Distributional Income Effects of Banking Regulation in Europe*

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Abstract

We study the impact of stricter and more harmonized banking regulation along the income distribution using household survey data for 25 EU countries. Exploiting country-level heterogeneity in the implementation of European Banking Union directives allows us to control for confounders and identify effects. Our results show that these regulatory reforms aimed at increasing financial system resilience affected households heterogeneously. More stringent regulation reduces income growth for low-income households due to employment exits. Yet it tends to increase growth rates at the top of the distribution both for employee and self-employed income.

Keywords: Financial Regulation; Distributional Effects; Income Inequality; EU-SILC Microdata

JEL Classification: G21; G28; D31; G50

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1 Introduction

The sustainability of economic unions such as the European Union (EU) or currency unions like the euro area depends on similar economic growth paths, non-excessive debt levels, and limited dispersion in the income distribution across countries. Financial crises pose a threat in that respect, as they tend to result in deep and prolonged recessions (Reinhart and Rogoff, 2009; Pereira da Silva et al., 2022) that unfold heterogeneously across countries and private households.

The re-regulation of the financial system over the last decade intended to decrease systemic vulnerability, reduce excessive risk-taking by financial intermediaries and thus prevent adverse effects of financial crises on the real sector and individuals. A key element in achieving this objective of a more stable financial system in Europe was the introduction of harmonized and more stringent capital and liquidity requirements, a resolution framework for distressed banks, and more similar deposit guarantee schemes. An increasing range of studies looks at the first-order effects of these regulatory changes on banking system stability or lending sensitivities and spillovers to corporate firms (e.g., Cutura, 2021; Degryse et al., 2020; Horváth and Silva Buston, 2022; Koetter et al., 2022a; Fiordelisi and Scardozzi, 2022; Pancotto et al., 2019). However, evidence on the potential spillovers to private households and the consequences for the income distribution is lacking.

We aim to fill this gap and investigate whether more stringent (and harmonized) regulatory policies in the EU affect individuals' income situation heterogeneously along the income distribution. A more comprehensive view of indirect spillovers of regulatory changes in the banking sector to households is crucial from a policy perspective for several reasons. First, as private households are the largest recipients of bank credit in the euro area (Dieckelmann et al., 2022), regulatory changes in the banking sector may directly impact their financial well-being. Furthermore, tighter bank regulation may affect labor or self-employed income through the financing conditions of non-financial firms and entrepreneurs. Even if the banking system has become more stable in the new regulatory environment, it remains unclear

whether banks pass regulatory costs or benefits heterogeneously onto their clients. We hypothesize that while tighter regulation can increase bank stability, it could at the same time provide incentives for banks to lend to a narrower set of less-risky households and firms, thus constraining income growth unequally (Eickmeier et al., 2018; Epure et al., 2018).

The analysis builds on two main data sources. First, the European Union Statistics on Income and Living Conditions (EU-SILC) provides granular survey data covering households and individuals. It contains detailed information on income, education, employment, and other socio-economic and individual characteristics. Our sample covers 25 EU countries over the 2010-2018 period.[1] The database has three essential advantages for analyzing distributional effects in a cross-country setting: Eurostat harmonizes the data at the household-level across EU member states such that we are not bound to data for a single country. Moreover, since the data is longitudinal, we can track households over time and evaluate short-run changes in their income situation. Lastly, European regulation prescribes reporting standards to EU-SILC, which ensures data quality (Wirth and Pforr, 2022).

Second, we rely on the European Banking Union (EBU) directives database assembled by Koetter et al. (2022b). In the EU, regulators had two main objectives when adapting the regulatory framework in response to the revealed flaws during the great financial crisis. First, banks should behave more prudently and bet less on being bailed out by state governments. Second, tightening regulation in one country should not induce regulatory arbitrage. Hence, the EU introduced new rules that all member states are obliged to implement. The database contains the related information on the country-specific transposition dates of the three EU directives harmonizing regulatory standards related to, amongst others, capital buffers (CRD IV), bank resolution (BRRD), and deposit insurance schemes (DGSD).[2] We exploit that there was no uniform implementation date but heterogeneity in the timing of the introduction across countries, which allows for the inclusion of time fixed effects that absorb confounding

[1] We have to exclude Germany and Luxembourg from the full set of EU countries due to data limitations.

[2] The three directives entail the Capital Requirements Directive IV (CRD IV), the Bank Recovery and Resolution Directive (BRRD) and the Deposit Guarantee Scheme Directive (DGSD). More details are provided in Section 3.2.

factors.

Our findings reveal first that more stringent and harmonized regulation of European banks affects the distribution of private households' disposable income in the short run. While income growth declines at the bottom of the distribution, it increases at the top in response to implementing the EBU directives. The income-reducing effect for poor households arises in response to stricter capital requirements. Households in the bottom decile experience about three percentage points lower income growth, on average, after the implementation of the CRD IV. While there is first evidence that households in the top deciles benefit from the new regulatory setting, the effect becomes more pronounced over time when also the BRRD and DGSD are transposed into national law. Households in the top decile see a positive effect on their income growth that also amounts to about three percentage points. Results are robust to changes in the model specification and controlling for the state of the social security system or expansionary monetary policy.

Second, we zoom into our sample of households and analyze for the bottom versus top deciles which of the two main components of disposable household income – *employee* and/or *self-employed* income – is driving the results. We further consider both the extensive and intensive margin adjustments similar to the study by Hubert and Savignac (2023) who assess the effects of monetary policy along the income distribution based on French data. An important upshot is that the poorer households see a decline in their employee income growth due to extensive margin adjustments. The probability of transitioning into unemployment increases following the implementation of the CRD IV. The result is driven by the main earner of a household. We do not find evidence suggesting changes in self-employed income matters for low-income households and our corresponding baseline finding. In contrast, richer households benefit from increased growth in self-employed rather than employee income. Their main earners experience not only a lower probability to exit self-employment (extensive margin) but also extract more income from entrepreneurship (intensive margin). The positive impact of the other two directives (BRRD and DGSD) on the income growth of more affluent

households comes from both employee and self-employed income and is an intensive margin effect. Hence, tighter regulation increasing risk-sensitivities of banks seems to, on impact, spill over to poorer household foremost through a higher unemployment risk while richer households benefit mainly via the intensive margin.

Third, we investigate whether heterogeneity in the ex-ante regulatory stance across countries plays a relevant role in explaining our results. For example, banks in countries with tighter capital regulation before the implementation of the CRD IV are likely to find the transition easier. This might put less pressure on them to constrain credit to cope with stricter capital requirements. We show that the income-reducing effect of tighter capital regulation on poor households is driven by the countries with an ex-ante lower stringency in capital regulation forcing banks to adjust to new rules and build up capital buffers disproportionately compared to other countries. In contrast, we observe that the positive income growth effect for richer households is mostly prevalent in banking systems with an ex-ante higher restructuring power and more tools to mitigate moral hazard from deposit insurance before the BRRD and DGSD implementation, respectively. These results imply that the intensity of the regulatory changes in the banking system matters for the spillover effects to households.

We contribute to three main strands of literature. First, we add to the micro data-based literature on the distributional effects of monetary policy. Amberg et al. (2022) and Andersen et al. (2022) use register data at the individual level for Sweden and Denmark, respectively, to assess the distributional effects of expansionary monetary policy shocks. The results turn out to differ across countries, a conclusion in line with Colciago et al. (2019). While Andersen et al. (2022) detect gains to increase monotonically based on the ex-ante income level for Denmark, Amberg et al. (2022) and Hubert and Savignac (2023) find a U-shaped effect of expansionary monetary policy shocks on income in Sweden and labor income in France, respectively. The latter result is driven by a lower transition probability into unemployment for the bottom (extensive margin) but higher labor income at the top of the distribution

(intensive margin).[3] We find that similar to changes in monetary policy, regulatory changes can feed back to the real sector and affect income inequality. Thus, we build on this literature but aim to provide novel evidence on the distributional effects of banking sector regulation. Drawing on the rarely used EU-SILC micro-level data allows us to study this link from a European perspective.

Second, several papers analyze the impact of financial development or liberalization of different segments of financial markets on inequality (Brei et al., 2018; De Haan and Sturm, 2017; Hasan et al., 2021). In a cross-country setting, Delis et al. (2014) find banking sector liberalization decreases inequality while the deregulation of securities markets has the opposite effect. Li and Su (2021) detect that income inequality rises once capital accounts are liberalized, especially for inward and equity capital flows (see also Furceri and Loungani (2018)). We add to this literature by assessing the related effects of a harmonized and more stringent regulatory environment within the perimeters of the EU. Our results suggest that moving away from deregulation benefits especially the median to top income households.

Third, this paper adds to the literature on the implications of macroprudential regulation for inequality and access to credit (e.g., Epure et al., 2018). Macroprudential measures are policy tools targeting banks or customers to maintain systemic stability and the EBU directives contain instruments in this vein. Instruments such as counter-cyclical capital buffers or loan-to-value ratios have gained relevance in advanced economies (Cerutti et al., 2017), and prudential policies such as systemic capital surcharges are part of the banking union directives. Frost and van Stralen (2018) assess the effect of different types of macroprudential policies on Gini coefficients in a cross-country setting and mostly find a positive association. They state that, on the one hand, macroprudential policies might stabilize the financial system in the longer run and have beneficial effects on inequality by avoiding downturns

[3]The role of monetary policy shocks for inequality has been assessed at the macroeconomic level by, e.g., Furceri et al. (2018). Mumtaz and Theophilopoulou (2017) use UK survey data to construct inequality measures and find that contractionary shocks affect low-income households most negatively. Based on survey data, Coibion et al. (2017) provide evidence for contractionary shocks to increase income inequality in the US. Moser et al. (2021) study negative interest rates and earnings inequality in Germany by linking data on firms, banks, and employees, whereas Jasova et al. (2021) conduct a similar linking exercise for Portugal.

in which some suffer more than others. On the other hand, policies like loan-to-value limits could restrict mortgage access, preventing poorer households from becoming homeowners and, thereby, from generating additional income by, for example, using the house as collateral to start an enterprise.[4] We complement these findings by providing evidence on distributional income effects.

2 Bank regulation and household income - potential channels

Before discussing different mechanisms through which tighter banking regulation can affect income inequality, we summarize key findings on how banks react to regulatory changes. A major focus of related studies has been on tighter capital requirements, e.g., due to Basel III or the EBU, as well as prudential instruments like loan-to-value ratios. As intended, the evidence shows that banks' capital ratios increase in response to stricter requirements, and banks more affected by tighter regulatory standards respond by decreasing lending (Corbae and D'Erasmo, 2021; Favara et al., 2021; Gropp et al., 2019). A contractionary effect on lending to firms and households also prevails when considering the tightening of macroprudential policies (Cerutti et al., 2017; Epure et al., 2018). Such policy changes are often transmitted through higher loan rates that slow credit growth (Zhang and Tressel, 2017; Juelsrud and Wold, 2020).

A common finding is also that the riskier entities tend to be more constrained in their access to capital (De Jonghe et al., 2020; Degryse et al., 2020; Epure et al., 2018; Koetter et al., 2022a). For example, the results by Epure et al. (2018) reveal that riskier household loans decline following a tightening of macroprudential policies in a low volatility environment. Koetter et al. (2022a) find that the national implementation of the BRRD increased funding

[4]Based on data for Ireland and the UK, Acharya et al. (2022) and Peydró et al. (2020) find that the introduction of household leverage limits redirects credit from lower- to higher-income households. Changes in access to housing could also have consequences for household wealth as emphasized by Carpantier et al. (2018).

costs for banks and resulted in relatively lower credit provision especially for more indebted and less profitable firms.

These documented changes in corporate lending can have real effects in terms of firm investment and employment. According to Degryse et al. (2020), risky firms depending on credit from global systemically important banks (GSIB) experienced lower investment and asset growth versus firms receiving loans from less-strictly regulated large banks. Ampudia et al. (2021) show that firms that receive credit from banks that moved under the supervision of the SSM reduced investment in risky projects and invested more in collateralizable assets, while investment in intangible assets declined. At the same time, there is some evidence for positive effects on long-term employment. In contrast, Juelsrud and Wold (2020) and Fraisse et al. (2020) find that reduced corporate lending in response to stricter capital requirements lowers firms' employment growth. Similarly, the results from Berton et al. (2018) and Moser et al. (2021) reveal that risky firms lay off workers in response to higher regulatory costs that lenders pass through.

Employment income channel

Considering the mixed evidence on employment effects, it is a priori unclear how regulatory tightening affects the level and distribution of employee income. When testing the *employment income channel*, we hypothesize that two effects can be at work. On the one hand, regulatory changes can affect the external financing conditions for firms, thereby influencing the relative demand for capital and labor. If external financing conditions tighten, firms may substitute labor for capital, and demand for lower-income workers as well as related wages may increase. On the other hand, tighter financing conditions after the global financial crisis resulted in a "jobless recovery" with firms substituting capital for labor, e.g., to increase collateralizable assets. Additionally, if firms finance labor with debt, employment and wages may decline in response to higher lending rates. Depending on the resulting changes in firms' labor demand and potential changes in the relative need for skilled and unskilled work, *employee income* can be affected heterogeneously by a regulatory tightening.

Entrepreneurial activity channel

Besides the indirect labor demand effects of banking regulation on household income, regulatory tightening can more directly affect income from entrepreneurship. Such effects might be relevant as income from self-employment constitutes another important share in households' disposable income (Figure 1). Consequently, we also consider the *entrepreneurial activity channel*. Lower access to finance, especially for the more risky borrowers with low collateral, may curb entrepreneurship and, hence, *self-employed income* (Popov, 2018).

3 Data

3.1 EU-SILC survey data

Our primary database to analyze income developments is the European Union Statistics on Income and Living Conditions (EU-SILC) database, which is an annual representative survey that covers all EU member states. It provides granular survey data on households' and individuals' income situation and their characteristics, such as gender, age, and education. The data is collected by member states' national statistical offices (NSOs) and subsequently cleaned, processed, and harmonized by Eurostat. EU-SILC features a rotational survey design, for which we provide more details in the Online Appendix, and each household is at least surveyed for four consecutive years.

3.1.1 Sample description

Sample: We set our sample period to 2010-2018. That ensures that neither the aftermath of the financial crisis nor the start of the pandemic drives our results. We exclude Germany from our sample as data is only available from 2014 onwards, i.e., information for the period before the regulatory changes started is missing. Furthermore, we exclude Luxembourg as it features a static sample without rotation and has a very dominant and particular banking sector. This approach results in a reasonably balanced sample. The only remaining exception

is Slovakia, for which we do not observe data for 2018. Despite survey participation being voluntary, attrition is limited. Iacovou and Lynn (2017) report re-interview rates ranging between 75 and 98% for 2003 to 2010.[5] That is consistent with our sample in which 80% of households report at least three out of four years.[6]

Variables: Our analysis mainly focuses on household income and the two subcomponents labor and self-employed income. Therefore, we follow Amberg et al. (2022) and focus on the working population in our sample. To that end, we drop households consisting exclusively of individuals younger than 25 or older than 65. We start our analysis at the household-level and aggregate the income components that are only available at the individual level, i.e., employee and self-employed income, across all household members. We complement the data set with households' and individuals' characteristics. At the household-level, we keep information on size and whether a household member owns the accommodation. At the individual level, we include information on gender, age, work experience, and education level. Table A1 in the Online Appendix contains more detailed information on the variable definitions.

Data cleaning: After careful consideration and consultations with Eurostat, we perform some data cleaning steps to account for reporting errors. First, while self-employed income can turn negative, this seems implausible for labor income. Thus, we assign missing values to the variable measuring employee income if it is negative. Second, we exclude individuals with changing sex or birth year as this should represent reporting errors in most cases. Third, we account for outliers and potential misreporting. For the variables measuring the household's size, the number of hours an individual works per week, and the number of years spent in paid work, we set extreme values above and below the one-percent level to missing. Further, we set the education status to missing if it decreases with respect to the previous year. Years

[5]For additional details on country- and year-specific attrition rates, please refer to the respective national quality reports provided by Eurostat: `https://ec.europa.eu/eurostat/web/income-and-living-conditions/quality/eu-and-national-quality-reports`

[6]We also checked attrition rates by deciles of the disposable income distribution and did not find significant differences in attrition rates for poorer versus richer households.

of work experience are set to missing if they decrease or increase by more than two years.

