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FINANCIAL INTEGRATION AND INCOME INEQUALITY: AN ECONOMETRIC ANALYSIS

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ABSTRACT

The process of financial integration increases income inequality in the early stages of development, but once the financial market moves to maturity in terms of integration, financial integration has an equalising effect. This relationship is estimated using a System General Method of Moments (GMM) estimator and is based on a panel data of 181 countries from 1970 to 2014. The relationship between *de facto* financial integration and the Gini-coefficient of inequality is different for developing countries, emerging market economies and advanced economies. I investigate three channels through which financial integration might affect inequality. Financial depth appears to be a significant channel through which financial integration affects income inequality. The labour share of income reduces the non-equalising effects of financial integration and financial access seems to play little to no role in this relationship.

1. Introduction

The distribution of wealth has always been an important topic in economics but has received new attention through the works of Thomas Piketty's (2013) book '*Capital in the Twenty-First Century'* and Joseph E. Stiglitz's (2012) book '*The Price of Inequality'*, as well as reports that have come out stating that billionaires have increased their wealth by almost four trillion US dollars, whereas it could take over a decade for the world's poorest to recover from the economic impacts of the COVID-19 pandemic (Berkhout et al., 2021). Rising income inequality is, however, not a recent phenomenon. Since the 1980s, income inequality has been rising within many advanced and developing countries, while world GDP growth has shown no signs of slowing down. To explain both phenomena, rising income inequality and economic growth, scholars have been studying the (distributional) effects of globalisation. This has resulted in a large literature on the effects of trade globalisation and financial integration on economic growth (Prasad et al., 2007), as well as a large number of papers on the effects of trade globalisation on income inequality (Meschi & Vivarelli, 2009; Lin & Fu, 2016). Literature on the relationship between financial integration and income inequality, however, remains scant. Therefore, this paper will focus its efforts on determining the relationship between financial integration and income inequality and the mechanisms which are at play within this relationship. I look at three mechanisms to be able to differentiate between possibly contradicting mechanisms. The first two mechanisms are related to financial development. The first mechanism relates to the proposed negative relationship between financial integration and income inequality. Financial access, characterised by a widening of the financial market, allows for increased access to credit which can allow households and individuals to smooth their consumption and invest in human capital. Running a regression with access to credit as the dependent variable will allow me to determine whether the poor can benefit from financial integration, thus alleviating income inequality. The second mechanism, financial depth, often measured as private credit by GDP, signals the size of the credit market. When the economy is characterised by capital constraints, individuals have trouble getting access to credit due to scarcity, which could increase income inequality. The third mechanism relates to the effects on the labour and capital shares of income. If, as proposed by Rajan and Zingales (2003) increases in financial integration only benefit the rich, the returns to the activity of labour will decrease and the returns to ownership will increase, which decreases the labour share of income. As the returns to labour activity are the main source of income for the vast majority of the population and returns to ownership a more important source of income for the wealthy, running a regression with the labour share of income as the dependent variable will provide more information on whether the rich benefit disproportionately more from financial integration than the poor.

This paper contributes to the empirical literature on financial integration and income inequality, investigating the options of a linear and non-linear relationship. The contributions are fourfold. First, the results provide evidence that financial integration increases inequality, using a large (unbalanced)

panel dataset comprised of 181 advanced, emerging and developing countries from 1970-2014. Second, the paper deviates from other current literature (Furceri & Lougani, 2018; Furceri et al., 2019; Li & Su, 2020) as it approaches financial integration not as an event during which the capital account is liberalised, after which the subsequent effects on income inequality are analysed, but as a continuous process by which financial markets and institutions become more tightly interlinked. To approach financial integration as a process instead of an event, this paper circumvents any issues concerning potential misidentification of episodes. Moreover, approaching financial integration as a process warrants the use of *de facto* financial integration. This also entails our third contribution. This paper uses a measure of *de facto* financial integration, instead of *de jure* financial integration, which means that the results reflect the effects of the actual level of financial integration realised. Measures of *de jure* financial integration are often based on the restrictions on cross-border financial transactions reported in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)* database, but the lifting of restrictions does not have to result into actualised financial integration, as the process of financial integration is only partly driven by governmental action. Fourth, in the face of both conflicting previous theoretical and empirical literature, this paper provides a more nuanced picture by looking at three mechanisms that could explain potential inconclusive or conflicting results, including financial access, financial depth and the labour share of income. As such, this paper also contributes to the literature on each of these concepts and their relationship to inequality.

