred to as “performance gap”. We find that the average performance gap, defined as the money-weighted return minus the time-weighted return, is negative and statistically significant for all funds, with sustainable funds exhibiting the worst gap respectively equal to -0.21% per year during the COVID-19 crisis and -0.31% per year in the phasing-out period from the pandemic. Moreover, computing a simple time-weighted strategy carried out with ESG fixed income funds, we find that buying and holding the index during the COVID-19 pandemic remains superior, even after controlling for risk. In particular, the time-weighted strategy for ESG market index with a holding period of 120 business days is positive and superior, by almost 1 percent point (0.91%) per year, with respect to the cross-sectional average of ESG funds.

This paper relates to two strands of literature. First, it contributes to the fast growing economic literature that studies investment flows towards sustainable funds through the COVID-19 pandemic. *Döttling and Kim (2022)*, using COVID-19 as an economic shock, show that funds with higher sustainability ratings experienced sharper declines in retail

³*Giglio et al. (2023)* analyze survey data on ESG beliefs and preferences in a large panel of retail investors, documenting that investors generally expected ESG investments to underperform the market. *Pastor et al. (2021)* model investing that considers ESG criteria and they find that, in equilibrium, green assets have low expected returns because investors enjoy holding them and because green assets hedge climate risk.

⁴The hypothesis that investors are willing to tolerate underperformance of the active mutual funds because of their ability to hedge against recessions was formulated, among the others, by *Moskowitz (2000)* and *Glode (2011)*.

flows during the pandemic. [Fang and Parida \(2022\)](#) study the performance and flows of sustainable equity mutual funds in recent years through the COVID-19 pandemic. They find that the high-sustainable funds perform better than the low-sustainable ones and that out-performance significantly increases during the COVID-19 pandemic-induced market crash and the post-crash pandemic. Concerning ESG fixed income funds, [Falato et al. \(2021\)](#) investigate outflows from corporate-bond funds through the COVID-19, [Ma et al. \(2022\)](#) identify fixed income mutual funds as an important contributor to the unusually high selling pressure in liquid asset markets during the COVID-19 crisis and [Jiang et al. \(2022\)](#), working with open-end corporate bond mutual funds and using the COVID-19 crisis as a natural experiment, find that bonds with higher pre-crisis fragility experienced more negative returns. We contribute to this area of analysis identifying short-term determinants of individual fund flows towards ESG fixed income euro area and providing evidence of the underperformance of active sustainable funds against passive benchmarks during the pandemic.

Second, a large body of literature analyzes the empirical finding that investors' decisions tend to time the market⁵. [Giglio et al. \(2021\)](#), working on survey administered to a large panel of retail investors, find a robust relationship between beliefs and portfolio allocations. Their results mirror findings from a literature that has documented how individuals extrapolate from their own experience when forecasting future economic outcomes. For example, [Greenwood and Shleifer \(2014\)](#) argue that investor expectations of future stock market returns, in the period 1963-2011, tend to be extrapolative: that is, they are correlated with past stock returns and with the level of the stock market. They also find that investor expectations are highly correlated with investor inflows into mutual funds, and negatively correlated with model-implied expectations. A market-timing strategy is not *ex-ante* doomed to fail, particularly in volatile markets⁶. Therefore, [Ferreira et al. \(2019\)](#) test how a return-chasing may be, in principle, a profitable strategy and they find that competitiveness of the industry explains the variation in performance persistence⁷. We contribute to this literature by studying the individual profitability of market-timing strategies in euro area fixed income with high granularity of data.

The remainder of the paper is organized as follows: section (2) presents data, section (3) identifies flows determinants, section (4) measures investor performance, section (5) reports robustness checks and section (6) concludes.

⁵Early works belonging to this area include, among others, [Friesen and Sapp \(2007\)](#), [Frazzini and Lamont \(2008\)](#), [Bailey et al. \(2011\)](#), [Ferreira et al. \(2012\)](#) and references therein.

⁶Among the others, [Cochrane \(2011\)](#) shows that if returns are somewhat predictable, by timing the market investors may be able to achieve higher Sharpe ratios.

⁷With a similar methodology [Cagnazzo \(2022\)](#) empirically investigates the performance of market-timing strategies effectively used by investors in Emerging Markets finding that the average performance gap is negative and statistically significant for all funds.

2 Data

We obtain fund-level data from Bloomberg at daily frequency with an interval spanning December 2017 through June 2023. We select primary share class open-end active funds denominated in euro (EUR) investing in ‘fixed income - euro area’ and we keep track of funds that declare investments according to ESG criteria. Since investment companies tend to liquidate funds with poor performance, particularly after substantial redemptions from investors, we control for survivorship bias. We therefore include funds expired at some point during the sample period, as well as those in business at the end of the interval. To ensure the accuracy of the analysis, we keep only funds existing for at least 90 consecutive business days during the sample period.

The resulting dataset contains 1,504,191 daily observations across 767 unique funds, of which 165 meet ESG sustainability criteria⁸. At June 2023 the dataset covers net assets under management equal to EUR 221.14 billion, of which EUR 99.87 billion refers to ESG funds⁹. The sample shows the relevance of ESG instruments that, at the end of the interval, weight for the 21.5% of the euro area fixed income market in terms of number of funds and for the 45.2% in terms of net assets under management.

In order to better evaluate the resulting dataset, we compare it with the corresponding sample investing in ‘equity - euro area’¹⁰. At June 2023 equity funds are 617, of which 195 invest according to ESG criteria, with aggregate net assets under management equal to EUR 135.02 billion of which EUR 60.80 billion refers to ESG funds. The comparison highlights that, at the end of the sample, the euro area non-ESG fixed income market is larger than equity and, although ESG fixed income funds are slightly lower in number, the corresponding net assets under management remains well above the equity level by almost EUR 40 billion. Table (1) reports the number of funds by size, type of instrument, area of domicile and object of investment for the last observation of each year.

The inspection of table (1) shows that, while the number of active non-ESG funds has been gradually decreasing, respectively from 509 in 2017 to 375 in 2023, ESG funds report an almost steady increase, from 113 in 2017 to 136 in 2023, reaching a peak of 144 funds in 2021. Sizes are set with respect to Total Net Asset (TNA) and are defined as follows:

⁸We exclude from the sample closed-end funds, exchange-trade products and funds-of-funds. The resulting dataset is made by Mutual Funds (MF), Sociétés d’Investissement à Capital Variable (SICAV) and open-end Pension Funds (PF). The [Appendix](#) reports the fund list in alphabetical order.

⁹The aggregate asset under management reached its peak in November 2021 with EUR 253.18 billion of which, EUR 116.70 billion assets were managed according to ESG criteria.

¹⁰[Capital Group \(2023\)](#) reports that global investors identify equities and bonds as the the most popular asset classes used to gain exposure towards ESG factors, respectively weighting for the 81% and 58%. Question: *For which asset classes and sectors have you implemented ESG?*, multiple answers allowed.

Table 1: Sample

| n | | Size | | | Type of fund | | | Area of domicile | | | Object of investment | | |
|---------------|-----|--------|--------|--------|--------------|--------|-------|------------------|--------|--------|----------------------|-----------|-----------|
| | | Small | Medium | Large | MF | SICAV | PF | NE | WE | SE | Govern. | Corporate | Aggregate |
| ESG funds | | | | | | | | | | | | | |
| 2017 | 113 | 14 | 54 | 45 | 49 | 64 | 1 | 1 | 110 | 2 | 8 | 42 | 63 |
| (% of total) | | (12.4) | (47.8) | (39.8) | (42.5) | (56.6) | (0.9) | (0.9) | (97.3) | (1.8) | (71.) | (37.2) | (55.8) |
| 2018 | 103 | 12 | 46 | 45 | 45 | 57 | 1 | 4 | 98 | 1 | 4 | 46 | 53 |
| (% of total) | | (11.7) | (44.7) | (43.7) | (43.7) | (55.3) | (1.0) | (3.9) | (95.1) | (1.0) | (3.9) | (44.7) | (51.5) |
| 2019 | 113 | 14 | 52 | 47 | 54 | 58 | 1 | 4 | 108 | 1 | 7 | 44 | 62 |
| (% of total) | | (12.4) | (46.0) | (41.6) | (47.8) | (51.3) | (0.9) | (3.5) | (95.6) | (0.9) | (6.2) | (38.9) | (54.9) |
| 2020 | 112 | 12 | 47 | 53 | 48 | 63 | 1 | 4 | 107 | 1 | 8 | 49 | 55 |
| (% of total) | | (10.7) | (42.0) | (47.3) | (42.9) | (56.3) | (0.9) | (3.6) | (95.5) | (0.9) | (7.6) | (34.5) | (56.9) |
| 2021 | 144 | 16 | 67 | 61 | 67 | 74 | 3 | 7 | 135 | 2 | 11 | 51 | 82 |
| (% of total) | | (11.1) | (46.5) | (42.4) | (46.5) | (51.4) | (2.1) | (4.9) | (93.8) | (1.4) | (7.6) | (35.4) | (56.9) |
| 2022 | 138 | 17 | 60 | 61 | 64 | 70 | 4 | 7 | 129 | 2 | 10 | 47 | 81 |
| (% of total) | | (12.3) | (43.5) | (44.2) | (46.4) | (50.7) | (2.9) | (5.1) | (93.5) | (1.4) | (7.2) | (34.1) | (58.7) |
| 2023 | 136 | 18 | 58 | 60 | 63 | 69 | 4 | 7 | 127 | 2 | 10 | 46 | 80 |
| (% of total) | | (13.2) | (42.6) | (44.1) | (46.3) | (50.7) | (2.9) | (5.1) | (93.4) | (1.5) | (7.4) | (33.8) | (58.8) |
| Non-ESG funds | | | | | | | | | | | | | |
| 2017 | 509 | 281 | 161 | 67 | 399 | 87 | 23 | 15 | 326 | 168 | 134 | 61 | 314 |
| (% of total) | | (55.2) | (31.6) | (13.2) | (78.4) | (17.1) | (4.5) | (2.9) | (64.0) | (33.1) | (26.3) | (12.0) | (61.7) |
| 2018 | 399 | 214 | 127 | 58 | 300 | 78 | 21 | 17 | 246 | 136 | 100 | 45 | 254 |
| (% of total) | | (53.6) | (31.8) | (14.5) | (75.2) | (19.5) | (5.3) | (4.3) | (61.7) | (34.1) | (25.1) | (11.3) | (63.7) |
| 2019 | 381 | 197 | 126 | 58 | 283 | 78 | 20 | 16 | 245 | 120 | 86 | 46 | 249 |
| (% of total) | | (51.7) | (33.1) | (15.2) | (74.3) | (20.5) | (5.2) | (4.2) | (64.3) | (31.5) | (22.6) | (12.1) | (65.4) |
| 2020 | 358 | 180 | 118 | 60 | 260 | 80 | 18 | 16 | 243 | 99 | 77 | 44 | 237 |
| (% of total) | | (50.3) | (33.0) | (16.8) | (72.6) | (22.3) | (5.0) | (4.5) | (67.9) | (27.7) | (21.5) | (12.3) | (66.2) |
| 2021 | 410 | 202 | 146 | 62 | 313 | 79 | 18 | 17 | 287 | 106 | 89 | 49 | 272 |
| (% of total) | | (49.3) | (35.6) | (15.1) | (76.3) | (19.3) | (4.4) | (4.1) | (70.0) | (25.9) | (21.7) | (12.0) | (66.3) |
| 2022 | 389 | 189 | 137 | 63 | 298 | 73 | 18 | 16 | 273 | 100 | 83 | 48 | 258 |
| (% of total) | | (48.6) | (35.2) | (16.2) | (76.6) | (18.8) | (4.6) | (4.1) | (70.2) | (25.7) | (21.3) | (12.3) | (66.3) |
| 2023 | 375 | 174 | 136 | 65 | 290 | 74 | 11 | 18 | 273 | 84 | 84 | 46 | 245 |
| (% of total) | | (46.4) | (36.3) | (17.3) | (77.3) | (19.7) | (2.9) | (4.8) | (72.8) | (22.4) | (22.4) | (12.3) | (65.3) |

This table reports the number of active funds for the full sample. For the last observation of each year, we report the number of funds by size, by type of fund, by area of domicile and by style of investment. Sizes are set with respect to TNA and are defined as follows: small, $TNA < 100$ mn EUR; medium, $TNA < 500$ mn EUR; otherwise funds are considered as large. MF and PF respectively stand for mutual funds and pension funds. NE, WE and SE respectively stand for Northern Europe, Western Europe and Southern Europe. Object of investment are: government, corporate and aggregate. Percentages of the totals are reported in parentheses. Data are daily from Bloomberg for the sample Dec. 2017 - Jun. 2023.

small, $TNA < 100$ mn EUR; medium, $TNA < 500$ mn EUR; large, otherwise. Small non-ESG funds show a slight predominance, weighting for the 55.2% of their total in 2017 and 46.4% in 2023. On the other hand, concerning the ESG sample, medium and large funds weight more, respectively for the 47.8% and 39.8% in 2017 and for the 42.4% and 44.1% at the end of the interval.

