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# Policy brief

## The climate impact of quantitative easing



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### Headline issue

- Climate change and the low-carbon transition have deep implications for the macro financial system.
- Central banks' quantitative easing corporate bond purchasing programmes appear skewed towards high-carbon sectors.
- Central banks should consider how the low-carbon transition may affect, and be affected by, their day-to-day operations.

### Summary

**Utilities, the most carbon-intensive sector by emissions, make up the largest share of purchases for the European Central Bank and Bank of England.** This partially reflects the make-up of the European and UK corporate bond markets, and especially the eligibility criteria of the purchase programmes.

**This carbon-intensive skew raises concerns of disproportionately increasing prices of assets purchased under quantitative easing and encouraging additional debt issuance in high-carbon relative to low-carbon sectors.** The purchase of such assets is in direct contradiction with, and may undermine, the signals that financial regulators are making about the risks associated with high-carbon investments.

**As a result, central banks should:** increase transparency around the purchases and selection process; investigate the impact of their interventions on high- and low-carbon investment; consider options for changing purchasing strategies; and communicate and coordinate with fiscal policymakers and financial regulators.

**Policy briefs** provide analysis on topical issues, presenting specific recommendations to inform ongoing policy debates. Drawing on the Grantham Research Institute's expertise, they either summarise our research findings or the state of knowledge about a particular issue.

This policy brief has been written by **Sini Matikainen, Emanuele Campiglio and Dimitri Zenghelis**. It is based on a longer report available at [www.lse.ac.uk/GranthamInstitute/publications](http://www.lse.ac.uk/GranthamInstitute/publications)

## Central banks and climate change-related financial risks

Climate change-related risks to financial stability have been increasingly acknowledged in recent years by central banks and financial regulators. Both climate change and the low-carbon transition are likely to have deep implications for the functioning and stability of the macro financial system (Carney, 2015).

Meeting the objectives of the Paris Agreement will leave a large proportion of fossil fuels in the ground. This could affect the asset prices of the firms involved in production, but also firms investing in physical and infrastructure capital based on fossil fuel resources (e.g. electricity production, transport, heat, and industrial processes). Firms may also face litigation risk for climate change damages, impacting valuations (Covington et al., 2016).

In addition to the transition risk associated with a shift to low-carbon production, climate-related damages risk impacting the productive structure of the global economy, with potential deep impacts on the insurance system in particular.

### A twofold response in high-income countries

Central banks and financial authorities have responded by:

- Stressing the importance of transparent information on emissions and a standardised method to disclose them

### Key terms

**Asset-backed security** — A debt security based on relatively illiquid underlying assets, such as car loans, that are pooled together.

**Covered bonds** — Debt securities backed by underlying collateral, usually mortgages or public sector debt, that investors have recourse to in case of default.

**Green bonds** — Bonds whose proceeds are used to fund environmental or climate-related projects.

**Quantitative easing** — A central bank asset purchasing programme to stimulate inflation and, thus, economic growth.

— for example, see the recommendations of the Task Force for Climate-Related Financial Disclosures (2017).

- Discussing dedicated climate stress-tests, to better assess the extent of the risk.

### How neutral are central bank interventions?

Central banks have argued that a more direct intervention to support the low-carbon transition would be outside their remit, which in the case of the ECB and Bank of England focuses on price stability.

Politicians and think tanks such as the Green Party and New Economics Foundation have discussed how to deploy **quantitative easing** (QE) more strategically to promote sustainable economic growth, or to target low-carbon sectors. However, the official positions of the Bank of England and European Central Bank (ECB) are to aim for sector neutrality and to avoid market distortions.

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“Central banks have often argued that environmental sustainability and direct intervention on the low-carbon transition lie outside their remit”

Yet evidence suggests that both current and past central bank interventions have had non-neutral effects on the economy and financial sector — impacts that the mandates of both the ECB and Bank of England suggest that they should, in fact, be considering.

### The sectoral effects of quantitative easing

In theory, QE is meant to act as a lever operating on the economy as a whole (see box). Purchases under QE increase the price of the assets purchased, which results in investors rebalancing their portfolios by buying other, relatively cheaper assets, which would theoretically result in price increases across the board.