Several robustness checks are performed to ensure the validity of the results, specifically the robustness of the measures of the dependent and independent variable. As the use of a (gross) Gini-coefficient comes with some well-known limitations, I include a set of alternate measures to capture income inequality, which include the net Gini-coefficient and the top 1%- and 10%-income shares. Although I argue why the use of *de facto* financial integration is preferred above that of *de jure* financial integration, I run a robustness check which captures financial integration with a *de jure* measure to check whether the results still hold. Furthermore, I check whether the findings are robust to the inclusion of tax havens. Tax havens receive a disproportionally large share of global capital flows, which is why they may bias or skew the results. Lastly, I check whether the results still hold when controlling for the occurrence of financial crises. As financial crises lead to financial instability, which could widen income inequality, the results might be biased.

The key findings for the paper are as follows. Financial integration increases income inequality, with a substantial and statistically significant effect. Financial access does not appear to be an important channel through which this occurs, whereas financial depth is. The labour share of income has a negative mediating effect on the relationship between financial integration and income inequality. Once the sample is split into developing, emerging market and advanced economies, the impact of financial integration on income inequality blurs, suggesting that characteristics that accompany those levels of development might play an important role in determining the relationship that financial integration has with income inequality.

The rest of the paper is structured as follows. The next section will review the relevant literature. Section 3 will describe the data, provide descriptive statistics and present the evolution of income inequality and financial integration. Section 4 will describe the methodology after which the results are presented, along with the robustness checks. Section 5 will elaborate on the previously mentioned channels through which financial integration might affect income inequality. Section 6 will summarize the main findings and conclude, including a discussion of the results.

2. Literature review

In this section, I briefly discuss the relevant studies on the effect of financial integration on income inequality. Hereby I review the theoretical and empirical papers separately, focusing the theoretical discussion on papers from the literature on the relationship between financial integration and economic growth, and on the relationship between financial development and income inequality. After, I follow with a critical review of the current empirical literature on financial liberalisation and financial integration. For an overview of the papers discussed in this latter section, view Appendix Table A.1.

2.1. Theoretical discussion

Ideally, the estimation methodology used in this paper would be motivated by a particular theoretical framework. However, no specific theoretical framework exists that focuses on the effect of financial integration on income inequality. Therefore, the estimation methodology in this paper will not be linked directly to any theoretical framework but will include elements from the two closest relating theories in the literature. These theories are focused on the relationship between financial development and income inequality, as well as the relationship between financial integration and economic growth. Together, these two separate literatures offer a potential theoretical basis to the relationship. Theory suggests that financial integration can have an effect on economic growth through a direct and indirect channel. The direct channel suggests that financial integration can have a positive effect on growth through efficient international capital and risk allocation. The indirect channel suggests that financial integration may affect economic growth through its effect on financial development, which appears in two ways. First, financial integration may lead to efficiency and decrease investment costs due to increased competition from foreign financial intermediation. Second, financial integration affects financial development by allowing access to foreign financial markets in terms of direct lending by foreign financial intermediaries. This indirect channel suggests that financial integration affects economic growth through its effect on the financial development of the domestic financial market (Fetai, 2015). As such, I contend that this indirect channel is also active in the relationship between financial integration and the distributional effects of economic growth. Thus, I argue that the theoretical predictions on the relationship between financial development and income inequality can be applied to the relationship between financial integration and income inequality.