3.1.2 Growth rates and deciles of the income distribution

We are interested in changes in households' *disposable income* growth along the income distribution and in response to the introduction of tighter regulation. Disposable income is defined as total income of all household members including social transfers but minus taxes and social insurance contributions.[7] We aim to estimate the heterogeneous impact of a specific banking regulation's implementation on the income growth of households belonging to different income groups. To that end, we need to define a household's placement in the income distribution and calculate household income growth rates.

We proceed as follows: In a first step, we derive country-specific income deciles to place households accordingly. We calculate the average disposable income for each household with at least three observations before the national implementation of a regulatory measure. Based on the distributions of the computed average incomes, we define regulation-specific income group deciles for each country. That yields time-invariant sets of deciles for each country and regulatory measure. We then assign households and individuals to deciles based on their first reported disposable household income and keep this assignment constant over the entire estimation period and also when analyzing income subcomponents.[8]

To validate the computation of income deciles, we provide summary statistics along the income distribution and check whether the deciles based on disposable income are consistent with mean values of the income components and characteristics well-known to be correlated with the income level. Tables A2 and A3 present the mean values for disposable household income and income subcomponents for households and individuals across the decile groups constructed with respect to the country-specific timing of the CRD IV implementation. The tables also show decile-group averages for household and individual characteristics regarding demographics, level of education, labor force status, and labor market variables. Table A2

[7] In the analysis, we also consider effects on total household income and income subcomponents.

[8] Figure A1 in the Online Appendix illustrates the procedure.

shows that the top 10% households in terms of disposable income also have the highest mean values for employee and self-employed income. Furthermore, households that have higher incomes are more likely to be larger and own their accommodation. The summary statistics at the individual level in Table A3 are in line with expectations along the age, sex, and educational attainment dimensions. For example, the percentage of individuals with a university degree increases with households' position in the income distribution. The share of employed is rising as well along the income distribution.

In a second step, we calculate one-year growth rates for the disposable income of households, i.e., $\Delta Y_{i,t} = \frac{Y_{i,t}-Y_{i,t-1}}{Y_{i,t-1}}$, where $Y_{i,t}$ is disposable income (total household income plus social transfers and minus taxes, inter-household cash transfer, and social insurance contributions in Euros) of household i in year t. We further specify the change in an income subcomponent $Y^c_{i,t}$ relative to the household's disposable income in the preceding period $Y_{i,t-1}$, that is $\Delta Y^c_{i,t} = \frac{Y^c_{i,t}-Y^c_{i,t-1}}{Y_{i,t-1}}$.[9] That allows us to analyze which component drives the aggregate result (Amberg et al., 2022; Andersen et al., 2022). To exclude significant outliers we follow (Amberg et al., 2022) and set growth rates above 500% in absolute terms to missing values.

3.1.3 Estimation sample and summary statistics

For the estimation analysis, we only keep household-year observations in our sample for which we can observe our main outcome variable, i.e., the annual growth of disposable household income.[10] We further narrow down the sample and require that we can observe at least two growth rates for households to be included in our baseline sample, which results in a sample size reduction of approximately 10%.

Tables 1 and 2 present the summary statistics for the households included in our baseline regression sample and the individuals being members of these households. The tables include

[9]To ensure that our results are not biased downwards by the fact that some households do not generate employee or self-employed income, we set the growth rates of an income subcomponent to missing if a household reports zero for the level value over two consecutive periods.

[10]By construction, this results in a sample size reduction of at least 25% given that we have a maximum of four observation in level terms per household. We loose an additional 2% due to missing values.

income growth rates in percent and information on household and individual characteristics, whereas detailed variable descriptions can be found in Table A1. Note that growth rates for income subcomponents both at the household and individual levels are scaled relative to disposable household income (see Section 3.1.2). Table 1 shows that employee income has similar mean and median growth values compared to disposable income. A sizable share of households own their accommodation. At the individual level, we can observe an average growth rate for employee income of around three percent (Table 2).[11]

Figure 1 illustrates that labor income constitutes a significant share in total household income. Labor income is particularly important for households with incomes around the median and those with an average working age below 55 (Figure A2, panel (a)). In contrast, income from self-employment constitutes a larger share of total income for households that belong to the bottom and top 10% of the distribution. In lower income groups, it matters most for households with an average age of 35-55. Self-employed income forms equally large shares of total income across age groups in the top decile (Figure A2, panel (b)).

3.2 Regulatory data: European Banking Union directives

Our second key database is the European Banking Union directives database assembled by Koetter et al. (2022a,b). The database contains information on the country-specific transposition dates of the three directives harmonizing regulatory standards across EU member states and underlying the EBU. In the aftermath of the global financial crisis starting in 2007/08, banking sector regulation has changed substantially to reduce risk-taking incentives and systemic risks in the banking system. Within the perimeters of the EU, the idea of establishing a level-playing field by harmonizing regulation in three key areas – capital and liquidity requirements, bank restructuring and resolution, and deposit insurance scheme – across the member states has accompanied the financial stability objective.

To this end, the European Commission (EC) agreed on three directives, i.e., the Cap-

[11] Table A4 in the Online Appendix presents means and standard deviations of income growth rates along the income distribution.

ital Requirements Directive IV (CRD IV, Directive 2013/36/EU), the Bank Recovery and Resolution Directive (BRRD, Directive 2014/59/EU), and the Deposit Guarantee Schemes Directive (DGSD, Directive 2014/49/EU). As of 26 June 2013, the CRD IV stipulates that banks must hold precautionary and counter-cyclical capital buffers. It also introduced liquidity requirements as well as a cap on leverage. To reduce bailout expectations and make banks behave more prudently, the BRRD dated 15 May 2014 sets clear rules for the resolution and the restructuring of banks being systemically relevant and likely to fail. Most importantly, banks are subject to a bail-in of losses amounting to 8% of total liabilities before they can access restructuring and resolution funds. Finally, the DGSD issued by the EC on 16 April 2014 harmonizes rules for deposit insurance. Deposit insurance must protect deposits of up to 100,000 Euros per depositor and bank. Furthermore, the DGSD contains rules on repayment deadlines and ex-ante risk-adjusted contributions to the deposit guarantee scheme. Consequently, all three directives aim to establish buffers to absorb future losses and set incentives for banks to internalize the potential implications of excessive risk-taking.

The three directives, together with the Capital Requirements Regulation (CRR), constitute the legal basis of the EBU. All 27 member states have to implement the directives into national law, while the supranational framework of the EBU is only binding for euro area countries. An institutional feature of EU directives is that the EC sets transposition dates, i.e., deadlines for the member states to implement the directives into national law. Figure 2 illustrates the transposition timing. The deadline is 31 December 2013 for the CRD IV, 31 December 2014 for the BRRD and 3 July 2015 for the DGSD. The member states thus have some flexibility regarding the timing.[12] Some countries implement a directive well before the transposition deadline, whereas others wait until the deadline. Some countries significantly delay the implementation process. Table 3 shows that the share of countries implementing a directive after the deadline is relatively high (80%).

We use this heterogeneity in the transposition of directives to identify the effects of regula-

[12]There is also some leeway regarding the legal tool they use to implement the directive contrary to EU regulations.

tory changes on income growth and along the income distribution (Section 4 provides details on the regression method). The analysis by Koetter et al. (2022a) reveals that BRRD implementation is not significantly correlated with ex-ante banking sector health, which reduces concerns of systematic delays depending on the state of domestic banks. We further explore whether there is evidence for a relationship between country-level inequality, measured by Gini coefficients, and the respective country's transposition of the directive into national law. The averaged ex-ante Gini coefficients (average over the years 2010-13) is scattered vis-à-vis the country-specific implementation date (based on the month and the year of the directive transposition). Figure 3 shows in panel a) that no relevant correlation between the two variables can be detected. Panel b) shows that this also holds for quintile ratios.

To match the information on the transposition dates of the EBU directives with our annual household and individual data, we create a set of country- and directive-specific dummy variables. We set the dummy variable for a country to one if the key law implementing a particular directive (i.e., CRD IV, BRRD, or DGSD) has been published in the second half of the previous year or the first half of the current year. Thus, we only consider the treatment to become effective once the implementation has been in place for at least six months.

3.3 Country-level controls

We complement the data set with country-level controls. In our baseline model, we include the annual change in the harmonized consumer price index to capture the impact of inflation. We further add GDP growth to account for time-varying differences in economic development. In robustness tests, we expand the model to additional country-level controls to account for varying degrees of the social welfare state, the impact of expansionary monetary policy and the regulatory stance before directive implementation. Table 4 presents summary statistics for the country-level control variables.

4 Regression method

To analyze whether the implementation of a harmonized and more stringent regulatory setting in the European banking sector has heterogeneous effects along the income distribution, we follow the approach by Amberg et al. (2022), who build on Guvenen et al. (2017) and specify the following regression model:

$$\Delta Y_{i,t} = \sum_{g=1}^{10} \mathbb{1}_{icg}(\alpha_{cg} + \beta_g D_{c,t} + \gamma_g Z_{c,t-1}) + \delta X_{i,t} + \alpha_t + \epsilon_{i,t} \tag{1}$$

The dependent variable $\Delta Y_{i,t}$ measures the one-year growth rate (in %) of the disposable income of household i in year t. To separate differential effects of the regulatory change along the income distribution, we include an indicator variable $\mathbb{1}_{icg}$ that is one in case a household i belongs to an ex-ante defined income decile g in country c and zero otherwise. We assign a household a decile depending on its first observed disposable income. We refer to Section 3.1.2 for more details on the calculations of growth rates and the construction of deciles.

Our key explanatory variable, $D_{c,t}$, is a dummy variable being one if country c has implemented the relevant directive (i.e., CRD IV, BRRD, or DGSD) in year t (i.e., the key law implementing a particular directive has been published for more than six months by the end of the year) and zero otherwise. Thus, the coefficient β_g indicates the average effect (in percentage points) of the regulatory change on income growth rates for income group g across countries. We include income group-specific intercepts for each country defined by α_{cg} to account for time-invariant differences in income dynamics across income groups, which eventually vary by country.

We furthermore control for time-varying confounders at the country level by including a set of macro variables denoted by $Z_{c,t-1}$. We lag these variables by one year to account for sluggish adjustments and to reduce simultaneity issues. By interacting the macro controls with the income group indicator, we account for the possibility that economic developments at the country level affect households with different income levels differently. We also expand

the model by adding household-level control variables $X_{i,t}$ to account for household size and home ownership. Furthermore, we include year fixed effects α_t to absorb global shocks as in Andersen et al. (2022).[13]

The standard errors are two-way clustered at the household and the country-year level. This way, we control for serial correlation within individuals and within-year correlation across individuals in the same country (see also Amberg et al. (2022) and Andersen et al. (2022)).

5 Distributional income effects of tighter banking regulation

We now turn to the discussion of our estimation results. In the first step, we present our findings regarding the implications of tighter banking regulation for the income distribution of private households. Second, we perform some robustness checks. Third, we disaggregate household income into its major subcomponents, labor income and income from self-employment, to gain insights into the potential channels through which the implementation of the directives underlying the EBU affects household incomes differently. Finally, we evaluate whether heterogeneity of our effects prevail depending on the ex-ante regulatory stance across countries.

5.1 Baseline result

Table 5 presents the estimation results for disposable income growth based on equation 1 for the implementation of CRD IV along the income distribution. *Decile 1* groups households with the lowest income while *Decile 10* comprises the most affluent ones. All regressions include decile-country specific intercepts. We sequentially add country- and household-level

[13]We do not include household fixed effects in our baseline model as we only observe a maximum of three observations per household. However, additional tests show that further including household fixed effect does not change our baseline findings qualitatively.

controls as well as year fixed effects.

The results show an increasingly positive effect of harmonized and tightened capital regulation on disposable income growth when moving up the distribution with no significant impact on the poorest households (column 1). However, when controlling for inflation (column 2), that changes: Households in the bottom 10% of the income distribution experience a negative and statistically significant effect of 3.6 percentage points in response to the implementation of CRD IV. Accounting for GDP growth only mildly reduces the size of the parameter estimate (column 3). That is different for more affluent households. When controlling for the time-varying differences in economic development, we no longer find a significant impact of harmonizing capital regulation neither in the middle of the distribution nor at the top 10%. Interestingly, a positive effect of almost 1.5 percentage points for decile nine remains statistically significant. This finding persists when including household controls for household size and the owner-occupier status (column 4) but does not withstand including year fixed effects (column 5). In contrast, our finding for the poorest households proves to be robust with an average 3 percentage points reduction in disposable income growth.[14], [15]

In sum, the estimation results reveal that introducing the first directive underlying the Banking Union resulted in negative income effects for the poorest household. While this leads to more dispersion of incomes in the short run, it might be an intended outcome due to banks behaving more prudently. In the longer run, better functioning and more stable financial markets could still ease access to credit for low-income households (e.g., Hasan et al., 2021). Bridges et al. (2021) find that banking crises have detrimental effects on inequality and point out that refraining from imposing macroprudential regulations that restrict borrowing

[14]For visibility, we only report the coefficients of the interaction between the decile indicators and the directive dummy. It turns out that GDP growth and inflation also have heterogeneous effects along the income distribution. Higher economic growth has significant and positive effects for medium and top income households. Higher inflation rates, in contrast, disproportionately affect income growth negatively for the poorer households. Results can be obtained upon request.

[15]The standard deviation of disposable income growth in the lowest decile is relatively high (Table A4), which might, for example, be driven by a higher fraction of employees with flexible contracts. Unreported tests show that the result for the first decile remains robust when we exclude the five countries with the highest standard deviation in disposable income in the first decile.

choices might not be a solution either.

The results also show that controlling for economic differences and, thus, potential confounders at the country level is crucial. To evaluate the role of the tax system, we also estimate equation 1 with the dependent variable being *total household income* growth, where total household income refers to the sum of all household members' gross personal income components including social transfers and before the deduction of taxes and social insurance contributions. Figure 4 visualizes the dispersion in (a) disposable vs. (b) total income growth in response to the CRD IV transposition. The parameter estimate for the bottom percentile becomes slightly larger for total income growth (see also column 1 vs. 2 of Table A5). This result suggests that the income tax systems across EU countries mitigate the negative impact of more stringent banking regulation for low-income households, yet only to a limited extent. We pick this up again in the robustness tests in Section 5.2 and control for related confounders such as the political ideology of the governing party and minimum wage growth.

Results for each of the three EBU directives (including BRRD and DGSD) are shown in Table 6. Regression results for disposable income growth when accounting for inflation and when including the full set of controls and year fixed effects are provided. The results show an overall pattern of a widening effect on the income distribution. While we only find a significant negative effect on income growth in the bottom decile for CRD IV, the positive impact on disposable income growth of households that are part of the upper deciles expands when BRRD and DGSD become effective. Households above the median see an average increase in disposable income growth of at least 1.7 and up to almost 4 percentage points after harmonizing the rules for bank resolution and deposit insurance. Figure 5 illustrates the distributional effects for disposable (left-hand side) and total (right-hand side) income growth for BRRD (top panel) and DGSD (bottom panel). Columns 3-6 in Table A5 present detailed regression results. In line with the results for CRD IV, our overall findings are more pronounced in size for total household income, which corroborates that the income tax systems absorb part of the effects that widen the income distribution.

Compared to the studies with a similar estimation approach, we find more of a linear (Andersen et al., 2022) than a U-shaped (Amberg et al., 2022) pattern of tighter regulation along the income distribution, whereas the households in the lowest decile are unlikely to see significant positive effects on income growth. While these two studies provide evidence that higher-income groups benefit from *looser* monetary policy, our results suggest that affluent households profit from *tighter* banking regulation. We investigate the underlying income channels for our findings in Section 5.3. Our results are in line with the studies on deregulation (and thus looser policies), which find that financial liberalization reduced inequality (e.g., Delis et al., 2014). We provide evidence for the reversed effect of a more stringent regulatory environment. Moreover, Frost and van Stralen (2018) also find a positive relationship between a tighter regulatory stance and inequality based on aggregate country-level data.