The majority of instruments in the sample are mutual funds (MF) and SICAV, while pension funds (PF) stand respectively below 3% for ESG funds and below 6% for non-ESG instruments. For both subsamples, the large majority of entities are formally domiciled in Western Europe (WE)¹¹. Interestingly, data show that a large non-ESG fixed income market is well

¹¹Countries of domicile are marked as follows. Northern Europe: Denmark, Finland, Great Britain, Ireland

established in SE, weighting between 22.4% to 34.1% of the total, while the same area is not relevant for ESG instruments that have a weight that remains below 2% over time.

Funds may invest in government, corporate or aggregate bonds¹² and managers, both for ESG and non-ESG, declare to invest mainly in the latter. Concerning the other two categories of investment, while non-ESG funds mainly invest in euro area government bonds, weighting between 21.3% to 26.3% through time, the second larger category for ESG funds are corporate investments spanning through time between 33.8% to 44.7%.

For each fund we collect TNA, Total Return (TR)¹³ and we obtain fund characteristics such as fees and age. For each ESG fund we obtain the Morningstar sustainability rating (in globes) and the Morningstar sustainability risk score¹⁴ as of June 30, 2023. Higher ratings indicate that a fund, on average, invests in fewer companies or sovereign debt with a high ESG risk, under *Sustainalytics*' ESG Risk and Country Risk methodologies, being exposed to less risk driven by E, S or G factors. Higher risk scores correspond to a higher ESG risk level.

For fund i we compute net daily individual return at time t ($r_{i,t}$) as $r_{i,t} = TR_{i,t}/TR_{i,t-1} - 1$. Individual flows are set in levels ($Flow_{i,t}$), under the hypothesis that each flow is dated at the end of each business day. Thus, the daily net cash flow for fund i in day t is:

$$Flow_{i,t} = TNA_{i,t} - TNA_{i,t-1}(1 + r_{i,t}). \quad (1)$$

Table (2) reports selected summary statistics for the sample we study.

First, table (2) shows that ESG funds are on average larger, younger and cheaper in terms of fees. Total net asset managed by ESG fixed income funds in 2017 is on average slightly higher than half a billion euro (EUR 528.22 million) and reaches EUR 734.34 million in 2023. In both years the variable is two-times higher than that of the corresponding non-ESG sample, respectively equal to EUR 257.33 million and EUR 323.39 million. ESG funds are on average less than 12 years old, while ages for non-ESG funds at the end of the sample overcomes 19 years. This highlights the presence of well-established fixed income funds in the European market well before the more recent mushrooming of ESG financial instruments.

and Sweden. Western Europe: Austria, Belgium, France, Germany, Luxembourg, Lichtenstein, Netherlands and Switzerland. Southern Europe: Greece, Italy, Malta, Portugal, San Marino and Spain.

¹²Aggregate bonds include both government and corporate securities.

¹³Individual flows that account for dividend reinvestment can be correctly computed since, for each fund in the sample, TR is different to Net Asset Values (NAV).

¹⁴[Morningstar sustainability rating](#) is designed to support investors in evaluating the relative environmental, social, and governance risks within portfolios. Ratings are determined using bottom-up assessments of the underlying holdings within a portfolio. The output of the rating is a category of 1 to 5 globes for each eligible portfolio, whereby a higher number of globes indicates that the portfolio has lower ESG risk. The Morningstar sustainability risk score is measured with respect to the Assets Under Management distribution of holdings (long positions only) in medium ESG risk classification.

Table 2: Descriptive statistics

| Fixed income | n | TNA (EUR mn) | Monthly net flows (EUR mn) | Turnover (%) | Age (years) | Fee (%) | Excess return (%) | Std. error (%) | Five-Factor alpha (%) | Std. error (%) | Volatility (%) |
|---------------|-----|-----------------|----------------------------------|-----------------|----------------|------------|-------------------------|----------------------|-----------------------------|----------------------|-------------------|
| ESG funds | | | | | | | | | | | |
| 2017 | 113 | 528.22 | 3.72 | 1.78 | 10.18 | 0.53 | -0.24 | (0.01) | - | - | - |
| 2018 | 103 | 329.77 | -12.09 | 1.04 | 10.17 | 0.49 | -0.04 | (0.01) | -0.17 | (0.01) | 0.06 |
| 2019 | 113 | 420.85 | -2.97 | 1.41 | 10.80 | 0.51 | -0.39 | (0.01) | 0.02 | (0.01) | 0.10 |
| 2020 | 112 | 608.90 | 9.56 | 1.22 | 11.22 | 0.48 | 0.08 | (0.01) | 0.03 | (0.01) | 0.07 |
| 2021 | 144 | 800.98 | 10.39 | 1.07 | 11.27 | 0.50 | -0.21 | (0.01) | -0.05 | (0.01) | 0.12 |
| 2022 | 138 | 695.13 | 16.72 | 2.33 | 11.31 | 0.47 | -2.48 | (0.02) | -0.29 | (0.01) | 0.32 |
| 2023 | 136 | 734.34 | 20.63 | 1.41 | 11.74 | 0.47 | -0.48 | (0.01) | -0.06 | (0.01) | 0.22 |
| Non-ESG funds | | | | | | | | | | | |
| 2017 | 509 | 257.33 | -1.32 | 2.09 | 14.93 | 0.63 | -0.37 | (0.01) | - | - | - |
| 2018 | 399 | 269.05 | -1.69 | 2.01 | 15.71 | 0.63 | -0.05 | (0.01) | -0.34 | (0.01) | 0.05 |
| 2019 | 381 | 306.57 | 2.48 | 2.04 | 16.48 | 0.63 | -0.30 | (0.01) | 0.06 | (0.01) | 0.06 |
| 2020 | 358 | 335.94 | -2.63 | 2.56 | 17.47 | 0.60 | 0.11 | (0.01) | 0.25 | (0.01) | 0.05 |
| 2021 | 410 | 315.87 | -1.74 | 2.39 | 18.57 | 0.60 | -0.19 | (0.01) | -0.01 | (0.01) | 0.09 |
| 2022 | 389 | 285.25 | 1.73 | 2.28 | 19.23 | 0.57 | -1.99 | (0.02) | -0.43 | (0.01) | 0.24 |
| 2023 | 375 | 323.39 | 1.97 | 1.77 | 19.67 | 0.56 | -0.30 | (0.01) | -0.10 | (0.01) | 0.14 |

This table reports summary statistics of the full sample. For the last observation of each year, we report the number of active funds and we calculate the cross-sectional averages of the following fund characteristics: TNA (in EUR million), monthly net flow (in EUR million), yearly turnover (in %), fund age (in years), management fee (in %), monthly excess return (in %), five-factor model-adjusted monthly return in the preceding 36 months (alpha, in%), standard deviation of monthly returns in the 12 months prior to each observation (volatility, in %). Standard errors (in %) referring to excess returns and to five-factor alphas are in parentheses. Yearly individual turnovers are computed as the minimum of purchase or sale of each fund during each year, divided by the TNA of the fund during the same period. Monthly excess returns are computed with respect to the 30-day Euribor. Data are daily from Bloomberg for the sample Dec. 2017 - Jun. 2023.

Overall fees, stated by fund managers, are lower for ESG funds, on average, by 0.1%.

Second, ESG funds show substantial inflows after 2020 and exhibit higher monthly net flow volatility, especially in years of financial distress. In fact, while non-ESG funds exhibit flows standing, in absolute value, below EUR 2.7 million, ESG funds show increasing monthly net inflows after 2020, respectively equal to EUR 9.56, 10.39, 16.72 and 20.63 million.

Third, excess returns do not show any significant heterogeneity in the two subsamples, even after correcting for risk exposures. For the ESG sample excess returns span between -2.48% in 2022 and 0.08% in 2020 and, in the same years non-ESG funds show respectively -1.99% and 0.11%. Cross-sectional averages of risk-adjusted returns (alphas) in the preceding 36 months, computed according to the five-factor model of [Fama and French \(2014\)](#)¹⁵, substantially show a similar trend for both samples. In fact, five-factor model alphas are positive in 2019 and

¹⁵Factors refers to Europe and are market portfolio (MKT), size (SMB), book-to-market (HML), momentum (RMW) and strategy (CMA). Factor data are daily from [Kenneth French's data library](#).

in 2020 and negative for the rest of the sample. Corresponding volatility, measured as the standard deviation of monthly returns in the 12-month period prior to each observation, reached its maximum in 2021, respectively equal to 0.24% and 0.32% and its low in 2018.

3 Evidence on market-timing

In this section we investigate whether fund individual flows to fixed income euro area respond to past performance and we further identify their short-term determinants by category of investment. In order to verify the existence of a well-established flow-performance relation, for each fund in the sample we compute, at daily frequency, weekly net flows as the unweighted sum of daily net flows registered in the previous 5 business days and average excess returns on a weekly basis as the unweighted average of daily excess return in the previous 5 business days. We therefore estimate the following fund fixed-effect panel regression, with standard errors clustered by date:

$$Flow_{i,t-5 \rightarrow t} = \alpha + \beta_{Ret} r_{i,t-10 \rightarrow t-5} + \beta_{Mkt} Z_t + \beta_{Ch}^T X_{i,t} + \beta_{Ch} \Gamma_i + \beta_{ESG} \Lambda_i + \nu_m + \eta_i + \epsilon_{i,t}, \quad (2)$$

where i indicates the fund, then $Flow_{i,t-5 \rightarrow t}$ is the net flow of a given fund registered between day $t - 5$ and t . The first variable of interest is the average excess return (in %) of the fund between day $t - 10$ and $t - 5$ ($r_{i,t-10 \rightarrow t-5}$). In order to analyze how euro area flows are correlated to market conditions, we include contemporaneous market variables (Z_t). These controls are the aggregate fund flows and the VIX index as indicators of the market volatility. We also include ECB announcements, measured as a dummy variables that takes 1 the day in which a meeting of the Governing Council takes place and 0 otherwise¹⁶. Finally, in order to verify how fund flows respond to the current economic sentiment, we control for lockdown measures applied by European governments to contain the spread of the virus during the pandemic crisis. We therefore include stringency indexes, released by Oxford University, for the three largest economies of the euro area: Germany, France and Italy¹⁷.

¹⁶Aramonte et al. (2020), with a similar methodology, study how the sensitivity of daily returns of open-end mutual funds to aggregate liquidity changes around real-activity macroeconomic announcements.