In practice, QE may have unintended effects because

financial markets do not work perfectly. For example, some investors may have a strong preference for certain types of assets (such as low-risk bonds), which makes them reluctant to rebalance their portfolios by buying riskier assets (Joyce et al., 2015). Generally, the pass-through to other asset classes and productive investment is unclear (Joyce et al., 2010; Ryan-Collins, 2013), and the overall effectiveness in terms of macroeconomic growth difficult to measure (Gros et al., 2015).

The latest rounds of QE from the ECB and Bank of England, which have both expanded their reach to include corporate bonds, seem to support findings of a variable effect for the assets being purchased under QE. For bonds eligible for ECB purchase,



The mandates of both the European Central Bank (pictured) and the Bank of England suggest that they should be considering the non-neutral effects their interventions have had on the economy and financial sector. Photo: Pixabay

### Quantitative easing in summary

**What?** QE operations consist of the concurrent purchase of financial assets and creation of a proportional amount of central bank reserves, where reserves are accounts that commercial banks hold at the central bank and use to settle inter-bank transactions. The central bank autonomously expands its own balance sheet, purchasing assets on secondary markets, employing newly created money, while putting new reserves at the disposal of private banks.

**When?** After cutting reference interest rates to levels close to or lower than zero following the 2007 financial crisis and subsequent economic stagnation, a large number of central banking institutions launched substantial QE programmes to purchase financial assets that, depending on the country, may include public sector (sovereign or supranational) bonds, asset-backed securities, covered bonds, corporate bonds, or equities.

**Why?** QE programmes aim to reduce financing costs, encourage bank lending, stimulate private spending, achieve a stable rate of inflation around a pre-announced target, and revive growth.

yield spreads widened after the announcement in March 2016 and for those bought since June of that year, showing both a lower cost of borrowing for the entire class of eligible bonds and for purchased bonds compared to ineligible and unpurchased bonds (Keohane, 2016).

Following the announcement of the Bank of England's Corporate Bond Purchase Programme, bonds that were eligible for purchase outperformed their ineligible counterparts, and yields dropped to record lows (Lewin, 2016). Corporate bond issuance by firms eligible for purchase (that is, investment-grade non-financial firms) also increased significantly (Haldane et al., 2016).

### **Environmental implications of the choice of asset class**

While the intention is to use asset purchases as a lever to stimulate growth overall, the transmission channels work imperfectly, with relatively more benefit for the assets being purchased relative to other assets. This suggests that the overall effect is not neutral, and the choice of asset and asset class has an impact. Both the ECB and the Bank of England seem to be aiming for 'neutrality' in the sense of avoiding market distortions, but the choice of instrument – bonds rather than equities, covered bonds and asset-backed securities – itself has an impact. For example, the decision to purchase corporate bonds over stocks could favour sectors that rely more heavily on debt rather than equity financing.

Even within an asset class, the action of allocating purchases according to the makeup of the market, or the economy, is a decision to maintain the status quo – and arguably, therefore, is not truly neutral as it does have a selective effect on the larger economy, by supporting industry incumbents and reinforcing existing market distortions compared with the socially-optimal distribution of capital.

Of the available asset classes:

- Public sector purchases leave the decision about the allocation of capital to fiscal authorities
- Equities tied to a benchmark would reflect the emissions intensity of the stock market as a whole
- Covered bonds and asset-backed securities may structurally disadvantage green loans
- Corporate bonds may skew towards high-carbon sectors