Given that we analyze *immediate* changes in response to the directives, our results are silent about potentially *long-run* distributional income effects of tighter banking regulation. The availability of household-level data spanning only four years limits the scope for longer-term evaluation based on EU-SILC. Studies drawing on household register data of one country and analyzing the effects of one policy instrument, such as loan-to-value ratios, are thus relevant complements to our analysis. We contribute to that area of research by providing a European perspective. Moreover, due to the overlap in the implementation periods for BRRD and DGSD, it is difficult to disentangle the impact of introducing harmonized bank recovery and resolution rules from more similar rules for deposit guarantee schemes. Hence, we interpret our results for BRRD and DGSD as the medium-term effects of a tighter regulatory environment in the EU due to the step-wise harmonization of the three directives. In the following, we focus on the CRD IV implementation, which is least likely to be confounded by anticipatory or distorting effects due to the other directives. To provide a complete view, we report the corresponding results for BRRD and DGSD in the Online Appendix.

5.2 Robustness checks

In this section, we run several alternative regressions to evaluate the robustness of our findings in response to the implementation of CRD IV.[16]

Confounding factors

We first focus on potential confounding events at the macro level and add interactions of the year fixed effects with region dummies. The region dummies indicate whether a country is part of the European Monetary Union (EMU) countries hit most by the sovereign debt crisis (Greece, Italy, Ireland, Portugal, Spain; GIIPS), the remaining countries of the EMU, or the non-EMU countries. Column 2 of Table 7 shows that our baseline findings (column 1) remain robust when controlling for time-varying region-specific confounding factors. Next, we account for the extent of quantitative easing to rule out any bias from omitting the impact these policy measures might have played for income dynamics. In column 3, we add the Public Sector Purchase Program (PSPP) take-up scaled by GDP. We interact these controls (and all other macro-level controls in the subsequent tests) with the income group indicator to account for the fact that these country-level dynamics might impact households heterogeneously along the income distribution. The result confirms our baseline findings.[17] Further, a stronger political willingness to support social and welfare state policies could impact both the income distribution and the implementation of more stringent banking regulation and, thus, lead to an omitted variable bias. Therefore, we test whether cross-country changes in minimum wages (column 4) or a social government (column 5) confound our results, which we find not to be the case. Lastly, we include a dummy for the GIIPS countries in the 2010-13 period to control for the potential impact of the European debt crisis, which does not alter our main finding. Similar to controlling for region-year fixed effects in column 2, the coefficient for the first decile is slightly smaller in absolute terms.

[16] Please see Tables A6 - A9 in the Online Appendix for analogous tests of our BRRD and DGSD results.

[17] In unreported robustness checks, we also find our results to remain robust when controlling for excess reserves in the respective banking system scaled by total MFI assets or the volume of Long Term Refinancing Operations (LTRO) scaled by a country's total assets of monetary financial institutions (MFIs).

Model specification

Next, we scrutinize our model specification. We perform a placebo test and randomly assign countries to introduce a placebo directive in either 2011 or 2012. Then, we estimate our model for 2010-2013, i.e., the period before the first country implemented CRD IV. Column 2 in Table 8 shows vis-à-vis our baseline results in column 1 that the placebo treatments do not produce any statistically significant effects. That substantiates the validity of our empirical strategy. In column 3, we restrict our sample period to 2013-18 to reduce the impact of the sovereign debt crisis in Europe and find the negative impact on households in the bottom 10% of the income distribution to become slightly more pronounced. Despite the fact that the inequality measures based on our constructed household panel data set seem to track well with aggregate benchmarks (see Online Appendix, Figure A3), we re-run our estimation and exclude Denmark, the Netherlands, Romania, and Sweden for which we find the largest absolute deviations of our estimated Gini coefficients from the respective OECD and World Bank aggregates. Column 4 shows that we continue to find an increase in income dispersion. Even though the effect for the first decile is slightly weaker, we see a bigger and more significant positive impact on households in the ninth income group. Finally, we exclude Poland from our regression as it is the only country implementing CRD IV in 2016 (vs. 2014/15 for all other countries), which does not change our results (column 5).

5.3 Employment income versus entrepreneurial activity channel

We now investigate the channels that drive the distributional effects of more stringent regulation in the European banking sector on households' disposable income growth. We exploit the granularity of the data and consider the two most important income sources: *employee income* and *self-employed income*, as Figure 1 illustrates.

We zoom into the lowest and highest income groups we find to be significantly affected by the implementation of a directive. That allows us to evaluate whether different channels are at play for poorer and more affluent households. For the CRD IV, we focus on households in

the bottom decile and the ninth decile, for which we (at least partially) observe significant effects in Table 5.[18]

Our regression model resembles equation 1 but is based on the subsample of households within one specific income group g:

$$\Delta Y_{i,t}^{c} = \beta D_{c,t} + \gamma Z_{c,t-1} + \delta X_{i,t} + \alpha_c + \epsilon_{i,t} \tag{2}$$

The dependent variable $\Delta Y_{i,t}^{c}$ is the change in household-level employee or self-employed income relative to disposable income as specified in Section 3.1.2. As before, $D_{c,t}$ is a dummy variable being one if country c has implemented the relevant directive (i.e., CRD IV, BRRD, or DGSD) for at least six months in year t. We add country-level controls for inflation and GDP growth ($Z_{c,t-1}$) and household-level controls for household size and owner-occupier status ($X_{i,t}$). All regressions contain country fixed effects. Standard errors are two-way clustered at the household and country-year level.

Column 1 in Table 9 presents the results. Panel A shows that less growth in household-level employee income rather than self-employed income (Panel B) drives our negative baseline finding for the bottom decile. In contrast, self-employed income seems to be the channel for the income growth of households in the ninth income group (Panels C and D). Panels C and D of column 1 in Tables A10 and A11 show that both the employee and self-employed income channels matter for our positive baseline finding at the top of the distribution following the BRRD and DGSD implementation.[19]

Next, we analyze whether the effects are driven by the *extensive* or *intensive margin*. To that end, we move to the individual-level and estimate the following model for the members

[18] In addition to the tenth decile, we focus on the sixth and third deciles for BRRD and DGSD, respectively. Columns (4) and (6) of Table 6 show these deciles to be the lowest income groups for which we find statistically significant effects for disposable income growth.

[19] That alleviates concerns that our findings for the top of the distribution is driven by errors from top coding. Recent studies show that differences in top incomes retrieved from tax versus survey data are mainly attributable to non-labor income (Carranza et al., 2023; Yonzan et al., 2022).

of the households included in the specific income groups:

$$\Delta Y^{m}_{j,i,t} = \beta D_{c,t} + \gamma Z_{c,t-1} + \delta X_{i,t} + \theta V_{j,t} + \alpha_c + \epsilon_{j,i,t} \tag{3}$$

For the extensive margin, we consider the household members' change in their (self-)employment status. The dependent variable $\Delta Y^{m}_{j,i,t}$ is minus one in case an individual becomes (self-)employed and plus one if the person transitions out of (self-)employment. No change in the (self-)employment status is indicated by zero. For the intensive margin, $\Delta Y^{m}_{j,i,t}$ is the one-year growth rate (in %) of the respective income subcomponent of household i's member j in year t, if the individual is continuously employed.

We add individual-level controls ($V_{j,t}$) for gender, age, years of work experience, and education (see Table A1 for variable definitions). All other variables are defined as in equation 2. Standard errors are two-way clustered at the individual and country-year level.

Column 2 of Panel A in Table 9 shows that the implementation of CRD IV across EU countries increases the likelihood of the poorest households' members to move from employment into unemployment. The effect is strongest for the main earner of these households (column 3). In contrast, we don't find evidence that the intensive margin plays a relevant role (columns 4 & 5). Moreover, Panel D suggests that there are fewer exits out of entrepreneurship by the household member being the main earner in the ninth income group (column 3). Also, the positive income growth effect is due to the main earner of a household seeing an increase in income growth from self-employment (column 5).

Hence, while dropping out of employment drives the negative effect at the bottom, we find positive dynamics for entrepreneurs at the top of the income distribution. Richer households with more collateral might find it easier to take up credit for their own business, invest, and generate income out of it.

Results for BRRD and DGSD in Tables A10 and A11 show that the very rich households see an intensive margin effect for both employee and self-employed income. Especially the main earners of these households seem to benefit in terms of positive growth effects of their

labor income and income from entrepreneurship. Given the BRRD and DGSD are implemented after the CRD IV, the result suggests that, in the medium-run, richer households face some positive spillovers due to risk-adjusted policies and a more tightly regulated banking sector.

The overall result that dynamics at the bottom are driven by the extensive margin and at the top by the intensive margins fits to recent evidence on monetary policy and income effects by Hubert and Savignac (2023).

The effects of tighter banking regulation on employee income are most likely second round effects, which is similar to effects of monetary policy on this income type (see also Hubert and Savignac (2023)). Tighter regulation resulting in credit constrained banks and higher loan rates affects in a first round non-financial firms before spilling over to the extensive and intensive margin of labor income. In contrast, for self-employed income, first round effects are more likely. For example, constrained access to credit for entrepreneurs with low collateral might fuel exits out of self-employment. These effects can differ depending on the adjustment needs of banks, which in turn can depend on differences in the regulatory tightness prevailing before the implementation of a directive in a country.

5.4 Heterogeneity by treatment intensity of banking regulation

To evaluate whether the ex-ante regulatory stance matters for the effect of prudential policies, we repeat our baseline analysis as defined by equation 1 but define two subsamples. The first subsample has a low (i.e., below the median) degree of regulatory tightness or supervisory power before the directive that harmonizes the regulatory environment is implemented. The second subsample shows a less lenient regulatory stance and contains countries with an above median value in a regulatory tool. We define regulatory stance based on measures for the year 2011 obtained from the World Bank Bank Regulation & Supervision Survey, and focus on capital regulation stringency for the CRD IV, the level of restructuring power for the BRRD and the level of mitigation of moral hazards from deposit insurance for the DGSD.

The heterogeneous role of supervisory power is assessed for all directives.

Results of this exercise for the CRD IV are available in Table 10, and in Tables A12 and A13 for the other two directives.[20] It turns out that the negative income effects for the poor households following CRD IV is going back to countries with a low ex-ante stringency in capital regulation (Table 10, column 2). This result suggests that the need to adjust to the new capital requirements directive had stronger indirect effects on poor households' income growth in countries in which the banking system had ex-ante less stringent capital regulation. In contrast, the positive income effect for more affluent households as a response to the BRRD and DGSD is driven by countries with a tighter regulatory stance or supervisory power (see e.g. column 3 of Table A12 and columns 3 & 5 of Table A13). The result suggest that banks in these countries, coping already with more stringent regulation, were not constrained in such a way that they found themselves forced to cut their exposure to firms from which richer households obtain income or to self-entrepreneurs with higher collateral. We interpret these findings as evidence that the extent of the regulatory change matters for the spillover effects to households.

6 Conclusions and outlook

Since the global financial crisis, an increasing amount of studies has analyzed the implications of newly introduced regulatory measures on bank behavior and the resulting outcomes for firm performance. We instead ask how the income of private households has been affected by the implementation of the EU directives that establish the European Banking Union. Our analysis draws on micro-level information on household income from the EU-SILC over the 2010-2018 period. We exploit variation in regulatory tightening across countries and time to evaluate the short-run effects of tighter bank regulation along the income distribution.

Our results indicate that the income distribution widens in response to a tightening of

[20]Regulatory data is not available for all countries such that the number of observations across the two subsamples does not always sum up to the full sample size. Czech Republic and Sweden drop out, Estonia lacks data on restructuring power and moral hazard mitigation.

European banking regulation - irrespective of whether we consider stricter capital requirements, the introduction of clear rules for banking resolution, or the harmonization of deposit guarantee schemes. A reduction in income growth for the lowest-income households and a stronger income dynamic at the top of the distribution drives the immediate rise in income inequality. The poor experience the most pronounced decrease in income growth in response to stricter capital requirements. Yet, income in the upper part of the distribution increases most after harmonizing and tightening the rules for bank recovery and resolution and deposit guarantee schemes. The income tax system partially acts as a buffer against more severe consequences.

To investigate which income channel is driving the detected income effects, we decompose households' disposable income into the two major income sources: employee and self-employed income. Our results reveal that the negative impact of tighter and harmonized capital regulation on disposable income growth for households in the bottom 10% is driven by extensive margin effects, that is the probability to become unemployed increases. In contrast, the implementation of CRD IV appears to have positive effects on richer households experiencing higher income growth from entrepreneurship. The result hints at easier access to credit for borrowers with more collateral resulting in opportunities to generate entrepreneurial income. The positive impact of tighter regulation on income growth for households above the median appears to be a combination of positive developments in income growth from both employment and entrepreneurial income in response to the BRRD and DGSD implementation.

Our results deliver three main conclusions. First, an evaluation of banking sector policies should include all stakeholders in the economy to understand not only direct effects for banks and firms but also indirect spillovers to households. Second, tighter and harmonized regulation of banks in the EU results in a widening of the income distribution in the short run. We find heterogeneous effects for poorer versus richer households with negative spillovers prevailing for low-income households. Assessing longer-run consequences for income inequality in

future research seems relevant. Third, we deliver indirect evidence that the new regulatory framework imposes pressure on banks to adapt to the risk-adjusted policies. Our effects are driven by the countries with a lower regulatory stringency before the EU-wide policy change.

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7 Tables and Figures

Table 1: Summary statistics for household-level outcomes and characteristics

	Mean	SD	Min	Mdn	Max	Obs.
Outcomes						
Δ Disp. Household Income [%]	7.94	44.84	-497.25	1.99	500.00	710,398
Δ Total Household Income [%]	9.03	51.68	-498.54	2.42	500.00	703,636
Δ Employee Income [%]	6.15	45.60	-487.13	1.82	499.84	567,213
Δ Self-Employed Income [%]	4.46	49.56	-499.83	0.04	499.61	183,004
Characteristics						
Household Size	2.83	1.31	1.00	3.00	7.00	710,398
Owner-Occupier	0.80	0.40	0.00	1.00	1.00	710,398

Note: This table presents summary statistics for household-level variables for the estimation sample. Δ denotes one-year growth rates in percent. Note, growth rates for income subcomponents are scaled relative to disposable household income (see Section 3.1.2 for details). Table A1 of the Online Appendix presents variable definitions.

Table 2: Summary statistics for individual-level outcomes and characteristics

	Mean	SD	Min	Mdn	Max	Obs.
Outcomes						
Δ Employee Income [%]	3.45	31.66	-487.13	0.98	499.84	710,765
Δ Self-Employed Income [%]	3.77	45.27	-498.34	0.05	499.61	172,551
Characteristics						
Demographics						
Male	0.50	0.50	0.00	0.00	1.00	1,124,633
Age	48.30	13.65	16.00	49.00	80.00	1,124,633
Education						
Middle School	0.26	0.44	0.00	0.00	1.00	1,124,633
High School	0.49	0.50	0.00	0.00	1.00	1,124,633
University	0.25	0.44	0.00	0.00	1.00	1,124,633
Labor Market						
Years of Work Experience	22.75	12.83	0.00	23.00	53.00	1,124,633

Note: This table presents summary statistics for individual-level variables for the estimation sample. Δ denotes one-year growth rates in percent. Note, growth rates for income subcomponents are scaled relative to disposable household income (see Section 3.1.2 for details). Table A1 of the Online Appendix presents variable definitions.