¹⁷The [stringency index](#) is a composite measure based on publicly available information on a series of indicators of government responses including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100=strictest). The use of the stringency index relies on results by Frazzini and Lamont (2008), Ben-Rephael et al. (2012) and Jiang and Yuksel (2019) that look at mutual fund flows as a measure of individual investor sentiment. More recently, Goel and Dash (2022) investigate the role of government policy interventions on the investor sentiment amid the early spread of COVID-19 finding that government policy responses have a moderating role in the investor sentiment and stock returns relationship.

The time-dependent characteristic of each fund ($X_{i,t}$) is size, measured by the natural log of fund TNA in euro, and the time-invariant fund characteristics is the management stated fee, in % (Γ_i). For ESG funds, the Morningstar sustainability rating and Morningstar sustainability risk are included (Λ_i). ν_y and η_y are the month and fund-level fixed effects. We run regression (2) separately by category of investment and table (3) reports results of different specifications.

Table 3: Market-timing of fund flows

| | ESG funds | | | | | | Non-ESG funds | | | | | |
|--------------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| | (1.a) | (2.a) | (3.a) | (4.a) | (5.a) | (6.a) | (1.b) | (2.b) | (3.b) | (4.b) | (5.b) | (6.b) |
| Excess return (lagged) | 1.55*** (3.28) | 1.55*** (3.33) | 1.52*** (3.18) | 1.54*** (3.27) | 1.52*** (3.33) | 1.77*** (3.18) | 0.38*** (3.61) | 0.37*** (3.59) | 0.37*** (3.58) | 0.37*** (3.63) | 0.37*** (3.60) | 0.38*** (3.59) |
| Aggregate flows | 0.01*** (4.37) | 0.01*** (4.35) | 0.01*** (4.37) | 0.01*** (4.37) | 0.01*** (4.35) | 0.01*** (4.37) | 0.01*** (4.85) | 0.01*** (4.87) | 0.01*** (4.87) | 0.01*** (4.86) | 0.01*** (4.88) | 0.01*** (4.88) |
| VIX | -0.02*** (-2.63) | -0.02*** (-3.13) | -0.02*** (-2.73) | -0.01*** (-2.42) | -0.02*** (-2.92) | -0.02*** (-2.53) | -0.01*** (4.85) | -0.01** (-1.88) | -0.01** (-2.14) | -0.01** (-2.05) | -0.01** (-1.86) | -0.01** (-2.11) |
| ECB announc. | 0.46** (2.22) | 0.46** (2.23) | 0.47** (2.26) | 0.46** (2.22) | 0.47** (2.23) | 0.46** (2.26) | 0.02 (0.64) | 0.02 (0.64) | 0.02 (0.63) | 0.02 (0.65) | 0.02 (0.64) | 0.02 (0.64) |
| Stringency Germany | 0.01* (1.96) | | | 0.01* (1.58) | | | 0.01 (0.84) | | | 0.01 (0.81) | | |
| Stringency France | | 0.01*** (3.04) | | | 0.01*** (2.64) | | | 0.01 (0.61) | | | 0.01 (0.57) | |
| Stringency Italy | | | 0.01** (1.97) | | | 0.01** (1.87) | | | 0.01 (0.53) | | | 0.01 (0.49) |
| Size | 0.75*** (2.72) | 0.75*** (2.78) | 0.77*** (2.78) | 0.89** (2.35) | 0.89** (2.27) | 0.90** (2.27) | 0.01** (1.98) | 0.01** (1.96) | 0.01** (1.95) | 0.01** (1.98) | 0.01** (1.96) | 0.01** (1.95) |
| Fee | -0.35 (-1.21) | -0.35 (-1.22) | -0.35 (-1.21) | - | - | - | -0.09** (-2.31) | -0.10** (-2.31) | -0.10** (-2.31) | - | - | - |
| Sustainability globes | 0.69*** (2.81) | 0.60*** (2.84) | 0.70*** (2.84) | - | - | - | - | - | - | - | - | - |
| Sustainability risk | -0.03** (-1.91) | -0.03** (-1.94) | -0.03** (-1.94) | - | - | - | - | - | - | - | - | - |
| Constant | -5.03*** (-3.13) | -4.99*** (-3.13) | -5.07*** (-3.20) | -5.35** (-2.16) | -5.31** (-2.17) | 5.41** (-2.21) | 0.16** (2.34) | 0.15*** (2.21) | 0.15*** (2.26) | 0.11** (1.97) | 0.10* (1.78) | 0.11* (1.88) |
| Time fixed effect | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Fund fixed effect | No | No | No | Yes | Yes | Yes | No | No | No | Yes | Yes | Yes |
| Observations | 85,272 | 85,272 | 85,272 | 85,272 | 85,272 | 85,272 | 340,093 | 340,093 | 340,093 | 340,093 | 340,093 | 340,093 |
| Adj. R-squared | 0.158 | 0.158 | 0.158 | 0.096 | 0.096 | 0.096 | 0.153 | 0.159 | 0.156 | 0.106 | 0.115 | 0.111 |
| Wald test High = Low (p-value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

This table presents the results of panel regressions examining the market-timing ability of investors on euro area fixed income funds. The dependent variable is weekly fund flows, computed as the sum of flows in previous 5 business days (in EUR million). Lagged variables include: the average of the excess returns of the past 5 days (in %). Market control variables (Z_t) include the aggregate fund flows, the VIX index, the ECB announcement, measured as a dummy variables taking 1 for the day in which a meeting of the Governing Council takes place and the stringency indexes for Germany, France and Italy released by Oxford University. Time-dependent control variables for each fund ($X_{i,t}$) include: fund size, measured by the natural log of fund TNA in euro. Time-invariant control variables for each fund (Γ_i) include: fund manager stated fee (in %). Further controls for ESG funds (Λ_i) include: Morningstar Sustainability Rating in 'globes' and Morningstar sustainability risk. Standard errors are clustered by date, and t-statistics are in parentheses. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent level, respectively. Month and fund fixed effects are included, but the coefficients are not shown. Data are daily from Bloomberg for the sample Dec. 2017 - Jun. 2023.

Table (3) shows that the β_{Ret} coefficient is positive and statistically significant for both asset allocations. This suggests that, after a positive excess return in the previous week of

1%, non-ESG funds show an inflow between EUR 0.37 million to EUR 0.38 million, while for ESG funds the inflow is larger and, depending of specification, it stands between EUR 1.52 million and EUR 1.77 million. Therefore, table (3) confirms that in euro area fixed income market, whatever specification we choose, there is statistical significance supporting the flow-performance relationship¹⁸.

Concerning market variables, both the aggregate fund flows and the VIX index coefficients are significant with, respectively, a positive and a negative sign. This confirms that investor behaviors in the euro area fixed income market are sensitive to market trends and market volatility. As far as monetary policy, the ECB announcement coefficient is statistically significant only for ESG funds. This suggests that monetary policy announcements, in the interval of interest, have a significant relation only with fixed income flows towards sustainable funds¹⁹. The evidence that ECB monetary policy affect short-term investors' behavior towards fixed income euro area ESG funds complements results by [Banegas et al. \(2022\)](#). They find that monetary policy shocks have a direct effect on flow dynamics and that an unexpected tightening of the stance of policy is associated with outflows from fixed income funds, in particular those investing in international, government and investment grade bond markets²⁰.

ESG flows show a peculiar behavior also with respect to economic sentiment. In fact Stringency indexes, tested for various economies in alternative specifications, show significant coefficients only for ESG fund flows. Interestingly, these coefficients have a positive sign suggesting that immediately after a period of negative feelings on the economy, measured in terms of government policy interventions, investors tend to move towards the ESG fixed income market. This finding is in line with [Agoraki et al. \(2023\)](#) showing that stringency is also positively associated with green investment funds, particularly for negative returns.

Turning to the other coefficients in regression (2), in all specifications the loadings on the size, are highly significant and positive, as expected. In fact, consistently with [Ferreira et al. \(2012\)](#), the dimension of the fund is positively correlated with net individual flows. In specifications (1.a) (1.b) (2.a) (2.b) (3.a) and (3.b) we do not include fund fixed effect in order to add time-invariant control variables. Coefficients for overall fees are significant only for non-ESG funds suggesting the ESG flows do not respond to management costs²¹. This may

¹⁸In alternative specifications we use the compounded excess return on weekly basis instead of the average excess return and findings remain substantially unaltered.

¹⁹In alternative specifications we include only ECB announcements for which the data releases deviate the most from consensus expectations, finding that results remain robust.

²⁰Relationships between monetary policy and developments in the fund industry are explored by [Bubeck et al. \(2018\)](#), [Hespeler and Suntheim \(2020\)](#), [Peksevim and Ercan \(2022\)](#), [Ciminelli et al. \(2022\)](#) and [Adrian et al. \(2023\)](#).

²¹We also estimate a model where we include front-load fee instead of total management fee with unaltered

find an explanation on the fact that fees for the ESG market are sensibly lower than those of the non-ESG instruments.

Finally, ESG flows show that coefficient for Morningstar sustainability rating and for Morningstar risk and significant and respectively positive and negative, as expected. This suggest that fixed income funds with higher ESG rating and with lower risk attract higher inflows. In specifications (4.a), (5.a), (6.a), (4.b), (5.b) and (6.b) we include both month and fund fixed effect and results remain robust.

4 Measuring investor strategies

In section (3) we find that the individual flows into and out of euro area fixed income funds quickly respond to past performance and to short-term determinants, therefore for each fund we use observed cash flows in order to measure a market-timing (i.e. money-weighted) strategy. Conversely, a time-weighted strategy invests EUR 1 at the beginning of period t in a fund, holding the investment for h days and reinvesting any accrued dividend. In the baseline simulations we set the investment horizon to 120 business days ($h = 120$). We denote with $\bar{r}_{i,t \rightarrow t+h}^{TW}$ the time-weighted net geometric excess return of an $t, t + h$ investment in day t with an horizon of h days:

$$\bar{r}_{i,t \rightarrow t+h}^{TW} = \left[\prod_{j=1}^h (1 + r_{i,t+j}) \right]^{1/h} - 1, \quad (3)$$

where $r_{i,t}$ represents the net return of fund i between day $t-1$ to t . This measures the net return of the fund manager, or equivalently, the buy-and-hold return on EUR 1 invested over the holding period. Money-weighted is instead an active market-timing strategy that invests every day in fund i , and with a holding period of 120 business days, an amount of resources equal to the net flows into that fund. Outflows are considered as dividend distributions, and inflows as additional investments. Since money-weighted requires buying and selling fund shares, investors are charged by entry/exit fees. Hereafter we abstract from these transaction costs that are likely to reduce the profitability of a money-weighted strategy. We estimate the performance of the money-weighted strategy through its internal rate of return (IRR). In particular, for each fund, we compute the net rate of return that solves the following equation:

$$TNA_{i,t} = - \sum_{j=1}^h \frac{Flow_{i,t+j}}{(1 + \bar{r}_{i,t}^{MW})^j} + \frac{TNA_{i,t+h}}{(1 + \bar{r}_{i,t}^{MW})^j}, \quad (4)$$

findings.

where TNA_t (i.e. the value for total net asset under management at time t), is the initial size of the investment, $Flow_{t+j}$, with $j = 1, \dots, h$, are the net flows in and out each fund²², and TNA_{t+h} is the final value of the investment. Since flows take both positive and negative values, the IRR is not necessarily unique, or real valued. Therefore, we follow standard assumptions and, when more than one strictly positive internal rate of return is found, we select the minimum; when no strictly positive internal rate of return is found, but one or multiple negative rates are found, we select the maximum. Since the computation of the IRR, when net flows change sign multiple times, can be difficult, Dietz (1966) suggests the following approximation:

$$\bar{r}_{i,t}^D = \left[\frac{TNA_{i,t+h} - TNA_{i,t} - \sum_{j=1}^h Flow_{i,t+j}}{TNA_{i,t} + \frac{1}{2} \sum_{j=1}^h Flow_{i,t+j}} + 1 \right]^{1/h} - 1. \quad (5)$$

Note that a money-weighted return explicitly accounts for net cash flows into and out of the fund over time, reflecting the average investor performance during the sample period. Therefore we measure the investor timing ability with a statistic hereafter referred to as “performance gap”, defined as the difference between fund money-weighted and time-weighted return:

$$\bar{r}_{i,t}^{PG} = \bar{r}_{i,t}^{MW} - \bar{r}_{i,t}^{TW}. \quad (6)$$

Table (4) reports results by category. Statistics are computed from the time-series of the 1,435 daily cross-sectional averages. Moreover, in order to better evaluate the profitability of a time-weighted strategy, we compute the same strategy for Bloomberg Barclays MSCI Euro Corporate SRI Index and for Morningstar investment grade Eurozone corporate bond index.