The theoretical predictions that are put forth can be sorted into four different strands of literature, which point to a conflicting relationship between financial development and inequality. The first strand of this literature points to a negative relationship between financial development and income inequality. This view says that development in the financial sector through widening and deepening can allow lower-income households to borrow and invest in their human capital, which is much harder to do when credit markets are imperfect. This, in turn, can lead to reductions in income inequality (Galor & Zeira, 1993; Banerjee & Newman, 1993). Greenwood and Jovanovic (1990) propose another, and thus the second, strand of the literature. They propose that the relationship between financial development and inequality follows an inverted U-curve relationship. In the early stages of development, only those who can afford the high fixed costs of joining the financial intermediaries benefit from them, increasing income growth and income inequality. When the economy moves towards maturity, more and more people are able to join the financial intermediaries, which increases growth but decreases income inequality. The third strand of literature proposes a positive relationship between financial development and income inequality. Rajan and Zingales' view (2003) is that it may only be the rich who benefit from getting access to credit, possibly through encouraging the financial sector to channel funds towards the rich. The last strand of literature follows the "too much finance hypothesis" and suggests that the relationship follows a U-curve. According to this last view, the role played by financial integration is positive in the early stages of financial development, but after a certain threshold is reached, further financial integration will lead to a reverse effect, and inequality will start to rise (Tan & Law, 2012; Park & Shin, 2017). For this last strand of literature, however, no theoretical basis exists, as it is only supported by empirical findings.

Moreover, these theoretical predictions as produced by the theories on financial development and income inequality are, for the majority, in accord with the predictions used in the majority of the empirical literature. These latter predictions hinge on two schools of thought. The first argues that globalisation, both through trade and through financial integration, has improved both relative and absolute outcomes in terms of income, thus narrowing the inequality gap. The other argues that, indeed, in absolute terms income outcomes have improved, but that the benefits are not equally distributed, thus widening the inequality gap (Asteriou et al., 2014).

2.2. Empirical Literature

No theoretical basis exists for the relationship between financial integration and income inequality, but empirical papers are more prevalent and quite unanimous in their conclusions, albeit not in their methods. Within these papers, a more recent focus has been on the effects of financial globalisation, similar to this paper, whereas other papers focused more on financial liberalisation, often in junction with financial development (De Haan & Sturm, 2017; Agnello et al., 2012; Zhang & Naceur, 2019). Financial integration and financial liberalisation are closely related concepts but distinguishing the two

concepts from one another is important. Financial liberalisation involves both internal policies and external policies to ease controls in domestic financial markets and to allow for the development of cross-border financial markets. Financial integration specifically captures the external policies that reduce constraints in cross-border capital and investment flows.

The database from Abiad et al. (2010) is often used to measure liberalisation. In the database, seven different dimensions of financial sector policy are distinguished, including (i) credit controls and excessively high reserve requirements, (ii) interest rate controls, (iii) entry barriers, (iv) state ownership in the banking sector, (v) financial account restrictions, (vi) prudential regulations and supervision of the banking sector and (vii) securities market policy. From these different dimensions, it can be interpreted that financial liberalisation is mostly concerned with liberalisation from the point of the domestic market. Financial integration, on the other hand, concerns itself more with capital flows from the cross-border perspective. In the papers on financial integration, financial integration is often captured either *de jure* or *de facto*. *De jure* financial integration measures are often based on the IMF's AREAER and include dimensions on (i) the presence of multiple exchange rates, (ii) restrictions on current account transactions, (iii) restrictions on capital account transactions and (iv) the requirements of the surrender of export proceeds. Data for *de facto* financial integration is often taken from the database created by Lane and Milesi-Ferretti (2017) which contains estimates of the external assets and liabilities positions of countries.