Table 3: Summary statistics on implementation delays across directives

	Mean	SD	Min	Max	Obs.
Directive (delay in days)	167.6	179.0	-192.0	582.0	81
Directive (delay 0/1)	0.8	0.4	0.0	1.0	81

Note: This table shows the average delay in days, the standard deviation and the minimum as well as maximum delay across the three directives (CRD IV, BRRD, DGSD) and all EU countries. Delay is measured as the difference in days between the publication date of the directive by the European Commission and the date when the key law implementing the directive in a country was published. See also Koetter et al. (2022b).

Table 4: Summary statistics for country-level controls

	Mean	SD	Min	Max	Obs.
GDP Growth [%]	1.14	4.02	-14.84	25.18	225
Consumer Price Index (HICP) Change Rate [%]	1.41	1.55	-1.70	6.10	225
Public Sector Purchase Programme (PSPP)	0.01	0.02	-0.00	0.08	225
Minimum Wage Growth [%]	3.18	5.36	-12.36	37.28	225
Social government	0.35	0.48	0.00	1.00	225
Ex-ante capital regulation stringency	7.04	1.55	4.00	9.00	207
Ex-ante restructuring power	2.27	0.86	0.00	3.00	198
Ex-ante mitigation of moral hazards from deposit insurance	1.27	0.75	0.00	3.00	198
Ex-ante supervisory power	10.91	2.11	5.00	14.00	207

Note: This table shows summary statistics for the country-level controls used in the baseline estimations and robustness checks. See Table A1 of the Online Appendix for variable definitions and data sources. The regulatory indices lack data for Czech Republic and Sweden, and partially for Estonia.

Table 5: Distributional effect of CRD IV implementation

Δ Disp. Household Income [%]	(1)	(2)	(3)	(4)	(5)
Decile 1 × Directive	-0.003	-3.572***	-3.253***	-2.925***	-3.114**
	(0.944)	(1.039)	(1.151)	(1.119)	(1.329)
Decile 2 × Directive	2.054***	0.083	-0.318	-0.149	-0.304
	(0.588)	(0.823)	(0.890)	(0.883)	(1.053)
Decile 3 × Directive	2.622***	0.983	0.233	0.436	0.309
	(0.501)	(0.690)	(0.746)	(0.743)	(1.002)
Decile 4 × Directive	2.813***	1.830**	0.976	1.113	0.991
	(0.517)	(0.739)	(0.732)	(0.744)	(0.978)
Decile 5 × Directive	2.634***	1.905***	0.796	0.790	0.715
	(0.503)	(0.715)	(0.715)	(0.718)	(0.952)
Decile 6 × Directive	2.755***	1.541**	0.516	0.672	0.589
	(0.498)	(0.657)	(0.706)	(0.713)	(0.918)
Decile 7 × Directive	2.719***	1.689**	0.530	0.648	0.601
	(0.455)	(0.669)	(0.674)	(0.683)	(0.967)
Decile 8 × Directive	2.563***	1.513**	0.458	0.575	0.448
	(0.505)	(0.708)	(0.723)	(0.738)	(0.926)
Decile 9 × Directive	3.119***	2.544***	1.422**	1.514**	1.423
	(0.488)	(0.653)	(0.686)	(0.698)	(0.922)
Decile 10 × Directive	3.623***	2.554***	0.653	0.659	0.533
	(0.603)	(0.760)	(0.830)	(0.840)	(1.029)
Observations	721,016	721,016	721,016	710,398	710,398
R-Squared	0.03	0.03	0.03	0.03	0.03
Country Controls		Infl.	Infl., GDP	Infl., GDP	Infl., GDP
Household Controls				Yes	Yes
Year FE					Yes

Note: This table shows the distributional effect of the CRD IV implementation according to the model specified in equation 1. The dependent variable **Δ**Disp. Household Income measures the growth rate of households' disposable income in percent. We sequentially add controls for inflation and GDP growth in columns (2) and (3). In column (4), we further control for household size and owner-occupier status (see Table A1 for definitions). Lastly, we add year fixed effects in column (5). Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Distributional effect of EBU directives' implementation

Δ Disp. Household Income [%]	(1)	(2)	(3)	(4)	(5)	(6)
	CRDIV	CRDIV	BRRD	BRRD	DGSD	DGSD
Decile 1 × Directive	-3.572***	-3.114**	-0.739	0.024	-1.086	0.125
	(1.039)	(1.329)	(1.238)	(1.512)	(1.228)	(1.528)
Decile 2 × Directive	0.083	-0.304	0.885	0.609	1.047	1.353
	(0.823)	(1.053)	(0.726)	(1.049)	(0.691)	(1.049)
Decile 3 × Directive	0.983	0.309	1.559***	0.966	1.719***	1.702*
	(0.690)	(1.002)	(0.592)	(0.891)	(0.590)	(0.914)
Decile 4 × Directive	1.830**	0.991	1.775***	1.106	2.229***	2.143**
	(0.739)	(0.978)	(0.628)	(0.920)	(0.598)	(0.900)
Decile 5 × Directive	1.905***	0.715	2.403***	1.450	2.260***	1.873**
	(0.715)	(0.952)	(0.599)	(0.882)	(0.567)	(0.872)
Decile 6 × Directive	1.541**	0.589	2.282***	1.729*	2.565***	2.511***
	(0.657)	(0.918)	(0.625)	(0.957)	(0.607)	(0.947)
Decile 7 × Directive	1.689**	0.601	2.515***	1.606*	2.673***	2.296**
	(0.669)	(0.967)	(0.601)	(0.935)	(0.586)	(0.916)
Decile 8 × Directive	1.513**	0.448	2.851***	2.151**	2.746***	2.673***
	(0.708)	(0.926)	(0.591)	(0.906)	(0.557)	(0.898)
Decile 9 × Directive	2.544***	1.423	2.866***	1.973**	3.157***	2.834***
	(0.653)	(0.922)	(0.568)	(0.876)	(0.559)	(0.857)
Decile 10 × Directive	2.554***	0.533	3.726***	2.378**	3.907***	3.078***
	(0.760)	(1.029)	(0.652)	(0.954)	(0.627)	(0.934)
Observations	721,016	710,398	721,016	710,398	721,016	710,398
R-Squared	0.03	0.03	0.03	0.03	0.03	0.03
Country Controls	Infl.	Infl., GDP	Infl.	Infl., GDP	Infl.	Infl., GDP
Household Controls		Yes		Yes		Yes
Year FE		Yes		Yes		Yes

Note: This table reports estimation results for the model specified in equation 1. **Δ**Disp. Household Income is the dependent variable and measures the growth rate of households' disposable income in percent. Columns (1)-(2), (3)-(4), and (5)-(6) show the distributional effects of the implementations of CRD IV, BRRD, and DGSD, respectively. We add controls for inflation, GDP growth, household size, owner-occupier status (see Table A1 for definitions), and year fixed effects in columns (2), (4), and (6). Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Robustness of CRD IV baseline results to macro-level confounding factors

Δ Disp. Household Income [%]	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline	Region-Year FE	PSPP Control	Min. Wage Control	Social gov. Control	Euro Crisis Dummy
Decile 1 × Directive	-3.114**	-2.794**	-2.937**	-3.423**	-3.143**	-2.829**
	(1.329)	(1.246)	(1.330)	(1.329)	(1.326)	(1.329)
Decile 2 × Directive	-0.304	-0.049	0.227	-0.666	-0.266	-0.079
	(1.053)	(1.034)	(1.033)	(1.046)	(1.034)	(1.038)
Decile 3 × Directive	0.309	0.542	0.275	-0.147	0.250	0.422
	(1.002)	(0.895)	(0.975)	(0.955)	(0.982)	(1.014)
Decile 4 × Directive	0.991	1.233	1.291	0.600	0.901	0.852
	(0.978)	(0.934)	(0.958)	(0.970)	(0.955)	(0.961)
Decile 5 × Directive	0.715	0.947	0.853	0.370	0.700	0.695
	(0.952)	(0.871)	(0.930)	(0.931)	(0.921)	(0.934)
Decile 6 × Directive	0.589	0.846	0.780	0.168	0.508	0.501
	(0.918)	(0.832)	(0.871)	(0.883)	(0.891)	(0.912)
Decile 7 × Directive	0.601	0.813	0.722	0.196	0.517	0.508
	(0.967)	(0.870)	(0.935)	(0.926)	(0.945)	(0.961)
Decile 8 × Directive	0.448	0.699	0.534	0.020	0.367	0.178
	(0.926)	(0.837)	(0.889)	(0.901)	(0.908)	(0.879)
Decile 9 × Directive	1.423	1.642**	1.646*	1.075	1.338	1.240
	(0.922)	(0.795)	(0.887)	(0.912)	(0.886)	(0.893)
Decile 10 × Directive	0.533	0.768	0.442	0.177	0.439	0.141
	(1.029)	(0.958)	(0.994)	(1.006)	(1.011)	(1.013)
Observations	710,398	710,398	710,398	710,398	710,398	710,398
R-Squared	0.03	0.03	0.03	0.03	0.03	0.03
Country Controls	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents robustness tests of potential macro-level confounding factors for the CRD IV baseline results (column (1)). All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and year fixed effects. In column (2), we interact the year fixed effects with region dummies, where regions are defined as the GIIPS countries, remaining EMU, and non-EMU countries. Column (3) includes a country-specific control for quantitative easing. In columns (4) and (5), we account for minimum wage growth and whether the head of government belongs to a social democratic or socialist government, respectively. In column (6), we include a Euro crisis dummy. We interact the country controls in columns (3)-(6) with the income group indicator. See Table A1 for detailed variable descriptions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Robustness of CRD IV baseline results to the model specification

Δ Disp. Household Income [%]	(1)	(2)	(3)	(4)	(5)
	Baseline	Placebo 2010-2013	2013 - 2018	Exclude DK, NL, RO, SE	Exclude PL
Decile 1 × Directive	-3.114**	-1.778	-4.034**	-2.618*	-3.445**
	(1.329)	(2.052)	(1.626)	(1.435)	(1.515)
Decile 2 × Directive	-0.304	-2.132	-0.630	0.444	-0.343
	(1.053)	(1.600)	(1.126)	(1.130)	(1.225)
Decile 3 × Directive	0.309	-1.061	-0.019	1.054	-0.004
	(1.002)	(1.483)	(1.079)	(1.036)	(1.163)
Decile 4 × Directive	0.991	-2.295	0.693	1.450	1.197
	(0.978)	(1.644)	(0.986)	(1.030)	(1.150)
Decile 5 × Directive	0.715	-0.945	0.510	1.217	0.686
	(0.952)	(1.455)	(1.018)	(0.970)	(1.115)
Decile 6 × Directive	0.589	-1.850	0.536	1.157	0.435
	(0.918)	(1.515)	(0.983)	(0.943)	(1.083)
Decile 7 × Directive	0.601	-0.754	0.437	1.256	0.300
	(0.967)	(1.515)	(1.063)	(1.003)	(1.138)
Decile 8 × Directive	0.448	-0.290	-0.605	0.849	0.321
	(0.926)	(1.531)	(0.856)	(0.963)	(1.082)
Decile 9 × Directive	1.423	0.581	0.991	2.336**	1.267
	(0.922)	(1.580)	(0.985)	(0.907)	(1.070)
Decile 10 × Directive	0.533	1.992	-0.255	1.455	0.415
	(1.029)	(1.839)	(1.152)	(1.032)	(1.191)
Observations	710,398	331,248	471,447	608,072	660,190
R-Squared	0.03	0.03	0.03	0.03	0.03
Country Controls	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP
Household Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Note: This table presents robustness tests of the model specification for the CRD IV baseline results (column (1)). All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and year fixed effects. Column (2) displays placebo test results with a randomized placebo directive introduction in 2011/12 for the 2010-2013 estimation period. In column (3), we exclude the Euro crisis years 2010-2012. Column (4) excludes the countries with the largest absolute deviations in the estimated Gini coefficients from OECD and World Bank aggregate measures (see Figure A3). Column (5) excludes the late implementer of CRD IV. See Table A1 for detailed variable descriptions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Channels - Effect of CRD IV on income subcomponents

	Income growth	Extensive effect		Intensive effect	
	Household	Individuals	Main earner	Individuals	Main earner
	(1)	(2)	(3)	(4)	(5)
Panel A: Decile 1 - Employee income					
Directive	-4.420**	0.033***	0.040***	-2.112	-1.944
	(1.910)	(0.010)	(0.012)	(1.464)	(1.551)
Observations	42,094	50,135	33,754	23,007	21,184
Panel B: Decile 1 - Self-employed income					
Directive	-1.258	-0.009	-0.026	-0.308	-0.384
	(2.639)	(0.017)	(0.021)	(2.515)	(2.777)
Observations	19,260	25,326	15,468	10,787	9,443
Panel C: Decile 9 - Employee income					
Directive	0.829	0.005	0.004	0.485	0.587
	(0.734)	(0.003)	(0.003)	(0.384)	(0.499)
Observations	64,669	122,853	51,585	83,765	47,554
Panel D: Decile 9 - Self-employed income					
Directive	1.501*	-0.007	-0.032***	1.897*	2.408**
	(0.827)	(0.011)	(0.011)	(1.019)	(1.060)
Observations	19,363	36,329	14,039	10,831	8,839

Note: This table presents the effects of the CRD IV implementation on the growth rates of different income subcomponents and related outcome variables for different income groups. Column (1) of the analysis is based on estimating equation 2 and displays the results for household-level growth in the income subcomponent (Panel A and C: employee income; Panel B and D: self-employed income) for the subset of households belonging to the bottom income group, i.e., for $g = 1$. Panels C and D show the results for $g = 10$. Columns (2) - (4) are the results for individual-level analyses based on equation 3. Columns (2) and (3) display the impact on the individual's change in (self-)employment status for all household members or only the main earner. Columns (4) and (5) show the effect on the individual-level growth in the income subcomponent for all household members or only main earners that continuously report that type of income. All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and country fixed effects. In columns (2)-(4), the individual-level controls Male, Age, Age^2, Years of work experience, and Education status are included. See Table A1 for variable definitions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

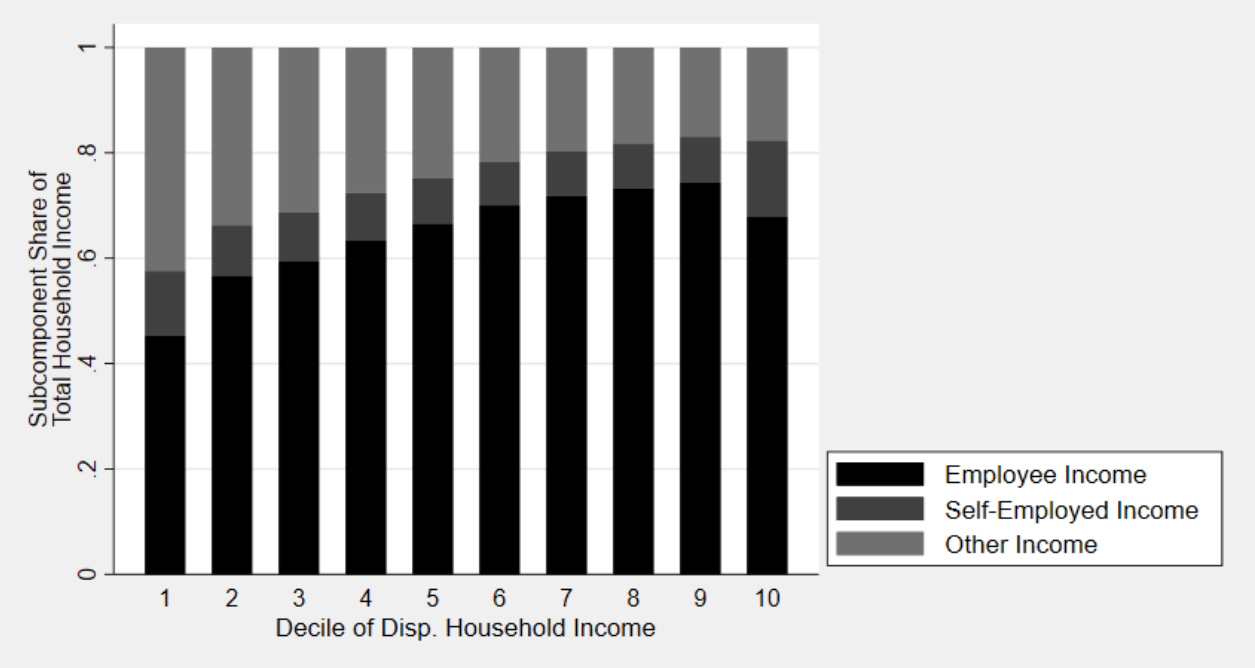
Table 10: Treatment intensity analysis of CRD IV effect