In order to evaluate how the performance gap changes in time, we divide the overall sample interval in three sub-intervals. The first concerns the pre-pandemic phase and spans December 2017 through January 1st 2020. The crisis period refers to the peak of the pandemic and covers between January 2nd 2020 to March 22nd 2022. The last interval, referred to as phasing-out, goes from March 24th, when the ECB Governing Council announced to gradually phase out the package of pandemic collateral easing measures in place since April 2020²³. In order to verify the robustness of results, for each fund in the sample we compute, at daily frequency, weekly performance gaps as the unweighted average of daily gaps registered in

²²Note that inflows into a fund have a positive sign. Therefore, in the formula for the IRR we need to multiply flows by -1 .

²³The timeline, implemented from July 8th 2022, is structured in three steps and it will take place until December 2024

the previous 5 business days. Table (4) reports results for all funds by ESG criteria and for each sub-interval.

First, table (4) shows that cross-sectional averages of a simple time-weighted strategy carried out with ESG fixed income funds underperform the corresponding passive benchmarks before and during the COVID-19 pandemic. In particular, panel (A.2) shows that, during the crisis period, the time-weighted strategy for ESG market index is positive (0.36%) and superior, by almost 1 percent point (0.91%) per year, with respect to the cross-sectional average of ESG funds (-0.55%). Panels (B.2) shows similar result for non-ESG funds with the time-weighted strategy of the index equal to 0.28% per year, the cross-sectional average of funds equal to -1.10% per year, and with a annual difference of 1.38%²⁴. Therefore, a simple strategy that buys and holds the index during the COVID-19 pandemic remains superior, even after controlling for risk, since corresponding Sharpe ratios are larger (or less negative) than those computed for the funds. This finding extends to fixed income results by Pastor and Vorsatz (2021) and provides support in contradicting a popular hypothesis that sustainable funds perform well during periods of distress.

Figure (1) plots cross-sectional averages of returns from different strategies during the interval of interest comparing them with relative benchmarks. It shows that strategies are highly correlated among each other. While ESG strategies move quite in lockstep with their benchmark, time-weighted strategies from non-ESG funds seem to be subject to less volatility than the respective market index.

Second, table (4) shows that average returns from money-weighted are always below time-weighted and then the average performance gap is negative in all cases. In particular, panels (A.1) and (A.2) show that, in the pre-crisis period, the average gap, computed with IRR methodology is -0.17% per year for ESG and -0.07% for non-ESG funds. Gaps computed with Dietz formula are a bit smaller in absolute value and respectively equal to -0.16% to -0.05% per year. Due to the return persistence, we also report standard errors that confirm in both cases that the negative performance gap is statistically significant. Sharpe-ratios of time-weighted are always larger (or less negative) than those computed for money-weighted. Therefore, time-weighted strategies are superior even after controlling for risk. We further report the fraction of days in which the average performance gap is strictly negative. Panel (A.1) and (A.2) shows that performance gaps are negative in almost 100% of days.

Figure (2) plots cross-sectional averages of performance gaps. It shows that gaps are negative, regardless of the asset class and the methodology of computation in most of days and that it widens through the pandemic, particularly for non-ESG funds.

Concerning the size of gaps through the COVID-19 pandemic, panels (A.2) and (B.2) of

²⁴Panels (A.1) and (B.1) show similar evidence for the pre-pandemic phase.

Figure 1: Investment strategies

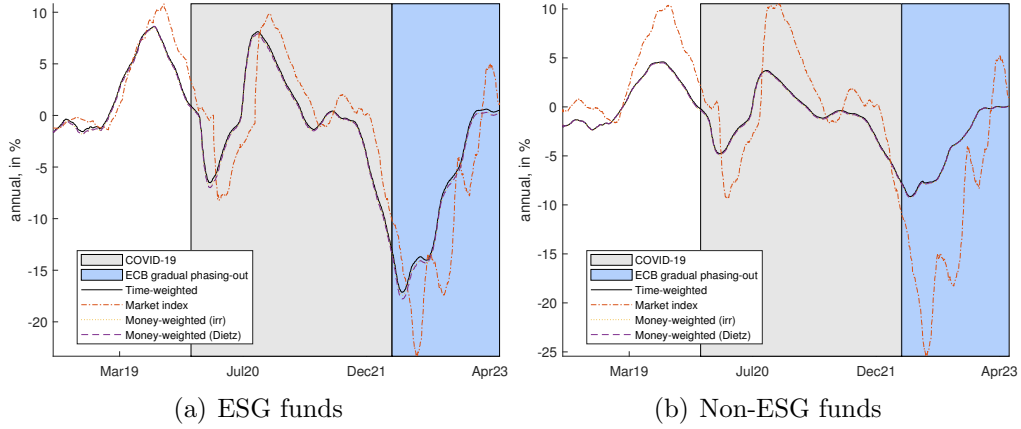


Figure (1) plots cross-sectional averages of returns from different strategies with a holding period of 120 business days. The reported statistics are computed from the time-series of the 1,435 daily cross-sectional averages for each item. Daily time-weighted returns are also computed for Bloomberg Barclays MSCI Euro Corporate SRI Index and for Morningstar investment grade Eurozone corporate bond index. Shaded areas represent respectively the COVID-19 crisis (in grey) and phasing-out from the package of pandemic collateral easing measures, decided by the ECB Governing Council on March 24th, 2022 (in blue). Returns are annual in %. Data are daily from Bloomberg for the sample Dec. 2017 - Jun. 2023.

Figure 2: Performance gaps

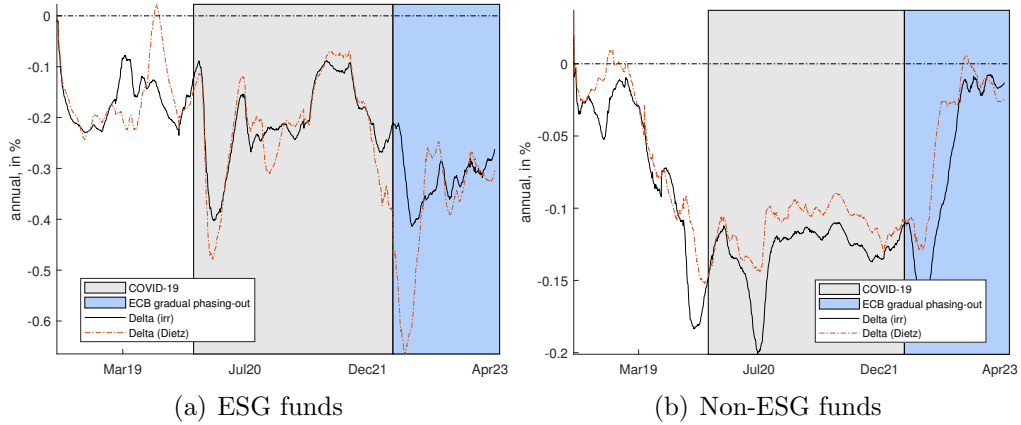


Figure (2) plots cross-sectional averages of performance gaps. Gaps are computed for each fund as the difference between money-weighted returns and time-weighted returns with a holding period of 120 business days. For each strategy the unweighted average of daily gaps registered in the previous 5 business days is reported. The reported statistics are computed from the time-series of the 1,435 daily cross-sectional averages for each item. Shaded areas represent respectively the COVID-19 crisis (in grey) and phasing-out from the package of pandemic collateral easing measures, decided by the ECB Governing Council on March 24th, 2022 (in blue). Returns are annual in %. Data are daily from Bloomberg for the sample Dec. 2017 - Jun. 2023.

table (4) report negative and larger gaps in all days of the time interval, regardless of the methodology of computation. In fact, gaps computed with IRR methodology are respectively equal to -0.21% for ESG funds to -0.13% for non-ESG instruments and those following Dietz

method are -0.22% and -0.11%.

Panels (C.1) and (C.2) confirm the persistence of negative gaps that, for ESG funds, tend to widen and that are respectively equal to -0.31% and to -0.37% per year.

Although results of the analysis are stable, we need to address some possible concerns about our findings. A first potential concern is that our results may be driven by funds with very negative gaps, since each fund receives an equal weight in the reported average regardless of its characteristics. In order to address this issue we verify the distribution of gaps across funds. Table (4) reports results of gaps ordered in percentiles and results show that, for both asset classes and for all intervals, performance gaps remain negative for more than the 50th percentile of the distribution, regardless of the methodology of computation. The second possible concern is that averages performance gap may be driven by the size of fund. In order to address this possibility, we compute performance gap for all the categories of funds (i.e. small, medium and large funds) and we find that results remain stable for all sizes and for the two categories of investment. Finally, in order to verify the sensitivity of our results with respect to the holding period chosen and to way in which data are presented, section (5) reports robustness checks on the investment horizon and on the methodology of computation.