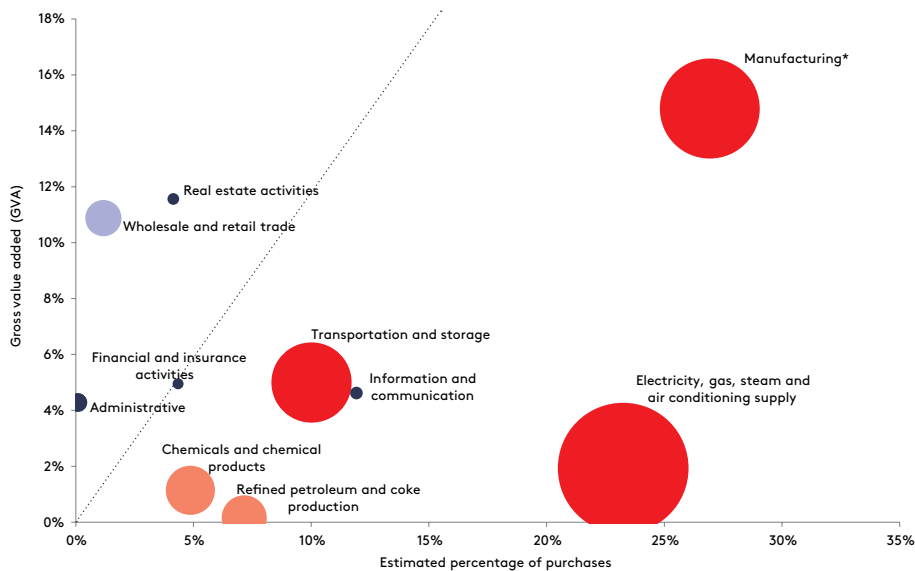
### **Analysis: a high-carbon skew in ECB and Bank of England bond purchases**

The ECB and Bank of England have recently expanded their quantitative easing programmes to include corporate bonds. The sectoral distribution of purchases appears to be inconsistent with the sectoral distribution of the eurozone economy in terms of contribution to gross value added (GVA), and skewed towards sectors characterised by high greenhouse gas emissions.

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“Even within an asset class, the action of allocating purchases according to the makeup of the market, or the economy, is a decision to maintain the status quo”

**Figure 1. ECB Corporate Sector Purchase Programme purchases, contributions to euro-area gross value added (GVA) and to greenhouse gas emissions (carbon dioxide equivalent), by NACE sector**



**Figure notes:** NACE sectors are the statistical classification of economic activities used by Eurostat for national accounting purposes in the European Community. Size of the bubble indicates relative contribution to emissions in euro-area countries. Colours are indicative of the more (red) and less (blue) carbon-intensive sectors. \*The manufacturing category excludes petroleum and chemical production, which are listed separately. For ease of viewing, only the sectors with more than 1% of estimated purchases are shown and the names of some sector categories have been appended; see Appendix 2 in our longer report (Matikainen et al., 2017) for full list. **Sources:** ECB (international securities identification numbers [ISINs] as of February 2017), Bloomberg (NACE categories, 2017), Eurostat (emissions and GVA data, as of 2013), and authors' calculations.

Calculations made using publicly available information indicate that 62.1% of ECB corporate bond purchases take place in the sectors of manufacturing and electricity and gas production, which alone are responsible for 58.5% of eurozone greenhouse gas emissions, but only 18% of GVA (Figure 1). For the Bank of England, manufacturing and electricity production – responsible for 52% of UK emissions – make up 49.2% of the eligible benchmark, but only 11.8% of GVA (Figure 2). Utilities, the most carbon-intensive sector by emissions, also make up the largest share of purchases for both the ECB and Bank of England.

Renewable energy companies, already a relatively small portion of the bond market to begin with, are not represented at all in ECB or Bank of England purchases,

while oil and gas companies make up an estimated 8.4% and 1.8% of their portfolios, respectively. This partly reflects the makeup of the European bond market, and particularly the universe of bonds that meet the eligibility criteria of the programme.

The purchases reflect the nature of financial markets, where externalities and future responses to them arguably are not adequately priced in and capital is sub-optimally allocated to large, carbon-intensive incumbents.

The carbon-intensive skew of these purchases raises concerns of disproportionately increasing prices of purchased bonds and encouraging additional debt issuance in high-carbon relative to low-carbon sectors. This could be exposing the financial system to higher transition-related risks

“Sectoral analysis of the ECB’s and Bank of England’s corporate bond purchase programmes suggests a skew towards high-carbon sectors”

**Figure 2. Bank of England corporate bond purchase programme benchmark, gross value added (GVA) and greenhouse gas emissions (carbon dioxide equivalent), by NACE sector**