The importance of the distinction between financial liberalisation and integration becomes more apparent when looking at the results. In the case of financial liberalisation, the reported signs of the relationship with income inequality are mixed. Zhang & Naceur (2019) and De Haan & Sturm (2017), for example, both find that financial liberalisation, using Abiad et al.'s (2010) dataset, widens inequality. Agnello et al. (2012), using the same dataset, finds that financial reforms lead to a narrowing of inequality. To address the effect of financial liberalisation on income inequality and the heterogeneity of the result, Ni & Liu (2019) performed a meta-regression analysis covering 23 cross-country studies and find a small, negative relationship. Finding this negative relationship is contingent on the inclusion of a control for financial development or an interaction term between financial development and financial liberalisation, as studies that include such terms are less likely to find a negative relationship between financial liberalisation and income inequality. Furthermore, the measurement used for financial liberalisation can change the effect from narrowing to widening inequality. Financial reforms, for example, are likely to reduce income inequality as they have a more multidimensional nature.

In contrast, the reported findings in the literature on the effect of financial integration on income inequality are a lot more conclusive, with the majority of the papers reporting a positive effect, thus leading to a widening of income inequality. The literature itself remains scant to this day and can be roughly separated into three groups. The first group focuses on capital account liberalisation and analyses the effect of a capital account liberalisation episode on subsequent income inequality (Furceri & Lougani, 2018; Furceri et al. 2019; Li & Su, 2020). The second group examines the relationship

between income inequality and financial globalisation, in conjunction with the effect of trade globalisation (Jaumotte et al., 2013; Asteriou et al., 2014). The third group provides a theoretical contribution to the literature, with their empirical results confirming the hypotheses of their theoretical model (Bumann & Lensink, 2016; Liu et al., 2020).

Furceri and Lougani (2018) find a positive impact of capital account liberalisation on income inequality and find that this effect is larger whenever the country's financial development, including both its depth and width component, is low and in periods following financial instability. Besides these latter two channels, they also suggest that an episode of capital account liberalisation affects income inequality through its impact on labour's bargaining power, made visible through the labour share of income, which provides another perspective on how the benefits of globalisation are shared. Furceri et al.'s (2019) paper corroborates these findings and provides further evidence that capital account liberalisation affects the labour share of income negatively, suggesting a widening of inequality, by employing a difference-in-difference strategy using industry-level data for 23 advanced economies. This is particularly the case for those industries with higher financial dependence and higher elasticity of substitution between labor and capital. Li & Su (2020) also validate these findings by employing a difference-in-difference strategy based on the identified years of capital account liberalisation. They complement the previous papers by showing how the liberalisation-inequality correlation differs between the liberalisation of equities, bonds, FDI and other capital, as well as inward and outward capital account liberalisation. They find that it is primarily the liberalisation of inward capital flows that increase inequality, while outward capital account openness has an insignificant relationship with income inequality. The liberalisation of FDI is also not significantly associated with widening inequality, whereas the liberalisation of other types of capital markets are significantly and positively correlated with inequality, in particular the liberalisation of the international equity market.

The second group of articles takes a broader look at the influence of globalisation on income inequality. Jaumotte et al. (2013) incorporates the effects of trade globalisation, financial globalisation and technology in an empirical model, while looking at a sample of 51 advanced and developing countries, and finds that technology has a greater impact than the combined effect of trade and financial globalisation on income inequality. This limited impact of globalisation is due to two offsetting tendencies; whereas financial globalisation increases income inequality, trade globalisation reduces inequality. Especially FDI contributes to increased inequality from financial globalisation. Asteriou et al. (2014) find similar results looking at the EU27 countries, suggesting that trade openness has an equalising effect, whereas financial globalisation drives inequality, in particularly FDI. These findings contradict with the findings of Li & Su (2020), which found that it was all other capital transactions besides FDI that had a significant and positive relationship with inequality.