Table 4: Investment strategies

| | Mean | Std. dev. | Std. error | Sharpe ratio | Skewness | Kurtosis | % of months | 25th perc. | 50th perc. | 75th perc. |
|-------------------------------|--------|-----------|------------|--------------|----------|----------|-------------|------------|------------|------------|
| Panel A: ESG funds | | | | | | | | | | |
| Panel A.1: Pre-Crisis | | | | | | | | | | |
| Time-weighted | 2.52 | 3.53 | (0.27) | 0.67 | 0.36 | 1.62 | - | 0.50 | 2.86 | 3.75 |
| Time-weighted (index) | 3.23 | 4.23 | (0.21) | 0.72 | 0.38 | 1.54 | - | - | - | - |
| Money-weighted | 2.35 | 3.55 | (0.62) | 0.61 | 0.36 | 1.62 | - | 0.53 | 2.79 | 3.78 |
| Money-weighted (Dietz) | 2.36 | 3.57 | (0.19) | 0.61 | 0.38 | 1.65 | - | 0.53 | 2.74 | 3.73 |
| Performance gap | -0.17 | 0.05 | (0.16) | -7.15 | 0.76 | 3.27 | 100.00 | -0.06 | -0.01 | 0.05 |
| Performance gap (Dietz) | -0.16 | 0.06 | (0.15) | -5.15 | 1.39 | 4.00 | 96.00 | -0.09 | -0.01 | 0.06 |
| Panel A.2: Crisis | | | | | | | | | | |
| Time-weighted | -0.55 | 4.72 | (0.31) | -0.13 | -0.21 | 2.97 | - | -2.35 | -0.60 | 1.05 |
| Time-weighted (index) | 0.36 | 4.71 | (0.20) | 0.06 | 0.03 | 2.70 | - | - | - | - |
| Money-weighted | -0.75 | 4.73 | (0.98) | -0.17 | -0.24 | 2.94 | - | -2.42 | -0.64 | 0.98 |
| Money-weighted (Dietz) | -0.76 | 4.76 | (0.25) | -0.17 | -0.26 | 2.97 | - | -2.40 | -0.65 | 0.99 |
| Performance gap | -0.21 | 0.08 | (0.16) | -3.40 | -0.49 | 2.99 | 100.00 | -0.14 | -0.02 | 0.07 |
| Performance gap (Dietz) | -0.22 | 0.10 | (0.15) | -2.67 | -0.61 | 2.69 | 100.00 | -0.18 | -0.02 | 0.10 |
| Panel A.3: Phasing-out | | | | | | | | | | |
| Time-weighted | -7.19 | 6.56 | (0.54) | -1.11 | -0.09 | 1.40 | - | -10.70 | -7.56 | -3.17 |
| Time-weighted (index) | -9.31 | 8.34 | 0.24 | -1.13 | 0.23 | 1.84 | - | - | - | - |
| Money-weighted | -7.50 | 6.58 | (0.51) | -1.16 | -0.09 | 1.40 | - | -10.87 | -7.66 | -3.30 |
| Money-weighted (Dietz) | -7.56 | 6.64 | (0.53) | -1.15 | -0.11 | 1.42 | - | -10.89 | -7.70 | -3.49 |
| Performance gap | -0.31 | 0.05 | (0.16) | -7.90 | 0.05 | 2.40 | 100.00 | -0.31 | -0.07 | 0.06 |
| Performance gap (Dietz) | -0.37 | 0.12 | (0.16) | -3.93 | -1.24 | 3.25 | 100.00 | -0.40 | -0.08 | 0.06 |
| Panel B: Non-ESG funds | | | | | | | | | | |
| Panel B.1: Pre-Crisis | | | | | | | | | | |
| Time-weighted | 0.79 | 2.41 | (0.21) | 0.26 | 0.25 | 1.52 | - | -1.35 | 0.55 | 3.41 |
| Time-weighted (index) | 3.38 | 3.97 | (0.19) | 0.81 | 0.39 | 1.68 | - | - | - | - |
| Money-weighted | 0.72 | 2.39 | (0.53) | 0.23 | 0.27 | 1.54 | - | -1.39 | 0.53 | 3.39 |
| Money-weighted (Dietz) | 0.74 | 2.38 | (0.20) | 0.24 | 0.26 | 1.53 | - | -1.39 | 0.53 | 3.36 |
| Performance gap | -0.07 | 0.05 | (0.06) | -4.44 | -0.88 | 2.62 | 99.25 | -0.06 | -0.01 | 0.02 |
| Performance gap (Dietz) | -0.05 | 0.05 | (0.08) | -4.61 | -0.48 | 2.00 | 90.00 | -0.09 | -0.01 | 0.03 |
| Panel B.2: Crisis | | | | | | | | | | |
| Time-weighted | -1.10 | 2.65 | (0.25) | -0.44 | -0.22 | 2.71 | - | -3.18 | -0.51 | 1.70 |
| Time-weighted (index) | 0.28 | 5.28 | (0.21) | 0.04 | 0.14 | 2.61 | - | - | - | - |
| Money-weighted | -1.23 | 2.65 | (0.78) | -0.49 | -0.21 | 2.70 | - | -3.29 | -0.56 | 1.69 |
| Money-weighted (Dietz) | -1.22 | 2.66 | (0.25) | -0.48 | -0.22 | 2.70 | - | -3.31 | -0.57 | 1.68 |
| Performance gap | -0.13 | 0.02 | (0.08) | -9.75 | -2.08 | 7.12 | 100.00 | -0.10 | -0.00 | 0.04 |
| Performance gap (Dietz) | -0.11 | 0.01 | (0.08) | -12.13 | -0.69 | 2.55 | 100.00 | -0.13 | -0.01 | 0.05 |
| Panel B.3: Phasing-out | | | | | | | | | | |
| Time-weighted | -3.90 | 3.44 | (0.32) | -1.16 | -0.16 | 1.39 | - | -7.77 | -2.23 | 0.77 |
| Time-weighted (index) | -10.11 | 9.02 | (0.23) | -1.13 | 0.19 | 1.84 | - | - | - | - |
| Money-weighted | -3.96 | 3.49 | (0.33) | -1.16 | -0.16 | 1.39 | - | -7.93 | -2.35 | 0.77 |
| Money-weighted (Dietz) | -3.94 | 3.47 | (0.33) | -1.16 | -0.17 | 1.40 | - | -7.94 | -2.36 | 0.74 |
| Performance gap | -0.06 | 0.06 | (0.05) | -2.77 | -0.56 | 1.70 | 100.00 | -0.11 | -0.01 | 0.05 |
| Performance gap (Dietz) | -0.04 | 0.04 | (0.10) | -3.21 | -0.93 | 2.25 | 94.59 | -0.13 | -0.00 | 0.08 |

This table reports results for investment strategies on euro area fixed income funds. For each fund, we calculate the time series of daily time-weighted and money-weighted returns computed with IRR formula and with the Dietz formula, with a holding period of 120 business days over the entire sample period. Daily time-weighted returns are also computed for Bloomberg Barclays MSCI Euro Corporate SRI Index and for Morningstar investment grade Eurozone corporate bond index. Performance gaps are computed for each fund as the difference between fund money-weighted and time-weighted returns. The reported statistics are computed from the time-series of the 1,435 daily cross-sectional averages for each item. Table reports unweighted average of daily gaps registered in the previous 5 business days. We report mean, standard deviation, standard error, Sharpe ratio, skewness, kurtosis of returns (in %). For the performance gap we report the fraction of days in which buy-and-hold overperforms market-timing (i.e., in which the performance gap is strictly negative). For each item we finally report percentiles of the distribution. All excess returns are computed with respect to the 30-day Euribor. Panel A reports statistics for ESG funds, panel B reports for non-ESG funds. Returns are annual in %. Data are daily from Bloomberg for the sample Dec. 2017 - Jun. 2023.

5 Robustness

In this section we verify whether results presented in section (4) are robust to different investment horizons (i.e. holding period). Therefore, table (5) reports performance gaps by holding period (i.e. 60, 120, 180 days). In order to address the possibility that results are driven by the methodology of calculation, performance gaps are computed as the unweighted average of daily gaps registered in the previous 5, 20, 60 business days.

Table 5: Performance gap - robustness

| | holding period | | | | | |
|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | ESG funds | | | Non-ESG funds | | |
| | (60-day) | (120-day) | (180-day) | (60-day) | (120-day) | (180-day) |
| Panel A: Pre-Crisis | | | | | | |
| past 5-day avg. | -0.24 (0.19) | -0.17 (0.16) | -0.10 (0.08) | -0.14 (0.07) | -0.07 (0.06) | -0.09 (0.03) |
| past 20-day avg. | -0.14 (0.10) | -0.11 (0.09) | -0.13 (0.10) | -0.08 (0.04) | -0.06 (0.04) | -0.06 (0.02) |
| past 60-day avg. | -0.04 (0.02) | -0.09 (0.07) | -0.16 (0.12) | -0.04 (0.03) | -0.06 (0.03) | -0.04 (0.02) |
| Panel B: Crisis | | | | | | |
| past 5-day avg. | -0.28 (0.20) | -0.21 (0.16) | -0.19 (0.12) | -0.24 (0.07) | -0.13 (0.08) | -0.09 (0.04) |
| past 20-day avg. | -0.26 (0.19) | -0.17 (0.13) | -0.17 (0.11) | -0.21 (0.06) | -0.06 (0.03) | -0.09 (0.03) |
| past 60-day avg. | -0.09 (0.05) | -0.10 (0.08) | -0.15 (0.11) | -0.07 (0.03) | -0.06 (0.03) | -0.04 (0.02) |
| Panel C: Phasing-out | | | | | | |
| past 5-day avg. | -0.37 (0.21) | -0.31 (0.16) | -0.32 (0.12) | -0.12 (0.04) | -0.06 (0.05) | -0.07 (0.04) |
| past 20-day avg. | -0.31 (0.19) | -0.21 (0.14) | -0.27 (0.11) | -0.18 (0.09) | -0.06 (0.02) | -0.09 (0.03) |
| past 60-day avg. | -0.11 (0.08) | -0.12 (0.09) | -0.20 (0.11) | -0.10 (0.03) | -0.06 (0.02) | -0.06 (0.02) |

This table reports the mean of performance gap (i.e., the difference between a money-weighted and a time-weighted investment strategy) from the time-series of the cross-sectional averages, as a function of the investment horizon (in days). Table reports unweighted average of daily gaps registered in the previous 5, 20, 60 business days. Standard errors are in parentheses. Returns are yearly in %. Data are daily from Bloomberg for the sample Dec. 2017 - Jun. 2023.

Table (5) shows that either by shortening or widening the holding period and the interval of computation, the performance gap remains negative for both categories of investment and standard errors confirm its statistical significance for both categories of investment.

6 Conclusions

Working with a novel dataset at daily frequency, this paper studies performance-flows relationship of fixed income investors in euro area, taking into account the relative ESG risk exposure of each fund. We identify short-term determinants of individual fund flows, finding that flows significantly react to recent past performance. Sustainable flows significantly respond to government policy intervention to contain the spread of the virus and to monetary policy announcements. We measure investor timing ability with a statistic hereafter referred to as “performance gap”. Gaps remain negative and significant regardless of the asset class with sustainable funds exhibiting the worst gap respectively equal to -0.21% per year during the COVID-19 crisis and -0.31% per year in the phasing-out period from the pandemic. Our results remain robust under different investment horizons and methodologies of computation, providing solid investment prescription in favor of time-weighted strategies. Computing a simple time-weighted strategy carried out with sustainable funds, we find that buying and holding the index during the COVID-19 pandemic remains superior, even after controlling for risk. This provides support in contradicting a popular hypothesis that sustainable funds perform well during period of distress.

Appendix

This Appendix reports the list of fixed income funds by category of investment. The sample contains all open-end active funds denominated in euro (EUR) that invest in euro area fixed income. The dataset spans December 2017 through June 2023 and contains 1,504,191 daily observations across 767 unique funds, of which 165 meet ESG sustainability criteria. We exclude from the sample closed-end funds, exchange-trade products and funds-of-funds. Moreover, to ensure the accuracy of the analysis, we keep only funds that exist for at least 90 consecutive business days during the sample period. Tables (6) and (7) list fixed income funds in alphabetical order.

Table 6: List of funds (1/2)