Δ Disp. Household Income [%]	(1)	(2)	(3)	(4)	(5)
	Baseline	Stringency		Supervisory power	
		<50%ile	>50%ile	<50%ile	>50%ile
Decile 1 × Directive	-3.114**	-4.700**	-2.296	-3.311*	-3.881**
	(1.329)	(2.018)	(1.714)	(1.789)	(1.878)
Decile 2 × Directive	-0.304	-0.916	0.106	0.346	-2.306
	(1.053)	(1.561)	(1.327)	(1.384)	(1.576)
Decile 3 × Directive	0.309	-1.405	1.479	0.805	-1.314
	(1.002)	(1.227)	(1.344)	(1.148)	(1.505)
Decile 4 × Directive	0.991	0.550	1.243	0.811	0.157
	(0.978)	(1.295)	(1.346)	(1.302)	(1.331)
Decile 5 × Directive	0.715	-0.146	1.204	1.735	-1.587
	(0.952)	(1.253)	(1.286)	(1.190)	(1.158)
Decile 6 × Directive	0.589	-1.180	1.732	0.318	-0.304
	(0.918)	(1.202)	(1.214)	(1.136)	(1.221)
Decile 7 × Directive	0.601	-1.270	1.665	1.180	-1.245
	(0.967)	(1.275)	(1.283)	(1.111)	(1.358)
Decile 8 × Directive	0.448	-1.528	1.318	0.976	-1.554
	(0.926)	(1.270)	(1.207)	(1.109)	(1.212)
Decile 9 × Directive	1.423	0.388	1.746	1.890	-0.371
	(0.922)	(1.053)	(1.303)	(1.143)	(1.152)
Decile 10 × Directive	0.533	0.095	0.281	0.585	-0.808
	(1.029)	(1.422)	(1.404)	(1.215)	(1.370)
Observations	710,398	337,290	323,153	368,129	292,314
R-Squared	0.03	0.03	0.03	0.03	0.03

Summary statistics	Stringency		Supervisory power	
Mean	5.76	8.18	9.50	12.62
SD	1.18	0.39	2.05	0.68
Min	4.00	8.00	5.00	12.00
Max	7.00	9.00	11.00	14.00

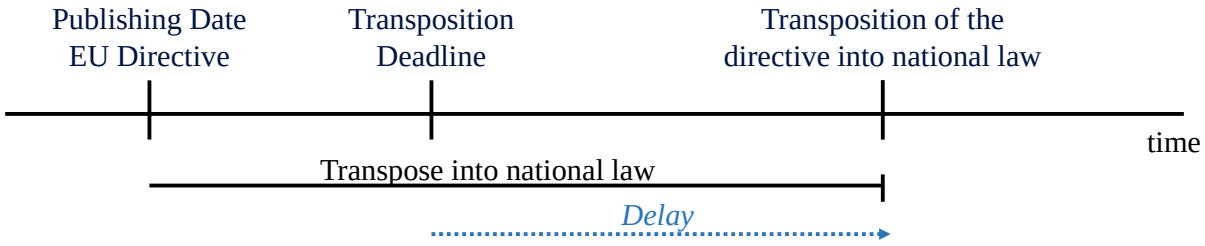
Note: This table presents our treatment intensity analysis of the CRD IV baseline effect (column (1)) based on equation 1. In columns (2) and (3), we report the estimation results for the subset of countries that reported below and above median levels of capital regulation stringency in 2011, respectively. In columns (4) and (5), we run separate regressions for countries that had below and above median levels of supervisory power in 2011. The bottom part shows summary statistics of the ex-ante capital regulation stringency and ex-ante supervisory power in the different subsets. All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and year-fixed effects. See Table A1 for variable definitions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

Figure 1: Income subcomponents of total household income



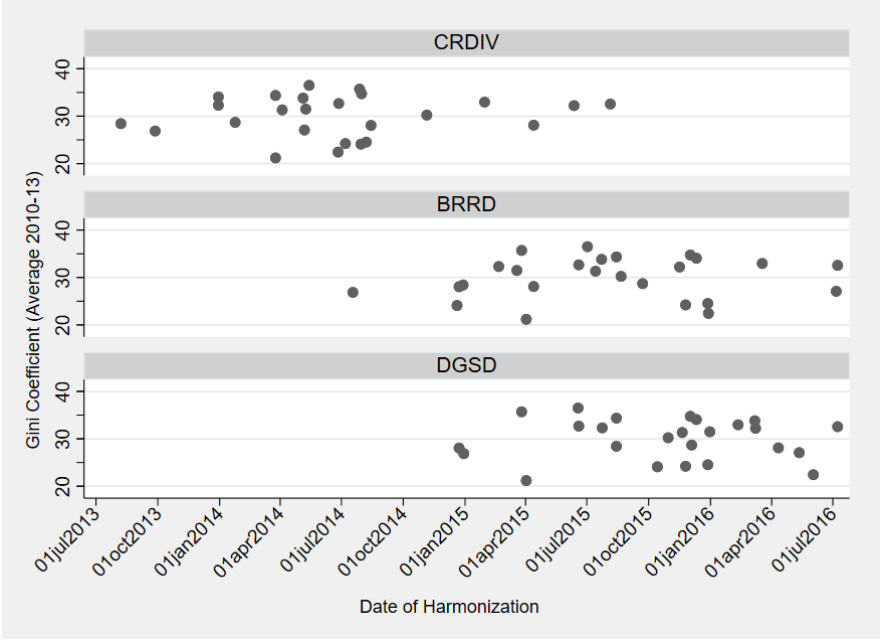
Note: This figure illustrates the main subcomponents of total household income across income groups. It is based on the sample used for regression analysis.

Figure 2: Transposition timing of EU directives

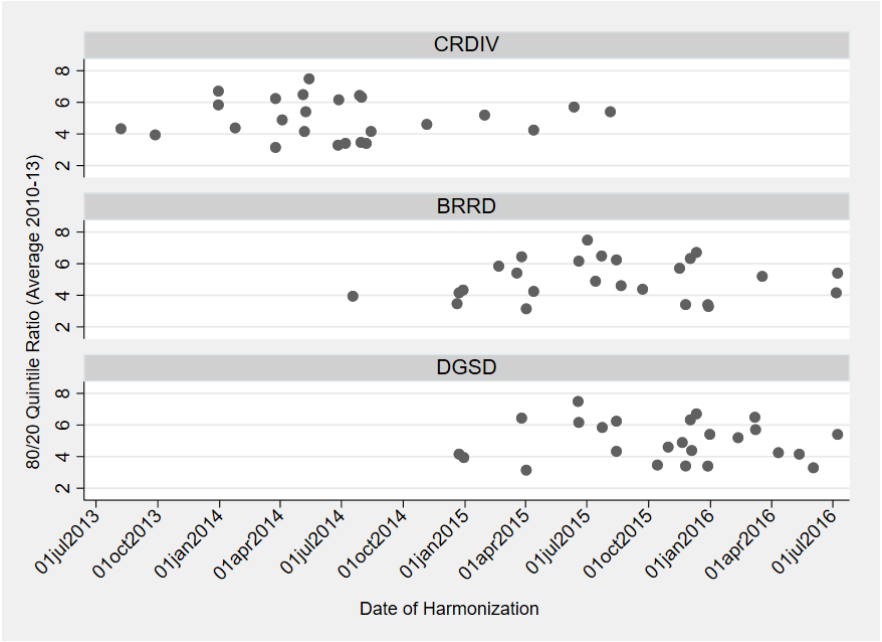


Note: This figure illustrates the transposition timing of EU directives. After the European Commission (EC) issued the directive, member states are supposed to implement it until a specified deadline. Yet, some countries delay the implementation into national law.

Figure 3: Gini coefficients (a) and quintile ratios (b) versus national directive implementation



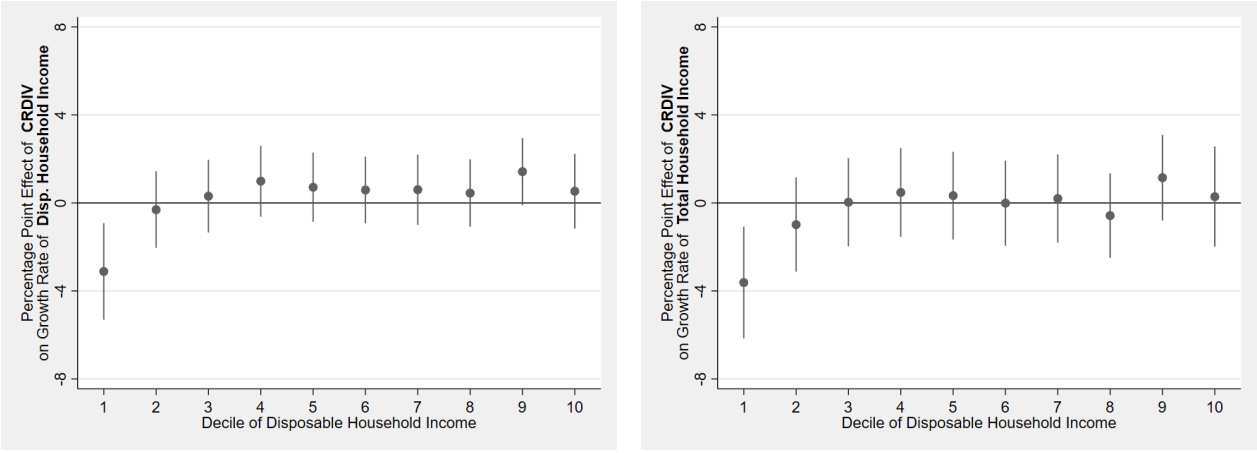
(a)



(b)

Note: This figure scatters the ex-ante Gini coefficients (a) and the 80/20 quintile ratios (b) of the sample countries against the month of the year in which the corresponding country implemented one of the three directives into national law. The country-specific Gini coefficients and quintile ratios are averaged over the 2010-13 period. Sources: Koetter et al. (2022b), Eurostat EU-SILC, own calculations.

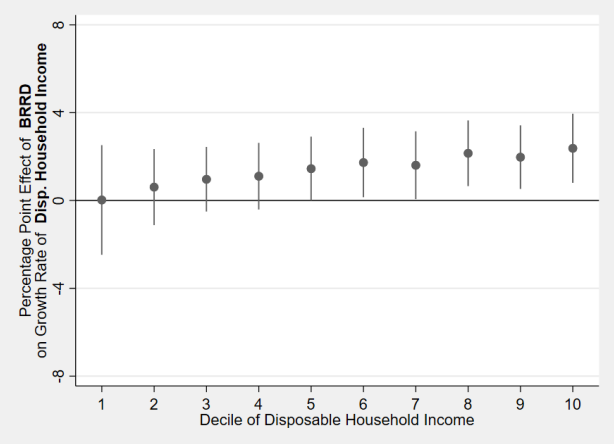
Figure 4: Distributional effect of CRD IV implementation



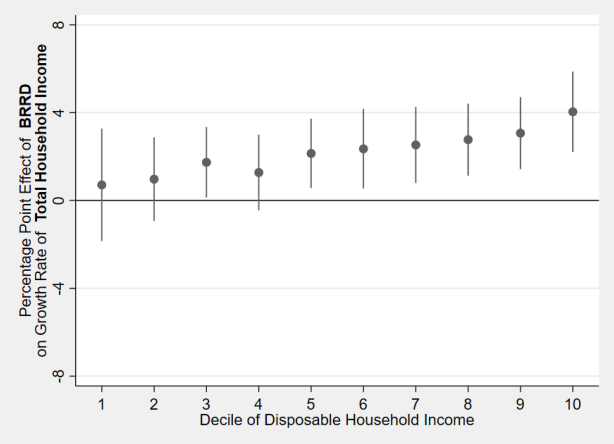
(a) Disposable Income **(b)** Total Income

Note: This figure is a graphic representation of the CRD IV baseline results for (a) disposable and (b) total household income growth (see also columns (1) and (2) of Table A5). All regressions include controls for inflation, GDP growth, household size, owner-occupier status (see Table A1 for definitions), and year fixed effects. Standard errors are two-way clustered at the household and country-year level. We display 90%-level confidence intervals.

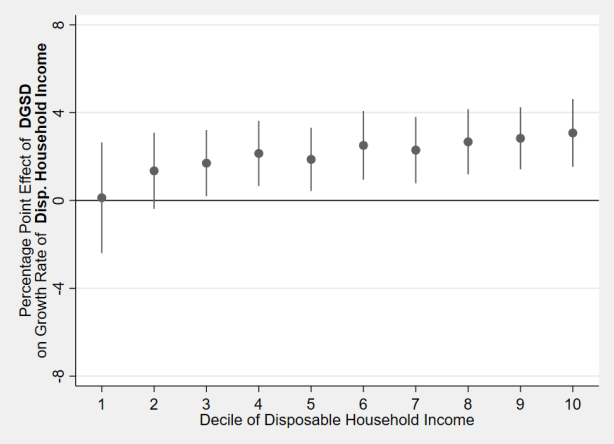
Figure 5: Distributional effect of BRRD and DGSD implementation



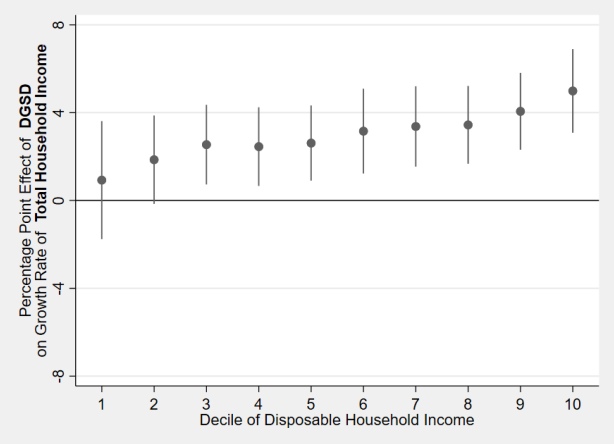
(a) BRRD - Disposable Income



(b) BRRD - Total Income



(c) DGSD - Disposable Income



(d) DGSD - Total Income

Note: This figure is a graphic representation of the BRRD baseline results (top row) and DGSD baseline results (bottom row). Panels (a) and (c) report the effect on disposable household income growth; panels (b) and (d) illustrate the effect on total household income growth (see also columns (3) - (6) of Table A5). All regressions include controls for inflation, GDP growth, household size, owner-occupier status (see Table A1 for definitions), and year fixed effects. Standard errors are two-way clustered at the household and country-year level. We display 90%-level confidence intervals.

Online Appendix

European Union Statistics on Income and Living Conditions (EU-SILC) database

EU-SILC is an annual representative survey that covers all EU member states. The database also covers Switzerland, Norway, Iceland, the United Kingdom, and Serbia, which we disregard since our analysis focuses on regulatory changes in EU banking markets. In addition to the survey, some countries use administrative data sources to provide part or all of the numerical variables they report.[21] We employ the longitudinal EU-SILC User Databases 2010-2019 in the release version of November 2021 (Eurostat, 2021).[22] We choose the longitudinal data sets rather than the cross-sectional ones, which Eurostat also provides, to create a panel data set since that allows us to track changes in income for households and individuals over time. A common identifier allows matching each individual to the respective household.

EU-SILC features a rotational survey design. Member states' national statistical offices (NSOs) survey households for four consecutive years. Each year, the statistical offices replace a quarter of surveyed households to keep the sample size constant. EU-SILC annual longitudinal User Databases contain information on three rotational groups reporting two, three, and four years, respectively. The data sets do not include first-time respondents as they only provide a single data point (Eurostat, 2020). To prevent duplicates, we extract only the rotational group that contains the four-year survey history from each longitudinal User Database.[23]

[21]The countries in our sample relying on register data are Denmark, Finland, the Netherlands, Slovenia, and Sweden (Törmälehto et al., 2017).