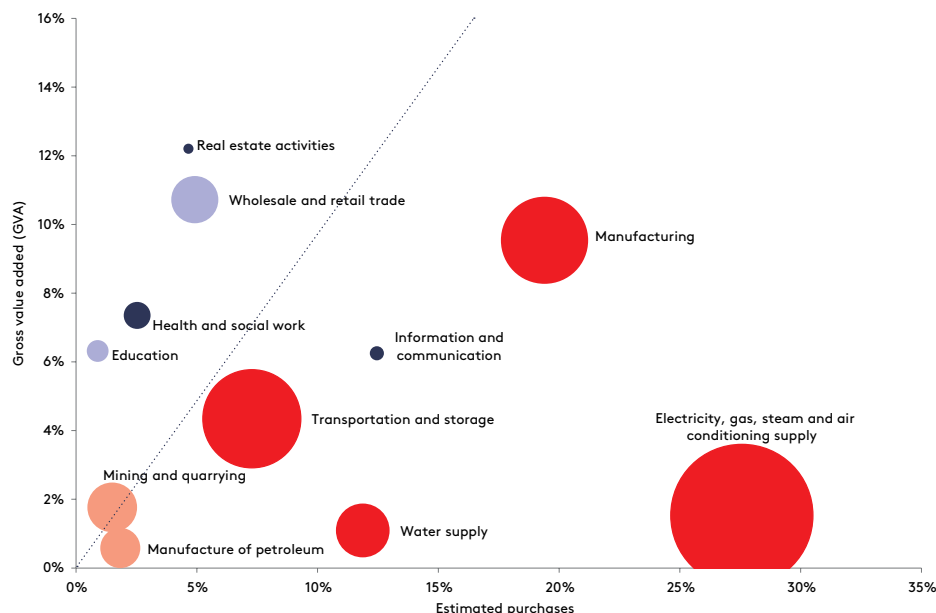


Figure notes: NACE sectors are the statistical classification of economic activities used by Eurostat for national accounting purposes in the European Community. Size of bubble indicates relative contribution to emissions in the UK. Colours are indicative of the more (red) and less (blue) carbon-intensive sectors. \*The manufacturing category excludes petroleum and chemical production, which are listed separately. For ease of viewing, only the sectors with more than 1% of estimated purchases are shown and the names of some sector categories have been appended. See Appendix 2 in our longer report (Matikainen et al., 2017) for a full list of sector categories. Sources: Bank of England (international securities identification numbers [ISINs] as of February 2017), Bloomberg (NACE categories, as of 2017), Eurostat (emissions and GVA data, 2013), and authors' calculations.

in the future and could undermine the signal that central banks are trying to send about how seriously they take climate risk.

### Under-representation of low-carbon assets

Neither the ECB nor the Bank of England has purchased any bonds from renewable energy issuers. The dearth of green assets in the two banks' corporate bond purchase programmes suggests not a deliberate attempt to exclude them but rather that much of green investment is taking place through funding structures other than corporate bonds.

However, low-carbon bond issuance is expected to increase over the next 10 years in particular, so possible institutional barriers to low-carbon investment are worth considering in more detail.

### Conclusions

High-carbon sectors might benefit relatively more than low-carbon sectors from lowered financing costs, and the purchases of assets might contribute to **mispricing** in high-carbon sectors such as oil and gas.

Central banks undertaking asset purchase programmes that reflect the existing state of the market may be unintentionally reinforcing the status quo, in which **low-carbon investments suffer from a 'green investment gap'** relative to the socially optimal scenario consistent with limiting warming to 1.5–2°C above pre-industrial levels. While monetary policy cannot substitute for environmental or fiscal policy, central banks and supervisory authorities should make sure their efforts are aligned. Delaying

“Delaying the transition to a low-carbon economy risks a ‘hard landing’: both heavy transition costs and physical costs”



the transition to a low-carbon economy risks the worst of both worlds: what the European Systemic Risk Board (2016) terms a ‘hard landing’ involving both heavy transition costs and physical costs.

## Recommendations

### 1. The European Central Bank and Bank of England should increase the transparency of the purchases and selection process

- Central banks should **disclose how climate change risk is accounted for and incorporated into their decision-making**, setting a good example for the private sector by mirroring the 2016 recommendations of the Financial Stability Board’s Task Force on Climate-related Financial Disclosures. The ECB and Bank of England could offer additional detail on how they select assets for eligibility and whether or not they take into account climate-related risks, to include climate damages as well as transition risks.