| ESG funds | | | |
|--------------------------------|------------------------------|-------------------------------|-------------------------------|
| AGRIPLAN ISR RENDEMENT | GROUPAMA CREDIT-G | ANTARIUS OBLI 1-3 ANS | BNP EURO S T CORP BD-CRA |
| ALLIANZ ADVAN FI EUR-C2EURI | GROUPAMA CREDIT-IC | ANTONVENETA VITA EQUILIBRATO | BNP MULTIPAR OBBLIG EURO-C |
| ALLIANZ ADVAN FI EUR-WT3 EUR | GROUPAMA CREDIT-ID | ANTONVENETA VITA OBBL MISTO | BNP MULTIPAR SOL OBL SO RE-C |
| ALLIANZ ADVANCED FIXD EUR-P | GROUPAMA CREDIT-M | ANTONVENETA VITA OBBLIG EURO | BNP PARIBAS 1 AN PROTEC 99-P |
| ALLIANZ ADVANCED FIXD EUR-RT | GROUPAMA CREDIT-NC | ANTONVENETA VITA PROTETTO | BNP PARIBAS B INV-EUR BON-C |
| ALLIANZ ADVANCED FXD EUR-Y14 | GROUPAMA OBLIG EURO-G | ANTONVENETA VITA SICURO | BNP PARIBAS CAAP MODERADO-A |
| ALLIANZ EURO GOV BOND-I2 | GROUPAMA OBLIG EURO-I | ANTONVENETA VITA TREND EQUIL | BNP PARIBAS COUPOLE OBLIGAT |
| ALLIANZ EURO GOV BOND-IT4 | GROUPAMA OBLIG EURO-M | ANTONVENETA VITA TREND PROT | BNP PARIBAS EURO |
| ALLIANZ EURO GOV BOND-RTEURA | GROUPAMA OBLIG EURO-O | ARCA CED 2019 OBB ATT VII-P | BNP PARIBAS OBLI ETAT-PD |
| ALLIANZ-ADV FXD EUR-AT | LBPAM ISR OBLI EUROPE-C | ARCA CED 2019 OBB ATT VII-P | BNP PARIBAS OBLI FLEXIBLE-D |
| ALLIANZ-ADV FXD EUR-CT EUR | LBPAM ISR OBLI EUROPE-D | ARCA CED 2019 OBB ATT VI-P | BNP PARIBAS OBLI LONG TERM-C |
| ALLIANZ-ADV FXD EUR-ITS | LBPAM ISR OBLI EUROPE-E | ARCA CED 2020 OBB ATT XII-P | BNP PARIBAS OBLI RESPONDS-D |
| ALLIANZ-ADV FXD EUR-W9 | LBPAM OBLI EUROPE-GP | ARCA CED 2020 OBB ATT XI-P | BNP PARIBAS OBLI REVENUS CLS |
| ALLIANZ-ADVANCED FI EUR - IT | LITRUST GF SUS FUR E C-A1AEU | ARCA CED 2020 OBB ATT IX-P | BNP PARIBAS OBLIPAR-CE |
| ALLIANZ-ADVANCED FI EUR - W | LITRUST GF SUS FUR E C-A5AEU | ARCA CED CORPORATE 2021-P | BNP SUST EUR BD-CL EUR A |
| ALLIANZ-ADVANCED FI EUR - A | MACQUARIE BONDS EUROPE | ARCA CEDOLA 2012 PLUS II-P | BOEHRINGER OBLIG EUR- |
| ALM CREDIT EURO ISR-IC | MACQUARIE BONDS EUROPE-A | ARCA CEDOLA 2018 OBB ATT 3-P | BOND STRATEGIA ATTIVA - A |
| ALM CREDIT EURO ISR-IE | MERCK FINCK-STIFTUNGSFN UL-A | ARCA CEDOLA 2018 OBB ATT 4-P | BREMENKAPITAL RENTEN STANDAR |
| ALM CREDIT EURO ISR-R | MERCK FINCK-STIFTUNGSFOND-BE | ARCA CEDOLA 2018 OBB ATT II | BS PLAN 15 PLUS 2 PP |
| ALM CREDIT EURO ISR-RB | MHGA SOUVERAIN 5-7 ISRC-EUR | ARCA CEDOLA 2020 OB ATX-A | BS PLAN MONETARIO PLUS 1 PP |
| ALM ES OBLIG EURO ISR-PARTE2 | MIROVA OBLI EURO-R C EUR | ARCA CEDOLA 2021 PLUS III-R | BS PLAN MONETARIO PLUS 2 PP |
| AMUND IND EUR CORP SRI-I13EC | MIROVA OBLI EURO-R D EUR | ARCA CEDOLA 2021 PLUS-P | BSSO COURT TERMIE |
| AMUND IND EUR CORP SRI-I14EC | MIROVA OBLI EURO-T C EUR | ASR ESG IDPL INST EU STAAT-C | BTP ACTIVITE PLUS |
| AMUND IND EUR CORP SRI-AEC | NN L-EUR CR SUST-ICEUR | ASTORG EURO SPREAD | BV SUSTAINABLE RESERVE |
| AMUND IND EUR CORP SRI-AED | NN L-EUR CR SUST-N | AXA EURO ACGRGTE SHRT DUR-C | CAI PENS HORIZONTE 7-2011 PP |
| AMUND IND EUR CORP SRI-IEC | NN L-EUR CR SUST-PCEUR | AXA WORLD FUND-EURO BONDS-AC | CAI PENS HORIZONTE 7-2012 |
| AMUND IND EUR CORP SRI-OEC | NN L-EUR CR SUST-PEUR | AXA AB-EUROZON BD PT-V4 A | CAIXABANK RF DUR NEG-PLUS |
| AMUND IND EUR CORP SRI-REC | NN L-EUR CR SUST-XC | AZ ORIZZ OBBLIG BREVIE TERM-S | CAIXAGEST LIQUEIDE |
| AMUND IND EUR CORP SRI-IEC | NN L-EUR SUST CR EX FI-CEUR | B2V OBLIGATIONS | CAJA INGEN 2018 INFILA GAR FI |
| AMUND IND EUR CORP SRI-IEC | NN L-EUR SUST CR EX FI-DEUR | BANCOPOSTA EURO GOVT BD 1-5Y | CAJA LABORAL AHORRO |
| AMUND IND EUR CORP SRI-IEC | NN L-EUR SUST CR EX FI-DEUR | BANCOPOSTA OBBL EURO M-L TER | CAMGESTION CAPI OBLIG |
| AMUND IND EUR CORP SRI-IEC | NN L-EUR SUST CR EX FI-DEUR | BANCOPOSTA OBBLIG DIC 2018 | CAMGESTION EUROBLIG-CLASS C |
| AMUND LABEL OBLIGATR ESR-F | NN L-EUR SUST CR EX FI-DEUR | BANKIA BONOS 24 MESES FI-UNI | CAN LOCALYS EURO COURT T T-C |
| AMUND LABEL PRUDENCE ESR-F | OSTRUM PREMIERE MOYEN TERMIE | BANKIA DURACN FLX 0-2-UNVRSL | CANDR BONDS-EURO GOVERN-M-C-C |
| AMUNDI RESA MODERATO-C | PENSPLAN-ETHICAL LIF CONSERV | BANKIA GOB EURO LP-UNVRSL | CANDR OBLIGATIONS EURO-C |
| ASR ESG IDPL IN EU BEDRIJ-AEAC | REGARD GREEN BONDS-H | BANKIA PROTEG RENTA 07 2019 | CANDRIAM BOND EURO DIVRSF-A |
| ASR ESG IDPL IN EU BEDRIJ-AE | SECURI-GAN-C | BANKIA PROTEG RENTA 2018 PP | CAPITOP REVENUS |
| ASR ESG IDPL IN EU BEDRIJ-BE | SECURI-GAN-D | BANKIA PROTEG RENTA 2023 PP | CARMIGNAC SECURITE-A EU ACC |
| ASR ESG IDPL IN EU BEDRIJ-KE | STT-EURO SUST CORP BD IF-A2 | BANKIA PROTEGI REN PREM XV | CASER 2009 PLUS |
| ASR ESG IDPL IN EU BEDRIJ-XE | STT-EURO SUST CORP BD IF-A2E | BANKIA PROTEGIDO RENTA 2020 | CASER 2012 |
| ASR ESG IDPL INS EU BEDRIJ-C | STT-EURO SUST CORP BD IF-ID | BANKIA PROTEGIDO RENTA 2022 | CATALANA OCCIDENTE RTA FIJA |
| ASR ESG IDPL INS EU BEDRIJ-K | STT-EURO SUST CORP BD IF-SEA | BANKINTER ESPANA 2021 | CD ALPHA BONDS-C |
| AXA WRLD FD-EUR SUS CR-ACEUR | STT-SUS CLM EURO CRP BD FD-I | BANKINTER EURIBOR 2027 GA FI | CEVIRE EST OBLI INV-EUR ACC |
| AXA WRLD FD-EUR SUS CR-ADEUR | STT-SUS CLM EURO CRP BD FD-S | BANKINTER EURIBOR RENTAS GFI | CLAY SHORT TERM BONDS-EUR-R |
| AXA WRLD FD-EUR SUS CR-ECEUR | STT-SUS CLM EURO CRP BD-PEUR | BANKINTER EUROBOLSA GARANTIZ | CLEOME INDEX EURO GOVT BD-C |
| AXA WRLD FD-EUR SUS CR-FCEUR | TRUSTEAM OBLIGATIONS CT - C | BANKINTER EUROSTOXX 2018 GAR | CLEOME INDEX EURO LNG TRM-CA |
| AXA WRLD FD-EUR SUS CR-ICEUR | VBV VK EURO SHRT TRM PLS ESG | BANKINTER GESTION ABIERTA | CLEOME INDX EURO SHRT TRM-CA |
| AXA WRLD FD-EUR SUS CR-IDEUR | | BANKINTER GRA EM ESP GAR FI | CLICHY PREMIERE |
| AXA WRLD FD-EUR SUS CR-MCEUR | | BANKINTER IBEX 2023 GARANT | CM AM NEGATIVE DURATION-C |
| AXA WRLD FD-EUR SUS CR-MDEUR | | BANKINTER IBEX 2028 PLS GARA | CM-AM INST SHORT TERM-C |
| BANTLEON SELECT GREEN BDS-IA | | BANKINTER IBEX 26 PLUS II GR | CM-AM OBLI MOYEN TERMIE-C |
| BANTLEON SELECT GREEN BDS-PA | | BASF GOVERNMENT BONDS EURO-I | CM-CIC OBLI SOUVERAINS-C |
| BFT CREDIT 12 MOIS ISR-I | 3 BANKEN EUROPA BOND-MIX | BASIS FONDS I | CNP ACN 10-C D |
| BFT CREDIT 12 MOIS ISR-PC | 3 BANKEN GENERALI OBLK 30 | BATI CREDIT PLUS | CNP ASSUR CAPI-I |
| BFT CREDIT 12 MOIS ISR-R | 3 BANKEN LNG-TM EUROBD MIX-A | BATI PREMIERE-C | CNP ASSUR EURO |
| BFT CREDIT OPPOIRT ISR-I-C | 3 BANKEN SHORT TERM EUROBOND | BBVA AHORRO EMPRESAS | CNP ASSUR LBPAMCREDIT |