[22]We rely on Stata scripts kindly provided by Pforr and Jung (2022) for converting EU-SILC raw data from CSV to DTA files and for labelling the extracted variables.

[23]France employs a panel duration of nine years. We choose to extract the first rotational group that reports a full four-year history to minimize attrition. Bulgaria changed the duration of its panel in 2015 from four to six years. We manually identify groups without overlap to extract the first four years of the six year panel.

The income information respondents provide in EU-SILC survey data refers to the previous calendar year.[24] A household or an individual surveyed in, e.g., 2019, reports its annual income and related subcomponents for 2018. Since the last survey year in our data set is 2019, this results in 2018 being the final year of reported income figures in our sample. Responses regarding household and individual characteristics, e.g., household size or level of education, refer to the time of the interview. Therefore, we match participants' responses on income figures in a particular survey year with the information on household and individual characteristics from the previous calendar year.

While EU-SILC data includes survey weights, our data extraction process, which is necessary to create a panel data set that allows us to track changes in income at the household or individual level over time, renders these weights meaningless. To verify the reliability of the generated panel data set, we compute inequality measures for each country and compare them to their respective counterpart taken from official sources. Figure A3 demonstrates the comparability of the country-specific Gini coefficients and quintile ratios of equivalized disposable household income computed based on our sample with country aggregates retrieved from Eurostat EU-SILC, the World Bank's World Development Indicators, and the OECD's Income Distribution Database. The figures show our estimates for income inequality to be consistent with trends derived from other data sources, both over time and across countries. Nevertheless, we take a prudent approach and check in robustness tests whether results remain unchanged when excluding the countries for which our estimates deviate most significantly from official sources.

[24]Ireland is an exception as respondents' answers refer to the twelve months preceding the interview (Krell et al., 2017; Mack et al., 2020).

Table A1: Variable definitions and sources

Variable	Definition	Source
Household-level		
Disposable household income	Total household income minus taxes, inter-household cash transfers, and social insurance contributions in Euro (HY020)	EU-SILC
Total household income	Total gross household income is the sum over all household members' gross personal income components including social transfers in Euro (HY010)	EU-SILC
Employee income	Gross total remuneration, in cash or in kind, payable by an employer to an employee in a given household in return for work done by the latter in Euro (PY010) aggregated across all household members	EU-SILC
Self-employed income	Sum of gross cash profits or losses from self-employment received by individuals in a given household, for themselves or in respect of their family members in Euro (PY050) aggregated across all household members	EU-SILC
Household size	Number of current household members (HX040)	EU-SILC
Owner-occupier	Dummy indicating if the owner of the accomdation is a member of the household (based on HH021)	EU-SILC & own calculations
Individual-level		
Employee income	Gross total remuneration, in cash or in kind, payable by an employer to an employee in return for work done by the latter in Euro (PY010)	EU-SILC
Exit employment	First difference of a dummy indicating if an individual reports zero employment income	EU-SILC & own calculations
Self-employed income	Gross cash profits or losses from self-employment received by individuals, for themselves or in respect of their family members in Euro (PY050)	EU-SILC
Exit self-employment	First difference of a dummy indicating if an individual reports zero self-employment income	EU-SILC & own calculations
Male	Dummy indicating if an individual is male (based on RB090)	EU-SILC & own calculations
Age	Age of the individual calculated based on birth year (Note: only available in 5-year intervals for Finland and Malta) (based on RB080)	EU-SILC & own calculations
Age^2	Square of the age of the individual calculated based on birth year (Note: only available in 5-year intervals for Finland and Malta) (based on RB080)	EU-SILC & own calculations
Married	Dummy indicating if the individual is married at the time of response (based on PB190)	EU-SILC & own calculations
Middle school	Dummy indicating if the individual successfully completed primary education (based on PE040)	EU-SILC & own calculations
High school	Dummy indicating if the individual successfully completed lower secondary education (based on PE040)	EU-SILC & own calculations
University	Dummy indicating if the individual successfully completed (upper) secondary education (based on PE040)	EU-SILC & own calculations
Employed	Dummy indicating if individual self-declares to be employed working part- or full-time (based on PL031)	EU-SILC & own calculations
Self-employed	Dummy indicating if individual self-declares to be self-employed working part- or full-time (based on PL031)	EU-SILC & own calculations
Unemployed	Dummy indicating if individual self-declares to be unemployed (based on PL031)	EU-SILC & own calculations

Continued on next page –

Table A1 – continued from previous page

Variable	Definition	Source
Retired	Dummy indicating if individual self-declares to be in retirement, in early retirement, or to have given up business (based on PL031)	EU-SILC & own calculations
Weekly hours	Number of hours usually worked per week in main job (PL060)	EU-SILC
Years of work experience	Number of years spent in paid work (PL200)	EU-SILC
Temporary contract	Dummy indicating a temporary job/work contract of limited duration (based on PL140)	EU-SILC & own calculations
Recent job change	Dummy indicating a change of job since the previous year (based on PL160)	EU-SILC & own calculations
Country-level		
CRD IV	Dummy indicating if the key law implementing the Capital Requirements Directive IV in a country has been published in the second half of the previous year or the first half of the current year	Koetter et al. (2022b)
BRRD	Dummy indicating if the key law implementing the Bank Recovery and Resolution Directive in a country has been published in the second half of the previous year or the first half of the current year	Koetter et al. (2022b)
DGSD	Dummy indicating if the key law implementing the Deposit Guarantee Schemes Directive in a country has been published in the second half of the previous year or the first half of the current year	Koetter et al. (2022b)
GDP growth [%]	Annual growth of gross domestic product in %	Worldbank
HICP change rate [%]	Annual change in the harmonized consumer price index (HICP) in %	ECB Macroeconomic and sectoral statistics
PSPP	Net purchases of debt securities under the Public Sector Purchase Programme (sum of monthly observations) scaled by gross domestic product in current prices	ECB Asset purchase programmes statistics & ECB Macroeconomic and sectoral statistics
Minimum wage growth [%]	Annual growth of the average minimum wage	Eurostat
Social government	Dummy indicating if the head of government belongs to a social democratic or socialist party	Whogoverns.eu
Ex-ante capital regulation stringency	Index between 0-10 with higher value indicating greater capital regulation stringency based on responses to the 2011 survey	World Bank Bank Regulation & Supervision Survey
Ex-ante restructuring power	Index between 0-6 with higher value indicating greater restructuring power based on responses to the2011 survey	World Bank Bank Regulation & Supervision Survey
Ex-ante mitigation of moral hazards from deposit insurance	Index between 0-3 with higher value indicating greater mitigation of moral hazard resulting from deposit insurance based on responses to the 2011 survey	World Bank Bank Regulation & Supervision Survey
Ex-ante supervisory power	Index between 0-14 with higher values indicating the supervisory authorities have the authority to take specific actions to prevent and correct problems based on responses to the 2011 survey	World Bank Bank Regulation & Supervision Survey
Euro crisis dummy	Dummy indicating if a country belongs to the GIIPS group in the 2010-13 period	own calculations

Table A2: Summary statistics for household-level outcomes and characteristics by deciles

Deciles by HH Disp Inc	1	2	3	4	5	6	7	8	9	10
Outcomes										
Disp. Household Income [€1K]	9.99	15.07	18.37	21.28	24.23	27.44	30.84	34.62	41.02	60.51
Total Household Income [€1K]	12.38	18.88	23.19	27.20	31.19	35.77	40.67	46.35	56.01	86.57
Income Subcomponents										
Employee Income [€1K]	5.33	10.44	13.50	16.92	20.50	24.68	28.90	33.68	41.16	57.49
Self-Employed Income [€1K]	1.53	1.76	2.08	2.43	2.67	2.96	3.52	3.97	4.96	13.04
Characteristics										
Household Size	1.86	2.20	2.47	2.69	2.88	3.03	3.18	3.29	3.42	3.51
Owner-Occupier	0.59	0.67	0.73	0.78	0.81	0.83	0.86	0.88	0.90	0.92

Note: This table presents summary statistics for household-level variables across deciles of ex-ante household disposable income for the full sample after correcting for outliers. For details on how we construct time-invariant and country-specific deciles and assign households, see Section 3.1.2 and Figure A1. The statistics are based on deciles constructed with respect to the CRD IV, which was the directive implemented first in all countries included in our sample. Table A1 presents variable definitions.

Table A3: Summary statistics for individual-level outcomes and characteristics by deciles

Deciles by HH Disp Inc	1	2	3	4	5	6	7	8	9	10
Income Subcomponents										
Employee Income [€1K]	3.34	5.68	6.65	7.77	8.91	10.18	11.40	12.75	14.95	20.08
Self-Employed Income [€1K]	0.96	0.96	1.03	1.12	1.16	1.22	1.39	1.50	1.80	4.55
Demographics										
Male	0.47	0.47	0.47	0.48	0.49	0.49	0.50	0.50	0.50	0.51
Age	46.65	46.68	46.36	45.55	44.86	44.39	44.00	43.94	43.76	44.00
Married	0.36	0.46	0.52	0.55	0.58	0.60	0.61	0.62	0.63	0.64
Education										
Middle School	0.45	0.41	0.38	0.35	0.32	0.30	0.27	0.24	0.21	0.16
High School	0.43	0.46	0.48	0.49	0.50	0.50	0.49	0.48	0.45	0.39
University	0.12	0.13	0.14	0.16	0.17	0.20	0.23	0.28	0.33	0.44
Labor Force										
Employed	0.24	0.34	0.37	0.42	0.47	0.51	0.53	0.55	0.57	0.56
Self-Employed	0.13	0.10	0.09	0.09	0.08	0.08	0.08	0.08	0.08	0.11
Unemployed	0.21	0.13	0.12	0.10	0.08	0.07	0.06	0.05	0.05	0.04
Retired	0.15	0.19	0.19	0.18	0.16	0.15	0.14	0.13	0.13	0.12
Other	0.28	0.24	0.24	0.22	0.21	0.20	0.19	0.18	0.17	0.17
Labor Market										
Weekly Hours	38.31	38.76	38.71	38.75	38.81	38.85	39.07	39.22	39.42	40.27
Years of Work Experience	21.37	22.76	23.11	22.96	22.64	22.54	22.49	22.60	22.56	22.83
Temporary Contract	0.32	0.22	0.19	0.17	0.15	0.14	0.12	0.11	0.10	0.08
Recent Job Change	0.11	0.09	0.09	0.08	0.08	0.07	0.06	0.06	0.06	0.05

Note: This table presents summary statistics for individual-level variables across deciles of ex-ante household disposable income for the full sample after correcting for outliers. For details on how we construct time-invariant and country-specific deciles and assign households, see Section 3.1.2 and Figure A1. The statistics are based on deciles constructed with respect to the CRD IV, which was the directive implemented first in all countries included in our sample. Table A1 presents variable definitions.

Table A4: Summary statistics for household- and individual-level outcomes by deciles

Deciles by HH Disp Inc	1	2	3	4	5	6	7	8	9	10
Household-level										
Δ Disp. Household Income [%]	23.65	12.41	9.51	7.65	6.56	5.50	4.24	3.54	2.40	0.52
	(76.61)	(48.93)	(42.87)	(39.12)	(36.60)	(34.82)	(33.72)	(32.59)	(32.37)	(36.27)
Δ Total Household Income [%]	25.26	14.24	11.20	9.10	7.83	6.60	5.20	4.17	2.84	0.45
	(82.02)	(56.36)	(50.38)	(46.50)	(44.15)	(42.20)	(41.40)	(39.34)	(39.65)	(45.67)
Δ Employee Income [%]	26.32	12.64	8.82	6.85	5.37	4.39	3.16	2.30	1.14	-0.40
	(83.90)	(56.13)	(47.87)	(43.38)	(40.40)	(37.20)	(35.85)	(34.30)	(33.85)	(35.46)
Δ Self-Employed Income [%]	15.43	7.65	6.57	4.72	4.57	3.43	2.54	1.69	0.95	-0.51
	(85.40)	(56.34)	(51.03)	(45.15)	(42.94)	(40.36)	(39.24)	(37.17)	(35.29)	(41.13)
Individual-level										
Δ Employee Income [%]	18.97	7.51	5.07	3.83	3.13	2.60	2.01	1.54	1.03	0.58
	(71.53)	(43.52)	(36.21)	(31.77)	(28.61)	(25.46)	(23.70)	(21.45)	(20.92)	(21.81)
Δ Self-Employed Income [%]	13.57	6.36	5.29	3.92	3.77	2.99	2.18	1.24	0.91	-0.39
	(79.42)	(51.59)	(47.40)	(41.65)	(38.76)	(37.26)	(35.84)	(33.01)	(31.93)	(35.18)

Note: This table presents means and standard deviations (in parentheses) for household- and individual-level outcomes across deciles for the sample used for regression analysis. For details on how we construct time-invariant and country-specific deciles and assign households, see Section 3.1.2 and Figure A1. Δ denotes one-year growth rates. Note, growth rates for income subcomponents are scaled relative to disposable household income (see Section 3.1.2 for details). The statistics are based on deciles constructed with respect to the CRD IV, which was the directive implemented first in all countries included in our sample. Table A1 presents variable definitions.

Table A5: Distributional effect of EBU directives' implementation on disposable vs. total income

Δ Household Outcome [%]	(1)	(2)	(3)	(4)	(5)	(6)
	CRDIV Disp. Inc.	CRDIV Total Inc.	BRRD Disp. Inc.	BRRD Total Inc.	DGSD Disp. Inc.	DGSD Total Inc.
Decile 1 × Directive	-3.114**	-3.617**	0.024	0.711	0.125	0.928
	(1.329)	(1.538)	(1.512)	(1.553)	(1.528)	(1.627)
Decile 2 × Directive	-0.304	-0.983	0.609	0.971	1.353	1.857
	(1.053)	(1.296)	(1.049)	(1.156)	(1.049)	(1.219)
Decile 3 × Directive	0.309	0.032	0.966	1.739*	1.702*	2.545**
	(1.002)	(1.214)	(0.891)	(0.973)	(0.914)	(1.098)
Decile 4 × Directive	0.991	0.478	1.106	1.274	2.143**	2.454**
	(0.978)	(1.225)	(0.920)	(1.042)	(0.900)	(1.084)
Decile 5 × Directive	0.715	0.332	1.450	2.143**	1.873**	2.616**
	(0.952)	(1.205)	(0.882)	(0.955)	(0.872)	(1.037)
Decile 6 × Directive	0.589	-0.010	1.729*	2.355**	2.511***	3.160***
	(0.918)	(1.170)	(0.957)	(1.097)	(0.947)	(1.170)
Decile 7 × Directive	0.601	0.201	1.606*	2.531**	2.296**	3.372***
	(0.967)	(1.214)	(0.935)	(1.050)	(0.916)	(1.109)
Decile 8 × Directive	0.448	-0.574	2.151**	2.771***	2.673***	3.444***
	(0.926)	(1.162)	(0.906)	(0.995)	(0.898)	(1.073)
Decile 9 × Directive	1.423	1.148	1.973**	3.069***	2.834***	4.061***
	(0.922)	(1.177)	(0.876)	(0.992)	(0.857)	(1.060)
Decile 10 × Directive	0.533	0.285	2.378**	4.041***	3.078***	4.990***
	(1.029)	(1.381)	(0.954)	(1.108)	(0.934)	(1.154)
Observations	710,398	703,636	710,398	703,636	710,398	703,636
R-Squared	0.03	0.03	0.03	0.03	0.03	0.03
Country Controls	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table reports estimation results for the model specified in equation 1. The dependent variable in columns (1), (3) and (5) is **Δ**Disp. Household Income and measures the growth rate of households' disposable income in percent. In columns (2), (4) and (6), the dependent variable is **Δ**HH Total Inc and measures the growth rate of households' total income in percent. Columns (1)-(2), (3)-(4), and (5)-(6) show the distributional effects of the implementations of CRD IV, BRRD, and DGSD, respectively. All regressions include controls for inflation, GDP growth, household size, owner-occupier status (see Table A1 for definitions), and year fixed effects. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Robustness of BRRD baseline results to macro-level confounding factors