### 2. Central banks should investigate the impact of their interventions on both high- and low-carbon investment

- The ECB and Bank of England should initiate reviews on the **material impact of monetary policy**. In addition to ongoing research on how monetary policy and financial stability are affected by climate change, this could look at what impact monetary policy is having on the transition itself.

### 3. The European Central Bank and Bank of England could consider options for changing their purchasing strategies

- The ECB and Bank of England could consider **revising eligibility criteria**, to take a more proactive approach to climate risk: for example, by deeming firms ineligible if credit ratings agencies disagree on investment grade status or have the issuers on credit downgrade watch, or by conducting their own internal risk analysis, to take into account that climate change risk is only beginning to be incorporated into credit ratings.
- Monetary policy could be used more effectively to **support long-term sustainable growth**, for example by purchasing ‘green’ bonds issued by development banks (such as the European Investment Bank). However, there are currently constraints on the execution of such a strategy, for both the development banks that would be issuing the bonds and the central banks that would be purchasing them.

### 4. Central banks should communicate and coordinate with fiscal policymakers and financial regulators

- Working in concert with other public institutions will enable central banks to harmonise the overall policy effort aimed at achieving a rapid and smooth transition to a low-carbon economy. The mandates of both



The European Investment Bank, headquartered in Luxembourg (pictured), could use targeted policy measures to increase the credit ratings of renewable energy bonds. Photo: EIB

the ECB and Bank of England state that the operation of monetary policy should **support the general economic policies of their respective governments**, including broad-based economic growth.

- Bonds from renewable energy companies and other emerging technologies may face barriers to eligibility under the **collateral framework**. The intervention of other institutions may be necessary, for example the European Investment Bank could use targeted policy measures to increase the credit ratings of renewable energy bonds.
- If current central bank interventions contribute to asset mispricing in high-carbon sectors, **financial regulators may want to focus on differentiating prudential regulations** across sectors and promoting disclosure as part of a wider effort to account for the potential financial stability risks associated with the transition to a low-carbon economy.

Central banks should consider how their day-to-day operations affect and are affected by climate change transition risk.

By **mainstreaming climate considerations**, they would send a clear signal that climate change is not a niche environmental issue: that the risk associated with *not* managing this transition is significant enough to merit serious consideration.

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## References

- Carney M (2015)** Breaking the Tragedy of the Horizon—climate change and financial stability. Speech to Lloyd's of London, Sept
- Covington H, Thornton J, Hepburn C (2016)** Global warming: Shareholders must vote for climate-change mitigation. *Nature* 530, 156
- European Systemic Risk Board (2016)** *Too late, too sudden - Transition to a low-carbon economy and systemic risk*. Frankfurt: European Systemic Risk Board
- Ganley J, Salmon C (1997)** *The industrial impact of monetary policy shocks: some stylised facts*. Bank of England Working Paper 68
- Gros D, Alcidi C, De Groen WP (2015)** *Lessons from Quantitative Easing: Much ado about so little?* Brussels: Centre for European Policy Studies
- Haldane A, Roberts-Sklar M, Wieladek T, Young C (2016)** *QE: the story so far*. Staff Working Paper 624. London: Bank of England
- Joyce M, Lasaosa A, Stevens I, Tong M (2010)** *The financial market impact of quantitative easing*. Bank of England Working Paper 393. London: Bank of England
- Joyce M, Liu Z, Tonks I (2015)** *Institutional investor investment behaviour during the Crisis and the portfolio balance effect of QE*. VoxEU.org, 3 January
- Keohane D (2016)** It feels good to be CSPP'd. *Financial Times*, 20 July
- Matikainen S, Campiglio E, Zenghelis D (2017)** *The climate impact of quantitative easing: policy paper*. London: Grantham Research Institute on Climate Change and the Environment
- Ryan-Collins J (2013)** *Strategic quantitative easing*. London: New Economics Foundation
- Task Force on Climate-related Financial Disclosures (2016)** *Recommendations of the Task Force on Climate-related Financial Disclosures*. London: TCFD
- United Nations Environment Programme (2015)** *The Financial System We Need*. Nairobi: UNEP

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### About the authors and acknowledgements

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