| BFT CREDIT OPPOIRT ISR-I2C | 3F EURO BONDS-C | BBVA AHORRO GARANTIA | CNP ASSUR-OBLIG-R |
| BFT CREDIT OPPOIRT ISR-ICD | A 115 | BBVA BONOS 2018 | CNP COURT TERMIE |
| BFT CREDIT OPPOIRT ISR-PC | AA ALLIANZ OBLIG EURO-CD | BBVA BONOS CORP DURACION CUB | CNP MOYEN TERMIE |
| BNP MLTIPR SO OB SO R-RE CAP | AAZ CAPITALISATION | BBVA BONOS CORPORATIVOS LP | CNP ASSUR-UBSCREDIT |
| BNP MULTIPAR SOL OBL SO RE-C | ABN AMRO EURO SHORT TRM BD-C | BBVA BONOS GOBIERNOS | COGEFI SHORT TERM BOND-P |
| BNP PARIBAS OBLI RESPON-PR I | ABN AMRO GLOBAL HI Y1 2021-C | BBVA BONOS PA REN II FI | CONFIANCE SOLIDAIRE-C |
| BNP PARIBAS OBLI RESPONDS-D | ABN AMRO TOT RET GLOB BDS C | BBVA BONOS PA REN III FI | CORTAL CONSORS OPEN RENDE-C |
| BNP PARIBAS OBLI RESPONDS-M | ABN AMRO-BLUEBAY EUR AGG B-F | BBVA BONOS PATRIMONIO 18 | CORUM ECO-D |
| BNP PARIBAS OBLI RESPONDS-PRI | ABN AMRO-FOM EU GOV BD-A EUR | BBVA BONOS PATRIMONIO IX FI | COVEA EURO SPREAD |
| BNP SUST EUR BD-CL EUR A | AEAM CORE EUROZONE GOVT BD | BBVA BONOS PATRIMONIO VII FI | COVEA MOYEN TERMIE-C |
| BNP SUST EUR BD-CL EUR I | A-F EUR ACG BOND-A EUR C | BBVA BONOS PATRIMONIO VIII | COVEA OBLIGATIONS-C |
| BNP SUST EUR BD-I EUR AC | AGPI INFILATION | BBVA BONOS PATRIMONIO XII FI | CPR EUROGOV LCR |
| BNP SUST EUR BD-N EUR | ALANDS BANKEN EURO BOND-B | BBVA BONOS PATRIMONIO XIV FI | CPR EUROGOV ME-P |
| BNP SUST EUR BD-PR EUR-A | ALCIS ALPHA OBLIGATION CREDI | BBVA BONOS PATRIMONIO XV FI | CREAND INSTITUTIONAL FI |
| BNP SUST EUR BD-PR EUR-I | ALLIANZ APOLLINE INFL LT | BBVA BONOS PATRIMONIO XVI FI | CREDIT EURO 1-3-1 C EUR |
| BNP SUST EUR BD-X EUR AC | ALLIANZ EURO RENTENFONDS K-A | BBVA BONOS PATRIMONIO XVII | CSIF CH BD FSC ST EUR BL-Z |
| CPR 7-10 EURO SR-S | ALLIANZ EURO RENTENFONDS-A | BBVA BONOS PATRIMONIO XVIII | CSIF CH BOND GOV EUR BLUE-D |
| DANONE COMM-INVEST RESPON S1 | ALLIANZ INVEST EUFORENT-A | BBVA BONOS PLAZO II FI | CSIF LUX BD GOV EU BL-DB EUR |
| DEBE RENT GLB SD ESG-AKCEUR | ALLIANZ INVEST-A160 | BBVA BONOS PLAZO III FI | CSIF LUX BOND AGG EUR-DBEUR |
| DEBE RENT GLB SD ESG-AKIREUR | ALLIANZ ME OBLIG CRED EURO-C | BBVA BONOS PLAZO IV FI | CX EVOLU RENDES MAIG 2020 |
| ECOFI CONTRAT SOLIDAIRE-A | ALLIANZ MOBIL-FONDS | BBVA BONOS PLAZO V FI | CX EVOLUCIO RENDES 5 FI |
| ECOFI CONTRAT SOLIDAIRE-B | ALLIANZ RENTENFONDS | BBVA BONOS PLAZO VI FI | DANONE COMM-INVEST RESPON S1 |
| ECOFI TAUX VARIABLE-I | ALLIANZ STRAT 2019 PLUS-AT | BBVA BONOS PLAZO VII FI | DEAM FONDS ZATI |
| EDR SICAV-EU SUST CR-A EUR | ALLIANZ VIE MULTI ASSETS-C | BBVA BONOS PLAZO VIII FI | DEGROOF BDS EMU IG GVT IN-F |
| EDR SICAV-EU SUST CR-B EUR | ALMA OBLIG EURO ISR-IC | BBVA BONOS PLUS FI | DEKA RENTEN: EURO 3-7 CF-A |
| EDR SICAV-EU SUST CR-CR EUR | ALMA GESTION 9 | BBVA BONOS RENTAS I FI | DEKA-INSTITUTNLL RENT EUROLD |
| EDR SICAV-EU SUST CR-I | ALPHAMA PREMIUM PLUS | BBVA BONOS RENTAS II FI | DELOS SHORT&MEDIUM BOND FUND |
| EDR SICAV-EU SUST CR-N EUR | ALTO FLESSIBILE PROTETTO-A | BBVA BONOS RENTAS III FI | DNCA SERENITE PLUS-C |
| EDR SICAV-EU SUST CR-R EUR | ALTO GLOBAL PROTETTO-A | BBVA BONOS RENTAS IV FI | DOM OPPORTUNITIES 1-3-C |
| EURIZON AM EURO MED LUN TERM | AMPEGA CROSSOVERPLUS RENT-P | BBVA BONOS RENTAS V FI | DP RENTA FIJA |
| EURIZON OBBL EURO CORP BR TE | AMPEGA RENDITE FONDS | BBVA BONOS RENTAS VI FI | DUCAL INCOME FD EURO-R |
| EVLI EURO GOVER BOND - IA AC | AMPEGA UNTERNEHMENSANLEIHEN | BBVA BONOS SOSTENIBILE ISR FI | DURAI 1 |
| EVLI EURO GOVER BOND - IB IN | AMU RES INV - EUR CRE SRI-IC | BBVA CREDITO EUROPA | DWS QI EXKL RENTEN CHANCE |
| EVLI EURO GOVERNMENT BOND-A | AMUNDI COVERED BONDS EURO-IC | BBVA FIXED INCOME PORT-I EUR | DYNASTY CORP BOND 1-3-BEUR |
| EVLI EURO GOVERNMENT BOND-B | AMUNDI CREDIT 1-3 EURO-I | BBVA FION-PLAZO 2018 FI | ECHIQ ALTARocca HYBRID BD-F |
| FEDERIS CREDIT ISR-MH | AMUNDI CREDIT EURO-I | BBVA FUSION CORTO PLZ FI | ECOFI CONTRAT COOPERATIF 2 |
| FEDERIS OBLIG ISR INTERNAT-M | AMUNDI CREDIT EURO-M | BBVA FUSION CORTO PLAZO III | ECOFI DYNACTIONS GARA 2018-C |
| FEDERIS OBLIG ISR INTERNAT-R | AMUNDI EURO GOV MIT A DIST-A | BBVA FUSION CORTO PLAZO V FI | ECOFI ENTREPRISES |
| FRUCTI OBLI EURO COURT TER-C | AMUNDI EURO GOVERN BOND-A | BBVA FUSION CORTO PLAZO VI | ECOFI OBJECTIF MARS-C |
| FRUCTI OBLI EURO COURT TER-D | AMUNDI OBBLI DINAMICO-D DIS | BBVA FUSION CORTO PLZ VII FI | ECOFI OPTIM 12 MOIS |
| G FUND CREDIT EURO ISR F | AMUNDI OBLIGAZ EURO A DIS-A | BBVA MERCADO MONETARIO | ECOFI QUANT OBLIGATIONS |
| G FUND CREDIT EURO ISR GC | AMUNDI OBLIG 1-3 EURO-I | BBVA PLAN RENTAS 2018 | ECUREUIL MONE COURT TERMIE |
| G FUND CREDIT EURO ISR GD | AMUNDI OBLIG 5-7 EURO-I2C | BESTINVER BONOS INST II FI | ECUREUIL OBLI EURO-C EUR |
| G FUND CREDIT EURO ISR GDM | AMUNDI OBLIG ETAT ESR- | BETA PENSIONES RENTA FIJA | ECUREUIL PROFIL 5-C D EUR |
| G FUND CREDIT EURO ISR IC | AMUNDI OBLIG EURO-C | BFI EUROBOND EUR-R | EDM AHORRO-R |
| G FUND CREDIT EURO ISR M | AMUNDI OKO SOZIAL RENT 2-A | BFT CREDIT 6 MOIS ISR-E | EDR SICAV-EU SUST CR-A EUR |
| G FUND CREDIT EURO ISR NC | AMUNDI OPTIRENDE 2-A | BFT SELECT REND 23-IC | EDR SICAV-SHORT DUR-A-I EUR A |
| G FUND CREDIT EURO ISR-EEURI | AMUNDI PRIM EU GOVS-IE EUR | BGF-EURO BOND-A2 EUR ACC | EGAMO OBLIGATION COURT TRM-I |
| GROUPAMA CREDIT EURO CT-G | AMUNDI RESA OBLIG DIVERSIFIE | BK EURIBOR 2025 GARANTIZADO | EIS-PB BOND CORPORATE EUR-I |
| GROUPAMA CREDIT EURO CT-I | AMUNDI RESA OBLIGATER 2023-C | BK EURIBOR RENTAS III GARANT | ELEV-EURO BOND STRAT-IEURA |
| GROUPAMA CREDIT EURO CT-M | AMUNDI SF - DVRS S T BD-EEUR | BK EUROSTOXX 2024 PLUS GAR | EPARGNE ETHIQUE OBLIGATION-D |
| GROUPAMA CREDIT EURO CT-N | AMUNDI SH TERM YIELD SLTN-IC | BK IBEX 2025 II GARANTIZADO | EPARGNE OBLIG EURO |
| GROUPAMA CREDIT EURO CT-OC | AMUNDI TREND BOND-A | BK INDICE EURO 2025 GAR | EPARGNE SOLIDAIRE |
| GROUPAMA CREDIT EURO CT-OD | AMUNDI-EURO CORP BD-A EUR-C | BLACKROCK EURO GOV INDEX FD | EPSILON FUND-EURO BD-I |
| | ANIMA FIX EURO BT-A | BLACKROCK GFI ISH EU AC-X2EU | EPSILON ITALY BOND SH TM-B |
| | ANIMA OBLIGAZ EURO MLT-A | BMM MUTUELLES RENDEMENT | EQ EURO INV GRADE 1 K |
| | ANIMA OBLIGAZIONARIO E BT-Y | BMO EURO BOND I ACC EUR | ERSTE BOND EURO TREND-A |
| | ANIMA VALORE OBLIGAZI | BNKTR EURIBOR RTS II GAR FI | ETOILE BOND 1-3 ANS-C EUR |
| | | | ETOILE OBLI 7 ANS ET + |