Δ Disp. Household Income [%]	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline	Region-Year FE	PSPP Control	Min. Wage Control	Social gov. Control	Euro Crisis Dummy
Decile 1 × Directive	0.024	-0.019	0.236	0.115	-0.046	0.231
	(1.512)	(1.472)	(1.694)	(1.519)	(1.530)	(1.506)
Decile 2 × Directive	0.609	0.528	1.059	0.648	0.531	0.747
	(1.049)	(1.046)	(1.081)	(1.049)	(1.059)	(1.027)
Decile 3 × Directive	0.966	0.882	0.655	0.949	0.887	0.967
	(0.891)	(0.905)	(0.895)	(0.880)	(0.911)	(0.886)
Decile 4 × Directive	1.106	1.001	0.808	1.127	1.024	0.941
	(0.920)	(0.952)	(0.923)	(0.902)	(0.935)	(0.908)
Decile 5 × Directive	1.450	1.337	1.331	1.515*	1.348	1.373
	(0.882)	(0.892)	(0.876)	(0.871)	(0.905)	(0.886)
Decile 6 × Directive	1.729*	1.632*	1.584*	1.730*	1.645*	1.662*
	(0.957)	(0.979)	(0.959)	(0.941)	(0.977)	(0.958)
Decile 7 × Directive	1.606*	1.497	1.652*	1.651*	1.524	1.511
	(0.935)	(0.968)	(0.977)	(0.914)	(0.953)	(0.925)
Decile 8 × Directive	2.151**	2.060**	2.160**	2.168**	2.053**	1.985**
	(0.906)	(0.937)	(0.908)	(0.870)	(0.918)	(0.880)
Decile 9 × Directive	1.973**	1.873**	1.900**	2.030**	1.866**	1.819**
	(0.876)	(0.918)	(0.897)	(0.845)	(0.892)	(0.857)
Decile 10 × Directive	2.378**	2.269**	2.230**	2.439***	2.283**	2.148**
	(0.954)	(0.994)	(1.036)	(0.925)	(0.969)	(0.933)
Observations	710,398	710,398	710,398	710,398	710,398	710,398
R-Squared	0.03	0.03	0.03	0.03	0.03	0.03
Country Controls	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents robustness tests of potential macro-level confounding factors for the CRD IV baseline results (column (1)). All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and year fixed effects. In column (2), we interact the year fixed effects with region dummies, where regions are defined as the GIIPS countries, remaining EMU, and non-EMU countries. Column (3) includes a country-specific control for quantitative easing. In columns (4) and (5), we account for minimum wage growth and whether the head of government belongs to a social democratic or socialist government, respectively. In column (6), we include a Euro crisis dummy. We interact the country controls in columns (3)-(6) with the income group indicator. See Table A1 for detailed variable descriptions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

Table A7: Robustness of BRRD baseline results to the model specification

Δ Disp. Household Income [%]	(1)	(2)	(3)	(4)	(5)
	Baseline	Placebo 2010-2013	2013 - 2018	Exclude DK, NL, RO, SE	Exclude BE, PL
Decile 1 × Directive	0.024	-1.778	0.401	0.484	0.306
	(1.512)	(2.052)	(1.705)	(1.672)	(1.731)
Decile 2 × Directive	0.609	-2.132	0.500	0.974	0.613
	(1.049)	(1.600)	(1.017)	(1.120)	(1.287)
Decile 3 × Directive	0.966	-1.061	0.985	1.015	0.387
	(0.891)	(1.483)	(0.843)	(0.941)	(1.120)
Decile 4 × Directive	1.106	-2.295	0.729	1.460	0.798
	(0.920)	(1.644)	(0.927)	(0.922)	(1.138)
Decile 5 × Directive	1.450	-0.945	1.632*	2.015**	0.847
	(0.882)	(1.455)	(0.916)	(0.878)	(1.092)
Decile 6 × Directive	1.729*	-1.850	1.785*	2.066**	1.199
	(0.957)	(1.515)	(0.982)	(0.993)	(1.205)
Decile 7 × Directive	1.606*	-0.754	1.729*	2.014**	1.068
	(0.935)	(1.515)	(0.969)	(0.957)	(1.180)
Decile 8 × Directive	2.151**	-0.290	2.071**	2.572***	1.618
	(0.906)	(1.531)	(0.868)	(0.917)	(1.138)
Decile 9 × Directive	1.973**	0.581	1.897**	2.512***	1.295
	(0.876)	(1.580)	(0.871)	(0.892)	(1.069)
Decile 10 × Directive	2.378**	1.992	2.431**	3.024***	1.773
	(0.954)	(1.839)	(0.961)	(1.027)	(1.162)
Observations	710,398	331,248	471,447	608,072	639,169
R-Squared	0.03	0.03	0.03	0.03	0.03
Country Controls	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP
Household Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Note: This table presents robustness tests of the model specification for the BRRD baseline results (column (1)). All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and year fixed effects. Column (2) displays placebo test results with a randomized placebo directive introduction in 2011/12 for the 2010-2013 estimation period. In column (3), we exclude the Euro crisis years 2010-2012. Column (4) excludes the countries with the largest absolute deviations in the estimated Gini coefficients from OECD and World Bank aggregate measures (see Figure A3). Column (5) excludes the late implementers of BRRD. See Table A1 for detailed variable descriptions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

Table A8: Robustness of DGSD baseline results to macro-level confounding factors

Δ Disp. Household Income [%]	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline	Region-Year FE	PSPP Control	Min. Wage Control	Social gov. Control	Euro Crisis Dummy
Decile 1 × Directive	0.125	0.361	0.084	0.063	-0.010	0.264
	(1.528)	(1.508)	(1.806)	(1.546)	(1.544)	(1.527)
Decile 2 × Directive	1.353	1.567	1.887*	1.224	1.216	1.439
	(1.049)	(1.062)	(1.110)	(1.056)	(1.049)	(1.025)
Decile 3 × Directive	1.702*	1.909**	1.346	1.517*	1.573*	1.656*
	(0.914)	(0.932)	(0.947)	(0.895)	(0.921)	(0.912)
Decile 4 × Directive	2.143**	2.329**	2.060**	1.967**	2.023**	1.936**
	(0.900)	(0.940)	(0.898)	(0.881)	(0.902)	(0.891)
Decile 5 × Directive	1.873**	2.043**	1.694**	1.791**	1.714*	1.732*
	(0.872)	(0.884)	(0.841)	(0.867)	(0.883)	(0.881)
Decile 6 × Directive	2.511***	2.705***	2.439**	2.330**	2.378**	2.388**
	(0.947)	(0.998)	(0.961)	(0.931)	(0.956)	(0.952)
Decile 7 × Directive	2.296**	2.480**	2.401**	2.169**	2.178**	2.148**
	(0.916)	(0.957)	(0.944)	(0.901)	(0.920)	(0.904)
Decile 8 × Directive	2.673***	2.864***	2.743***	2.490***	2.532***	2.450***
	(0.898)	(0.935)	(0.879)	(0.869)	(0.900)	(0.873)
Decile 9 × Directive	2.834***	3.029***	2.827***	2.714***	2.685***	2.628***
	(0.857)	(0.909)	(0.864)	(0.834)	(0.859)	(0.842)
Decile 10 × Directive	3.078***	3.273***	2.975***	2.967***	2.936***	2.792***
	(0.934)	(1.007)	(1.010)	(0.914)	(0.938)	(0.916)
Observations	710,398	710,398	710,398	710,398	710,398	710,398
R-Squared	0.03	0.03	0.03	0.03	0.03	0.03
Country Controls	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP
Household Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents robustness tests of potential macro-level confounding factors for the DGSD baseline results (column (1)). All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and year fixed effects. In column (2), we interact the year fixed effects with region dummies, where regions are defined as the GIIPS countries, remaining EMU, and non-EMU countries. Column (3) includes a country-specific control for quantitative easing. In columns (4) and (5), we account for minimum wage growth and whether the head of government belongs to a social democratic or socialist government, respectively. In column (6), we include a Euro crisis dummy. We interact the country controls in columns (3)-(6) with the income group indicator. See Table A1 for detailed variable descriptions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

Table A9: Robustness of DGSD baseline results to the model specification

Δ Disp. Household Income [%]	(1)	(2)	(3)	(4)	(5)
	Baseline	Placebo 2010-2013	2013 - 2018	Exclude DK, NL, RO, SE	Exclude PL
Decile 1 × Directive	0.125	-1.778	0.389	0.465	0.570
	(1.528)	(2.052)	(1.634)	(1.719)	(1.676)
Decile 2 × Directive	1.353	-2.132	1.360	1.699	1.730
	(1.049)	(1.600)	(0.959)	(1.141)	(1.210)
Decile 3 × Directive	1.702*	-1.061	1.617*	1.746*	1.728
	(0.914)	(1.483)	(0.837)	(0.979)	(1.089)
Decile 4 × Directive	2.143**	-2.295	1.815**	2.519***	2.393**
	(0.900)	(1.644)	(0.829)	(0.918)	(1.079)
Decile 5 × Directive	1.873**	-0.945	1.899**	2.363***	1.916*
	(0.872)	(1.455)	(0.874)	(0.897)	(1.035)
Decile 6 × Directive	2.511***	-1.850	2.429***	2.836***	2.576**
	(0.947)	(1.515)	(0.909)	(1.002)	(1.142)
Decile 7 × Directive	2.296**	-0.754	2.229**	2.680***	2.250**
	(0.916)	(1.515)	(0.903)	(0.952)	(1.112)
Decile 8 × Directive	2.673***	-0.290	2.450***	3.036***	2.634**
	(0.898)	(1.531)	(0.833)	(0.932)	(1.100)
Decile 9 × Directive	2.834***	0.581	2.559***	3.354***	2.714***
	(0.857)	(1.580)	(0.826)	(0.881)	(1.028)
Decile 10 × Directive	3.078***	1.992	3.073***	3.682***	2.986***
	(0.934)	(1.839)	(0.915)	(1.006)	(1.112)
Observations	710,398	331,248	471,447	608,072	660,190
R-Squared	0.03	0.03	0.03	0.03	0.03
Country Controls	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP	Infl., GDP
Household Controls	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Note: This table presents robustness tests of the model specification for the DGSD baseline results (column (1)). All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and year fixed effects. Column (2) displays placebo test results with a randomized placebo directive introduction in 2011/12 for the 2010-2013 estimation period. In column (3), we exclude the Euro crisis years 2010-2012. Column (4) excludes the countries with the largest absolute deviations in the estimated Gini coefficients from OECD and World Bank aggregate measures (see Figure A3). Column (5) excludes the late implementer of DGSD. See Table A1 for detailed variable descriptions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

Table A10: Channels - Effect of BRRD on income subcomponents

	Income growth	Extensive effect		Intensive effect	
	Household	Individuals	Main earner	Individuals	Main earner
	(1)	(2)	(3)	(4)	(5)
Panel A: Decile 6 - Employee income					
Directive	1.379**	-0.002	-0.001	0.914**	0.762
	(0.689)	(0.004)	(0.003)	(0.415)	(0.501)
Observations	59,479	98,561	47,277	62,972	42,446
Panel B: Decile 6 - Self-employed income					
Directive	0.912	-0.032*	-0.032**	3.010**	3.160**
	(1.262)	(0.017)	(0.016)	(1.246)	(1.357)
Observations	17,128	28,827	12,194	9,140	7,627
Panel C: Decile 10 - Employee income					
Directive	1.825***	-0.002	0.004	1.236***	1.603***
	(0.664)	(0.003)	(0.003)	(0.379)	(0.482)
Observations	66,975	132,973	53,287	89,256	48,567
Panel D: Decile 10 - Self-employed income					
Directive	2.196**	-0.007	-0.001	2.132**	2.392**
	(0.888)	(0.012)	(0.015)	(1.039)	(1.120)
Observations	26,098	50,309	19,513	16,353	12,909

Note: This table presents the effects of the BRRD implementation on the growth rates of different income subcomponents and related outcome variables for different income groups. Column (1) of the analysis is based on estimating equation 2 and displays the results for household-level growth in the income subcomponent (Panel A and C: employee income; Panel B and D: self-employed income) for the subset of households belonging to the bottom income group, i.e., for $g = 6$. Panels C and D show the results for $g = 10$. Columns (2) - (4) are the results for individual-level analyses based on equation 3. Columns (2) and (3) display the impact on the individual's change in (self-)employment status for all household members or only the main earner. Columns (4) and (5) show the effect on the individual-level growth in the income subcomponent for all household members or only main earners that continuously report that type of income. All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and country fixed effects. In columns (2)-(4), the individual-level controls Male, Age, Age^2, Years of work experience, and Education status are included. See Table A1 for variable definitions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1

Table A11: Channels - Effect of DGSD on income subcomponents

	Income growth	Extensive effect		Intensive effect	
	Household	Individuals	Main earner	Individuals	Main earner
	(1)	(2)	(3)	(4)	(5)
Panel A: Decile 3 - Employee income					
Directive	0.648	0.005	0.007	0.546	0.577
	(0.759)	(0.005)	(0.005)	(0.623)	(0.637)
Observations	50,749	70,052	40,787	39,483	33,539
Panel B: Decile 3 - Self-employed income					
Directive	1.843	-0.037*	-0.033*	1.102	1.037
	(1.200)	(0.022)	(0.020)	(1.629)	(1.803)
Observations	15,951	23,845	11,754	8,362	7,209
Panel C: Decile 10 - Employee income					
Directive	2.217***	-0.002	0.004	1.381***	1.763***
	(0.658)	(0.003)	(0.003)	(0.368)	(0.456)
Observations	67,217	133,214	53,419	89,447	48,706
Panel D: Decile 10 - Self-employed income					
Directive	2.662***	-0.011	-0.012	2.931***	3.342***
	(0.885)	(0.012)	(0.015)	(1.109)	(1.199)
Observations	26,162	50,320	19,549	16,369	12,924

Note:
This table presents the effects of the DGSD implementation on the growth rates of different income subcomponents and related outcome variables for different income groups. Column (1) of the analysis is based on estimating equation 2 and displays the results for household-level growth in the income subcomponent (Panel A and C: employee income; Panel B and D: self-employed income) for the subset of households belonging to the bottom income group, i.e., for $g = 3$. Panels C and D show the results for $g = 10$. Columns (2) - (4) are the results for individual-level analyses based on equation 3. Columns (2) and (3) display the impact on the individual's change in (self-)employment status for all household members or only the main earner. Columns (4) and (5) show the effect on the individual-level growth in the income subcomponent for all household members or only main earners that continuously report that type of income. All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and country fixed effects. In columns (2)-(4), the individual-level controls Male, Age, Age^2, Years of work experience, and Education status are included. See Table A1 for variable definitions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1

Table A12: Treatment intensity analysis of BRRD effect

Δ Disp. Household Income [%]	(1)	(2)	(3)	(4)	(5)
	Baseline	Stringency		Supervisory power	
		<50%ile	>50%ile	<50%ile	>50%ile
Decile 1 × Directive	0.024	-1.021	1.463	0.583	-0.567
	(1.512)	(2.288)	(2.264)	(1.978)	(2.535)
Decile 2 × Directive	0.609	0.405	0.469	1.041	0.209
	(1.049)	(1.450)	(1.744)	(1.350)	(1.755)
Decile 3 × Directive	0.966	0.532	1.322	1.146	0.823
	(0.891)	(1.157)	(1.441)	(1.085)	(1.594)
Decile 4 × Directive	1.106	0.518	1.594	0.850	1.815
	(0.920)	(1.343)	(1.450)	(1.234)	(1.468)
Decile 5 × Directive	1.450	0.675	2.754**	1.646	1.911
	(0.882)	(1.277)	(1.315)	(1.185)	(1.366)
Decile 6 × Directive	1.729*	0.846	2.550*	1.426	2.329
	(0.957)	(1.436)	(1.517)	(1.335)	(1.445)
Decile 7 × Directive	1.606*	0.919	2.514*	1.930	1.569
	(0.935)	(1.250)	(1.460)	(1.175)	(1.498)
Decile 8 × Directive	2.151**	1.739	2.199	1.792	2.663*
	(0.906)	(1.242)	(1.415)	(1.125)	(1.598)
Decile 9 × Directive	1.973**	0.830	2.769*	1.651	2.355
	(0.876)	(1.198)	(1.416)	(1.176)	(1.463)
Decile 10 × Directive	2.378**	1.167	3.283**	2.284*	2.848*
	(0.954)	(1.137)	(1.621)	(1.331)	(1.454)
Observations	710,398	326,464	314,192	368,129	292,314
R-Squared	0.03	0.03	0.03	0.03	0.03