The two theoretical papers on financial integration and income inequality include Bumann & Lensink (2016) and Liu et al. (2020). The former paper develops a theoretical model comprising of agents with varying investment abilities and a banking sector. Agents with good investment skills

become investors and earn the most money. Agents with fewer investment skills become savers and earn less money. The financial regulator present in the country determines the reserve requirement and restricts the amount of foreign funds that can be used to finance domestic loans. Financial liberalisation lowers the wedge between interest rates on deposits and loans and, hence, improves banking efficiency. Improved bank efficiency reduces borrowing costs, which will lead to a sharp increase in aggregate loan demand, requiring an increase in the deposit rate to restore equilibrium in the financial market. The increase in the deposit rate improves the income of savers and, hence, the distribution of income. However, the extent to which bank efficiency leads to reduced costs depends on the financial depth of a country as it coincides with a low interest elasticity of demand for loans. In the case of low financial depth, increases in bank efficiency will only have a minor impact on loan demand and will require a decrease in the deposit rate to reach financial market equilibrium, which reduces the income of savers and consequently increases income inequality. Empirically, Bumann & Lensink (2016) find support for their theoretical findings, with the estimates suggesting that financial liberalisation only tends to lower income inequality if the level of financial depth is at a sufficient level. Liu et al.'s (2020) model is a small open economy comprising of heterogenous agents and financial frictions. These heterogenous agents can be classified as households and entrepreneurs. Households finance their spending by work and save for retirement when they are young, to consume their accumulated wealth when they are old. Entrepreneurs consume and invest and borrow to finance their spending when they are young, to consume their accumulated wealth after debt repayments when they are old. Households save in domestic banks and entrepreneurs borrow from domestic banks, but both can also save or borrow from foreign banks depending on the capital inflow and outflow policies. Financial intermediation costs generate a range between deposit and lending interest rates. In this model, a permanent reduction in either capital inflow or outflow taxes can raise the household share of income and thus reduce inequality. When capital outflow taxes are permanently reduced, a slight increase in the lending rate (and thus the rate of return on capital investment) and a larger increase in the deposit rate raises household income relative to entrepreneur income, reducing income inequality. A permanent reduction of capital inflow taxes also reduces inequality, as reducing inflow taxes pushes down the domestic lending rate while the deposit rate is invariant to changes in inflow policies. The short-run implications of this model, however, point to different effects. A temporary decline in the foreign interest rate would lead to an insurge of capital inflows, which reduce the financing costs for investment, thus boosting the entrepreneur's income. The shock to foreign interest rate would also reduce the domestic deposit rate, depressing the household's income. Capital inflows would then increase inequality during the transition periods. Liu et al. (2020) find evidence for these short-run effects using a panel of emerging market economies instrumenting for the potential endogeneity of capital flows. Capital inflows are associated with increases in income inequality whereas capital outflows are associated with declines in inequality. Both papers thus imply that financial integration leads to reduced income inequality, either

conditionally or after a transitory period has passed. These hypotheses and the associated results confirming them contradict the other empirical papers mentioned.

Although the little existing literature is quite uniform in its conclusions on the relationship between financial integration and income inequality, this paper intends to close some gaps in a number of ways. First, although literature on the relationship between financial globalisation and income inequality exists, it often looks at the effects of trade and financial globalisation combined or is based on episodes of capital account liberalisation. No study has yet been performed that specifically looks at the effects of *de facto* financial integration, in isolation, on income inequality, where financial globalisation was approached as a continuous process by which financial markets and institutions become more tightly interlinked, instead of an episode during which the capital account is liberalised and after which this liberalisation ends, albeit at a higher level of financial openness. This approach, however, might be more reflective of what actually happens when opening the capital account. Second, this paper will look at the mechanisms through which financial integration affects income inequality. Currently, Furceri & Loungani's (2018) paper is the sole paper that examines this precise relationship, however, they include two potential mechanisms, financial depth and financial inclusion, as conditional variables rather than estimating the mediating effects of these elements of financial development. Therefore, this paper will look at the impact financial integration has on financial depth and financial inclusion, as well as labour share of income, thereby following in the footsteps of Furceri & Lougani (2018) and Furceri et al. (2019). Third, this paper will try to establish some clarity on what the role is of financial crises on the relationship between financial integration and income inequality. Furceri & Lougani (2019) view financial crises as a channel through which capital account liberalisation reforms may increase income inequality and test this hypothesis by including a dummy variable for those capital account liberalisation episodes that have been followed by a financial crisis within 5 years of the episode. This approach, however, does not answer the question how much of the effect of financial integration on income inequality can be contributed to financial crises. Therefore, I perform a robustness check whereby I control for financial crises to gauge the effect of financial crises on the relationship between financial integration and income inequality. Lastly, the existing papers focus primarily on the existence of a linear relationship between financial integration and income inequality, whereas the relationship could possibly also take an (inverted) U-shape. Therefore, I include the squared term of the financial integration variable for a potential nonlinear relationship.