Table 7: List of funds (2/2)

| | | |
|-------------------------------|-------------------------------|-------------------------------|
| ETOILE STRATEGIE TAUX-C | LBPAM OBLI LONG TERME | RENTOBLIG |
| ETORPENSION RENTA MIXTA | LBPAM OBLI MOYEN TERME C | RAM INDEXI-P |
| EUFULUX FIX-I RET ST FIRST-D | LBPAM OBLI REVENUS | ROBECO CUST LIA DRIV I-PEUR |
| EURIZON AM EURO BT | LBPAM OBLIG EURO GOVIES 3-5 | ROBECO PHARMA OBLIGATIONS |
| EURIZON AM PROTEZIONE MER EU | LCL OBLIG MOYEN TERME EUR-PC | RSI OBLIGATIONS ETATS EURO 1 |
| EURIZON FUND-BD EUR SHTRLT-R | LCL OBLIGATIONS 24 MOIS FC-C | RURAL 5 GARANTIA RENTA FIJA |
| EURIZON FUND-EUR LNGTR LTE-R | LCL OBLIGATIONS EURO-D | RURAL EUROPA 2012 GARANTIA |
| EURIZON OBLBLG EURO BREV TER | LEASETEN RENT FIJ CORTO FI | RURAL MIXTO 15 |
| EURIZON OBLIGAZIONI EURO | LFP EURO SOUVERAINS | RURAL MIXTO 20 |
| EURO OBLIGATION-A1 EUR | LFP MULTISTRATEGIES OBLIG-I | RVERTREE BOND-EURO-R CAP |
| EURO RAENTA-A1 EUR | LLB STAATSANLEIHEN EUR-A | S WALDVIERTEL BOND-A |
| EUROBONDGARANT I | LLOYD ADRIATICO CAP PRUDENTE | S3-A |
| EUROFUNDLUX FLOATING RATE-B | LLOYD ADRIATICO GARANTIT PIU | S5-T |
| EUROVALOR AHORRO EURO | LLOYD ADRIATICO PROTETTO PIU | S700 |
| EUROVALOR BONOS CORPORATIVOS | LO FUNDS-EURO GOV FUNDMTL-PA | SABADELL GARANTIA EXTRA 20 |
| EUROVALOR BONOS EURO L P | LUX IM-INCOME COUP II-DX-BL | SACEM |
| EUROVALOR EMPRESAS VOLUMEN | MACQUARIE BONDS EUROPE | SANTANDER MONETARIO PP |
| EUROVALOR GARANTIZADO ORO II | MADELEINE MID CAP FLX-EURCAP | SANTANDER SOST RF 1-3-A |
| EUROVALOR GRNTZD ACC III FI | MAM FLEXIBLE BONDS-C | SCHNEIDER ENER SICAV SOLIDAI |
| EUROVALOR PATRIMONIO | MAM SHORT TERM BONDS-C | SCHRODER INTL-EURO GOV -A AC |
| EUROVALOR RENTA FIJA | MAM TAUX VARIABLE-C | SEB EURO BOND-A |
| EUROVLR AHORRO OBJETV 2018-A | MAM-TRANS DUR OBLG-C | SEB EURO SHORT RATE-A |
| F BANKINTER RENTA FIJA 6 GRT | MARCH PENSION RENTA FIJA FP | SEB TOTAL RETURN BOND FUND |
| FAIM ET DEVELOPPMNT SOLIDAR | MARCH RENTA FIJA CORTO PLAZ | SECURI-GAN-C |
| FEDERAL GLOBAL GREEN BONDS-P | MARCH RENTA FIJA CORTO PLAZ-A | SELGISON & CO EURO BOND-A |
| FIDEURAM RENDIMENTO | MICA GESTOBLIG | SELGISON EURO CORP BOND-A |
| FIDEURAM RISPARMIO | MEAG EUROERTRAG | SLF (F) BOND 6M P CAP |
| FIJ EURO CORP BD-IEUR | MEDI MONETAIRE-C | SLGP CORPORATE BONDS-C |
| FIM EURO | MEDI OBLIGATIONS VARIABLES | SG OBLIG MOYEN TERME-D |
| FINCA ACTIVE DURATION | MEDIOLANUM ACTIVO FI SA | SG TRESORERIE 12 MOIS-E |
| FLEXPROTECTION SECURE 12 | MEDIOLANUM RENTA-SA | SG TRESORERIE 6 MOIS-E |
| FLEXPROTECTION SECURE 13 | MERCK FINCK-STIFTUNGSFOND-UI | SIGMA INV HSE FCP MED EUR ST |
| FLEXPROTECTION SECURE 14 | METAVALOR GLOBAL | SK ENDBRG FD SICAV-EU BP-EURP |
| FLEXPROTECTION SECURE 15 | METROPOLE F-M CORP BONDS-A | SK ENDBRG FD SICAV-EU BP-EURP |
| FON FINECO BASSE FI | MFS MER EURO CREDIT-A1 EUR | SLF (F) BOND 6M P CAP |
| FONDERSEL SHORT TERM ASSET | MILLESIMA 2024-C ACC EUR | SOPRARNNO PRNT TRMN OB-IEURA |
| FONDESPANNA DUERO HORIZO 2018 | MIRABAUD FUNDS SHORT TERM | SOPRARNNO PRONTI TERMINE-B |
| FONDITEL RNT FJ CORT PLAZ FI | MIXED CONSERVATIVE | SOUVERAINS EUR 1-3-I C EUR |
| FONDMAPFRE RENTA CORTO FI-R | MNVST-GOVERN BONDS-EUR | SOUVERAINS EUR 3-5-I C EUR |
| FORCE LORRAINE DUO-CD | MONEGA - CORPORATE M SUST-I | SOUVERAINS EUR 5-7-C EUR |
| FRANCE INVESTISS OBLIGATIO-C | MONTSEGUR SECURITE-C | SPEZIAL 43 |
| FRUCTI TRESORERIE-C | MOOREA FD- SUSTBL EUR FXD IN | SPPI MULTI-OBLIG-C |
| FT EUROGOVERNMENTS M | MS MONETARIO | SPPI SEREN-OBLIG-C |
| FT EUROZINS | MULTIPAR TRESORERIE PLUS-C | SS EUR COR B ESG SCR I F-I |
| FTIF-FRKN EU GOV BD-AYDISEUR | MUTUAFONDO CORTO PLAZO-A | STRATEGIC OPPORTUNITY BD-D |
| FUNDY | MUTUAFONDO DINERO-A | STRATEGIE CRDT EUR-R C EUR |
| GAM EURO GOVERNMENT BD A | NAGELMACKER INSTTT-VARIAB TR | STT-EURO CORE TREAS BOND-I |
| GCC MIXTO I PP | NATIXIS SECURITE JOUR | STT-EURO SUST CORP BD IF-ID |
| GENERALI EURO BD 1-3 YRS-BX | NB BRM-EURO BOND AB RE-EURIA | STT-SUS CLM EURO CRP BD FD-I |
| GENERALI IN-EU COR SHT BD-AX | NB GARANTIZADO EUROPA 70 FI | SUEDWESTBANK-INTERRENT-UNION |
| GENERALI INV-CAE EUR BND-AY | NB ULTRA SHORT TERM EN CASH | SWG-IBF EMU GOV NT EUR |
| GENERALI INV-EUR CORP BD-AX | NEF-EURO CORP BND-I-C | TARENO-ENH IDX INVEST-BON RT |
| GENERALI INV-EURO BOND-AX | NESTLE FRANCE OBLIG SOLID-E | TAUX REELS EUROPEENS-AC |
| GESTIELLE BT CEDOLA-A | NN L GREEN BOND - I CAP EUR | THREADNEEDLE-EURO STR BD-AE |
| GESTIELLE MT EURO-A | NN L-EURO FIX INC-IC | TIKEHAU 2022-R ACC EUR |
| GESTIFONSA MIXTO 25 FI-BASE | NORDEA 1 SCV EU IN LI B-YEUR | TIKEHAU COURT TERME-AACEUR |
| GESTION PRIVEE RENDEMENT-PD | NOVEPARGNE-C | TIKEHAU SUBFIN FUND-A ACEUR |
| GETINO GESTION ACTIVA FI | OBLI MOYEN TERME-D EUR | TIKEHAU TAUX VARIABLE-A ACC |
| GI FOCUS EURO GOVERN BR TERM | OBLIG CORP 1-2.5 YEAR EUR-C | TRUSTEAM OBLIGATIONS CT - C |
| GOYER & CO ZI-IN AT IZA-ANT-I | OBLIG DU CREDIT DU NORD | UBS (CH) IF-EUR BDS PA 1-X |
| GROUPAMA CREDIT EURO-NC | OCTYS | UCROBLIG NO 1 FCP |
| GROUPAMA ETAT EURO CT-ID | ODDO BHF EUR SH-TRM BND FT | UFF ALLOCATION PRUDENCE-C |
| GROUPAMA ETAT EURO ISR-ID | OFI OBLIGATIONS ISR - C | UNI-MT-C |
| GROUPAMA OBLIG LT | OMNIBOND | UNOFI-EXPANSION-C |
| GROUPAMA OBLIG MONDE-N | OP-OBLIGAATIO TUOTTO-A | UNOFI-OBLIG |
| GSD PATRIMOINE | OPTIMIX EURORENTE FD G | UNOFI-RENDLEMENT 2-D |
| GVCGAESCO CONSTANTFONS | ORANO OBLIGATAIRE | VALIDA ANLEIHEFONDS 10 |
| GVIE DIVERSIFIE I | OSTRICA EU INV GR CB OSTR | Valida Anlehefondss 4 |
| HANNOVERSCHERASINVEST | OSTRM SOVERAIN EUR-RCEUR | VALIDA ANLEIHEFONDS 12 |
| HI-RENTEN EURO-FONDS | OSTRUM CASH PREMIERE-I | VALIDA ANLEIHEFONDS 6 |
| HMT CORPORATES RISKCONT SH D | OSTRUM EURO INFLATION-I AEUR | VALIDA ANLEIHEFONDS 8 |
| HOTTING OBLIG CRT TRM EURO-A | OSTRUM OBLI CROSSOVER-I | VALOROBIGATIONS-D |
| HSBC EURO GVT BOND FUND-C | OSTRUM OBLI EUROS 3-5 ANS | VALPROGREEUR |
| HSBC EURO SHORT TERM BND-C | PACTEO TRESORERIE-EUR ACC | VANGUARD EURO IN GR IX-EUR A |
| HSBC EURO SHORT TERM GVT B-C | PANDA RENTA FIJA PP | VANGUARD-20+ YR EUR TR IN-EA |
| HSBC SRI EURO BOND-AC | PBP AHORRO GP | VANGUARD-EUR GV BND IDX- INV |
| HUGAU 12M | PENSION INCOME D2 | VBV VK PIA HTM FOND |
| HUGAU OBLI 3-5 | PENSION INCOME D3 | VBV VK PIA HTM FOND |
| HYPOT-RENT-A | PENSION-INCOME D1 | VEGA EURO SPREAD-RC |
| IBERCAJA 2025 GARANTZDO 2 FI | PENSPLAN-ETHICAL LIF CONSERV | VEGA OBLIGATIONS EURO |
| IBERCAJA CAPITAL GARANTIZ FI | PHIM SOLUT ALL WEATHER R3-R | VENDOME OBLI MOYEN TERME-D |
| IBERCAJA MIXTO FLEXIBLE 15-A | PL IBER DE PENS PROTECC 2012 | VINDOBONA METTERNICH-EUR |
| IBERCAJA RENTA FIJA 2025-A | PL IBERCAJA DE PEN SOLI 2012 | WELZIA PATRIMONIO FI |
| ILIM-INDEX EURGOV LONGBOND-A | PLACEURO DOM OPP-CAP EUR ACC | WWK SELECT BONDS-C I |
| INDOCAM PF 3 | PLAN DE PENSIONES FINECO 5 | |
| ING DIRECT F NARANJA R F | PLAN FINECOPENSION RENTA FIJ | |
| INSIGHT-ILF EUR LIQUID PL -2 | POPSO EURO BOND-B | |
| INTERMONEY RF CORTO PLAZO | POPSO TOTAL RETURN BOND-B | |
| ISHARES EU GV BD I(IE)-IEURA | PORT DETTES FINANCIER EUR-BC | |
| IVA BD OPPPRINTS EUR-EUR B | PORTFOLIO LCR ALLOCATION-C D | |
| JPM EUR GOV SH DUR-A ACC E | PORTFOLIO LCR CREDIT-C D | |
| K 125 | PORTFOLIO LCR GOV | |
| K 5 | POSTBANK EURORENT | |
| K 66 FUND | PROMEPAR ABSOLUTE RETURN-C | |
| KCM KATHREIN PFANDBRIEF +-RT | PROMEPAR OBLI COURT TERME | |
| KEPLER REALZINS PL RENTEN-A | PUBLITOP-TREASURY-I | |
| KEREN CORPORATE-R | QUILVEST BONDS EURO S.TERM-C | |
| KUTXABANK RENTA FIJA PP | QUILVEST CASH EQUIVALENT-I | |
| KUTXABANK RF CORTO FI | QUILVEST CREDIT SUB-I | |
| KUTXABANK RF EMPRESAS FI | R 263-FONDS | |
| LA FRANC OBJECT TP | R+P RENDITE PLUS UI | |
| LA FRANCAISE OBLIG CAR IMP-D | R-2012 SPEZIAL-T | |
| LA FRANCAISE SUB DEBT-C | RAIFFEISEN-EU-SPEZIA-RENT-A | |
| LABORAL KUTXA RF GAR XIX FI | RAINBOW FUND XV | |
| LABORAL KUTXA RF GRTZ XX FI | RAINBOW FUND XVI | |
| LACTALIS OBLIGATIONS-CLS | R-CO 4CH NT ZERO CRD EURO-CT | |
| LAM-EURO-CORPORATES-UNIVERSA | R-CO CONV CREDIT EURO-C EUR | |
| LAZARD EUR SHORT DURATION-IC | REGARD CREDIT EURO IG 1-3 | |
| LAZARD LOW DELTA 12 MOIS | REGARD CREDIT EURO IG 5-7 | |
| LAZARD VARIABLE FI | REGARD GREEN BONDS-H | |
| LBW UNTERNEHMENSAN EURO SEL | REGARD OBLIG PRIVEES ISR-H | |
| LBP ISR OBLI CREDIT | REGARD OBLIGATIONS | |
| LBPAM ISR OBLI CREDIT-E | RENDITDEKA-CF | |
| LBPAM OBLI COURT TERME-C | RENTA 4 RENTA FIJA EURO | |
| LBPAM OBLI EUROPE C | | |

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