Summary statistics	Stringency		Supervisory power	
Mean	1.68	3.00	9.50	12.62
SD	0.74	0.00	2.05	0.68
Min	0.00	3.00	5.00	12.00
Max	2.00	3.00	11.00	14.00

Note: This table presents our treatment intensity analysis of the BRRD baseline effect (column (1)) based on equation 1. In columns (2) and (3), we report the estimation results for the subset of countries that reported below and above median levels of restructuring power in 2011, respectively. In columns (4) and (5), we run separate regressions for countries that had below and above median levels of supervisory power in 2011. The bottom part shows summary statistics of the ex-ante restructuring power and ex-ante supervisory power in the different subsets. All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and year-fixed effects. See Table A1 for variable definitions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

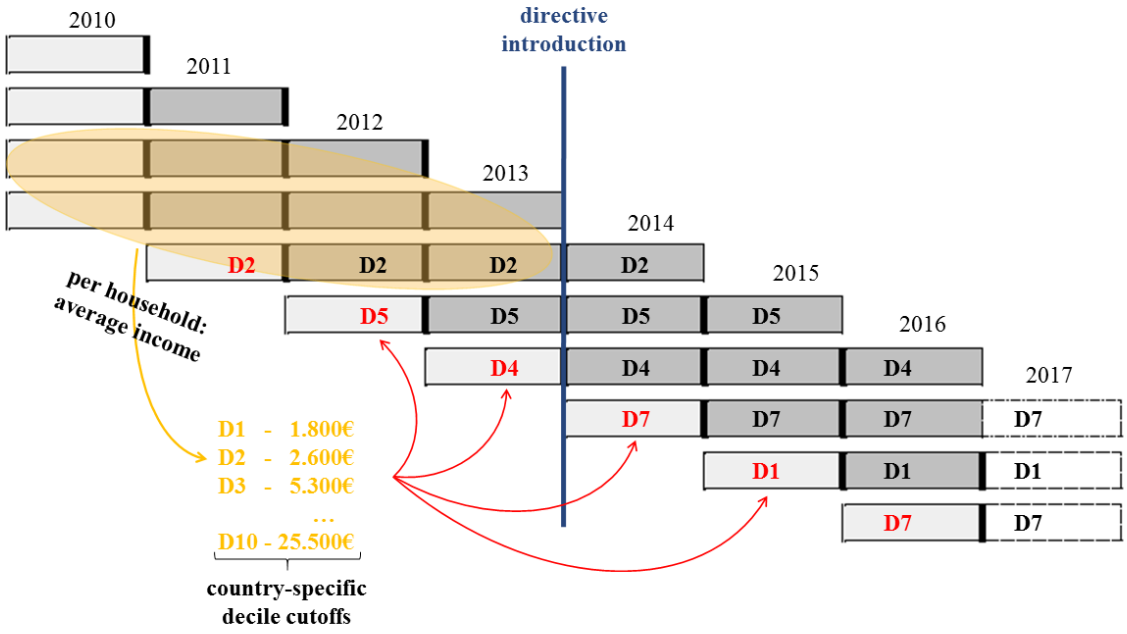
Table A13: Treatment intensity analysis of DGSD effect

Δ Disp. Household Income [%]	(1)	(2)	(3)	(4)	(5)
	Baseline	Stringency		Supervisory power	
		<50%ile	>50%ile	<50%ile	>50%ile
Decile 1 × Directive	0.125	-0.594	1.921	0.134	0.714
	(1.528)	(1.437)	(2.643)	(1.937)	(2.430)
Decile 2 × Directive	1.353	1.091	2.361	1.152	2.383
	(1.049)	(1.131)	(1.664)	(1.319)	(1.610)
Decile 3 × Directive	1.702*	1.393	2.748**	1.167	3.087**
	(0.914)	(1.015)	(1.368)	(1.022)	(1.489)
Decile 4 × Directive	2.143**	1.512	3.311**	0.838	4.867***
	(0.900)	(1.130)	(1.321)	(1.172)	(1.311)
Decile 5 × Directive	1.873**	1.056	3.697***	1.438	3.649***
	(0.872)	(1.058)	(1.169)	(1.127)	(1.338)
Decile 6 × Directive	2.511***	1.742	4.007**	1.427	4.790***
	(0.947)	(1.054)	(1.534)	(1.272)	(1.385)
Decile 7 × Directive	2.296**	1.745	3.319**	1.685	4.132***
	(0.916)	(1.097)	(1.370)	(1.143)	(1.381)
Decile 8 × Directive	2.673***	2.079*	3.865***	1.559	4.708***
	(0.898)	(1.072)	(1.429)	(1.099)	(1.546)
Decile 9 × Directive	2.834***	2.106*	3.698***	1.286	5.497***
	(0.857)	(1.116)	(1.306)	(1.163)	(1.302)
Decile 10 × Directive	3.078***	2.200*	3.958***	2.027	5.381***
	(0.934)	(1.264)	(1.355)	(1.303)	(1.385)
Observations	710,398	370,423	270,233	368,129	292,314
R-Squared	0.03	0.03	0.03	0.03	0.03

Summary statistics	Stringency		Supervisory power	
Mean	0.74	2.08	9.50	12.62
SD	0.44	0.27	2.05	0.68
Min	0.00	2.00	5.00	12.00
Max	1.00	3.00	11.00	14.00

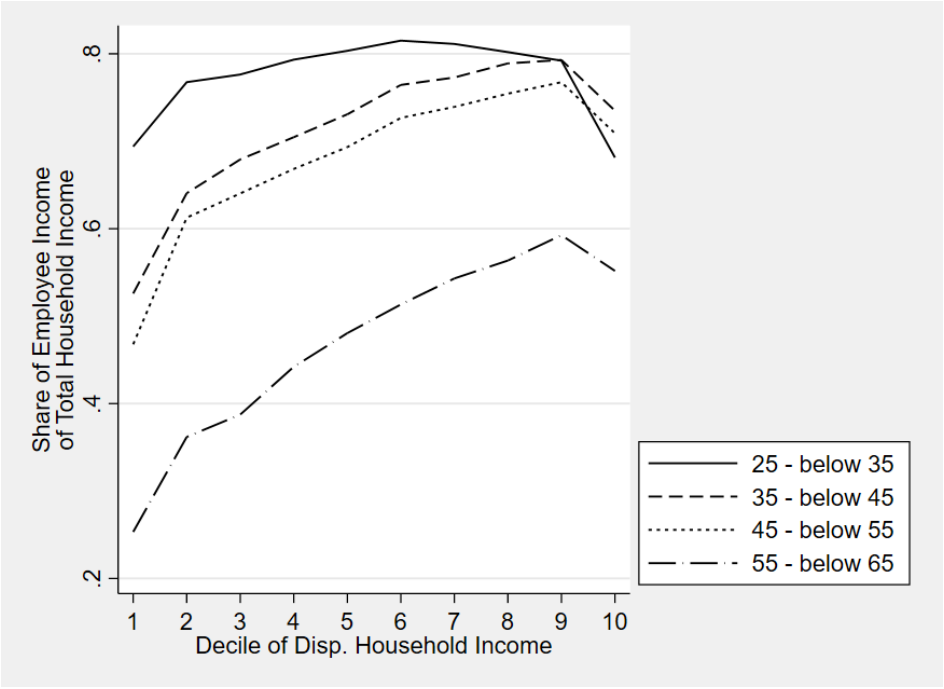
Note: This table presents our treatment intensity analysis of the DGSD baseline effect (column (1)) based on equation 1. In columns (2) and (3), we report the estimation results for the subset of countries that reported below and above median levels of mitigation of moral hazards from deposit insurance in 2011, respectively. In columns (4) and (5), we run separate regressions for countries that had below and above median levels of supervisory power in 2011. The bottom part shows summary statistics of the ex-ante mitigation of moral hazards from deposit insurance and ex-ante supervisory power in the different subsets. All regressions include controls for inflation, GDP growth, household size, owner-occupier status, and year-fixed effects. See Table A1 for variable definitions. Standard errors are two-way clustered at the household and country-year level. *** p<0.01, ** p<0.05, * p<0.1.

Figure A1: Construction of country- and regulation-specific income deciles

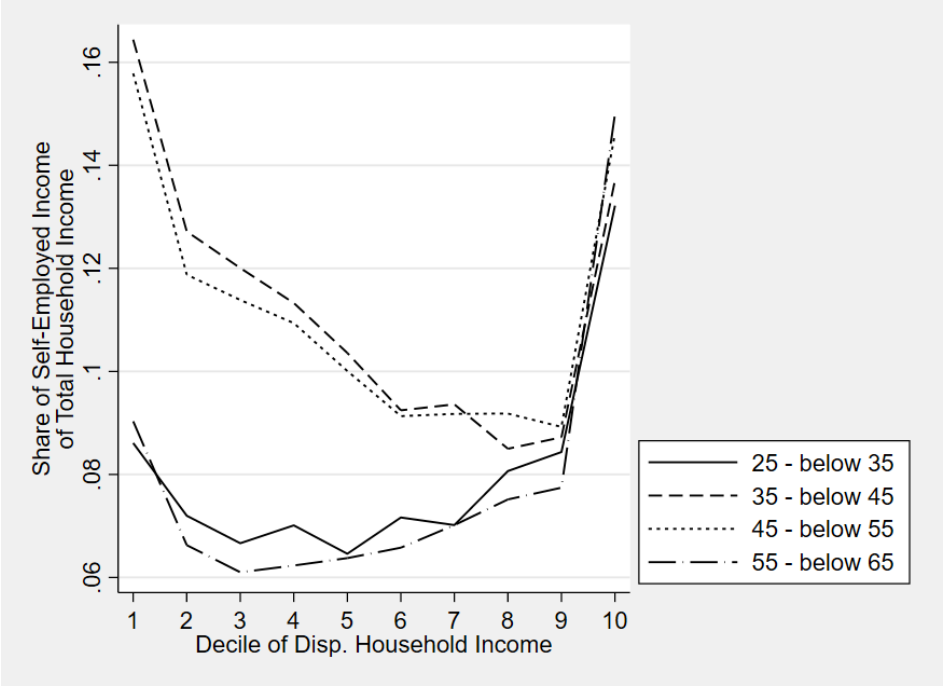


Note: This figure illustrates the process of decile construction. Decile cutoffs are calculated based on the average pre-regulation disposable income for households that feature at least three non-zero income observations before national regulation implementation. Once the deciles are determined, households are grouped into these deciles according to their first observed disposable income. Note that deciles are time-invariant, i.e., households do not transition between deciles over time. The resulting deciles are specific to a given regulation in a given country.

Figure A2: Employee and self-employed income share of total household income by age group



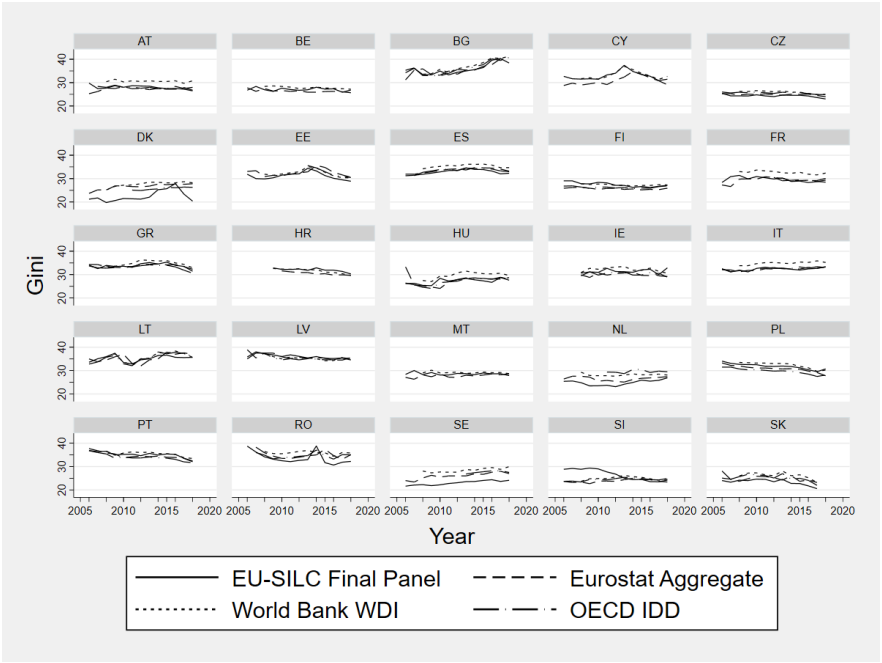
(a) Employee Income



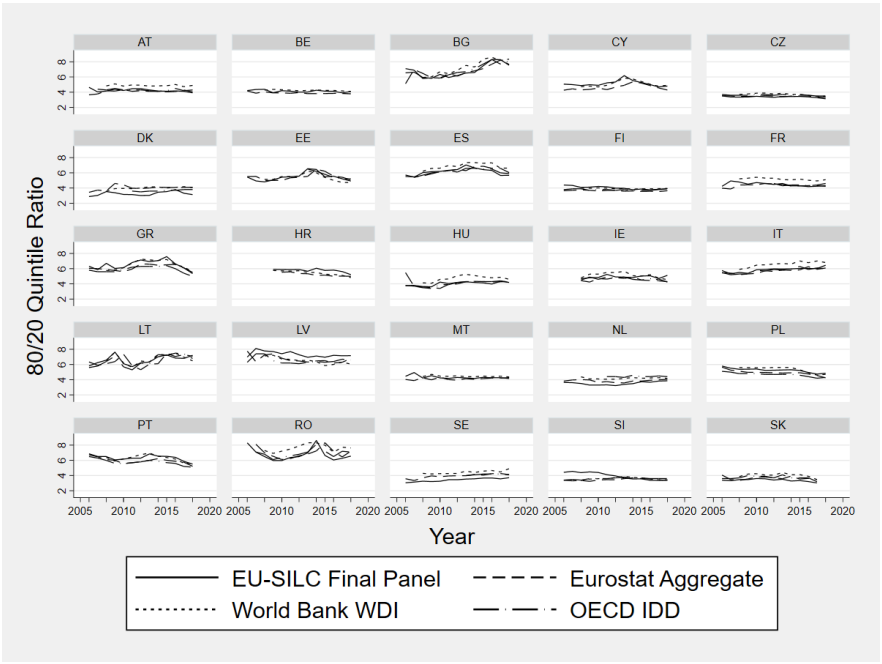
(b) Self-Employed Income

Note: This figure illustrates the (a) employee and (b) self-employed income share of total household income across age groups for the sample used for regression analysis. Households are sorted into age groups according to the mean age of all working-age household members.

Figure A3: Gini coefficients (a) and quintile ratios (b) of equivalized disposable household income



(a)



(b)

Note: This figure displays the Gini coefficients (a) and quintile ratios (b) of equivalized disposable household income calculated based on our sample used for regression analysis and extracted from the longitudinal EU-SILC User Databases 2010-2019. The measures are compared to aggregate measures retrieved from Eurostat, World Bank WDI, and OECD IDD. The figure covers all 25 EU countries in our sample over the 2010-2018 sample period.