3. Data

In this section, I introduce the data and data sources used in the analysis of this paper, including descriptive statistics. Moreover, I review the eventual sample of countries used in the analysis and highlight some underlying trends.

3.1.Measures and data sources

The dataset is mainly derived from three different data sources. Data on Gini-coefficients comes from the Standardised World Income Inequality Database (SWIID) created by Frederick Solt (2016). This dataset contains comparable estimates of Gini-coefficients of household disposable income (post-tax, post-transfer), household market income (pre-tax, pre-transfer), and the absolute and relative redistribution for 173 countries for as many years as possible from 1960 to 2018. I use the estimated Gini-coefficient of household market income as the main measure for income inequality, as this measure is pre-tax and pre-transfer. This measure is not ideal as it does not capture the eventual disposable income of households, and government spending and taxes affect income distribution measured by the gross Gini (Bergh, 2005), but it does serve as a better proxy than the net Gini-coefficient as that is highly influenced by taxes and redistributive policies. Moreover, this also mitigates some concerns that tax-avoidant behaviour from the wealthy could bias the estimate for the Gini downward. Gini-coefficients are bounded between 0 and 100, where a larger value signals a higher degree of income inequality. The largest benefits of using the SWIID is that the database provides comparable estimates, as it standardises income, and the large number of countries for which data on Gini-coefficients are included.

The measure of financial globalisation used in this paper is based on a *de facto* measure of financial integration. The data comes from the External Wealth of Nations II dataset created by Lane and Milesi-Ferretti (2016). This dataset contains estimates of external assets and liabilities for 213 countries for the period 1970 to 2014. They report the external asset and liability positions, and the composition of international capital flows, distinguishing between foreign direct investment, portfolio equity investment, official reserves and external debt. This dataset will provide the data for the measure of de facto financial integration, measured by the sum of the external asset and liability positions divided by GDP. Although *de facto* measures are more sensitive to potential reverse causality, they offer a benefit over *de jure* measures as they are less noisy indicators, but also because they measure *actual* capital flows and not changes in regulatory openness, which might not reflect what is actually happening. Using gross positions over net positions has the added advantage that it captures the full extent of inflows and outflows which both could influence income inequality.

As a supplement to the data on the Gini-coefficients, I use data on the Top-1% and -10% income share from World Inequality Database. This database combines different data sources to provide data on income shares in a systematic manner, allowing comparisons between countries and over time. These

top income shares, along with the net Gini-coefficient, will be alternative measures to the gross Gini-coefficient used in the main analysis, to check for the robustness of the latter as a measure of income inequality. I supplement the data on financial integration with a measure of *de jure* financial integration, taken from the Chinn and Ito (2008) database. Although alternative databases exist which capture *de jure* financial integration, the Chinn and Ito index provides the largest country and time coverage. This index bases its values for financial integration on the IMF's AREAER, by creating dummy variables that codify the tabulation of restrictions. This measure is used to test for the robustness of the *de facto* financial integration measure used in the main analysis. Data on financial access and financial depth are taken from the World Bank's Global Financial Development database. Financial access and depth and are measured as number of commercial bank branches per 100,000 adults and private credit to GDP, respectively. The Global Financial Development database covers an extensive dataset of financial system characteristics for 205 economies from 1960 to 2010. Although information on the actual number of bank accounts the population holds is available, this information is more freely available for developing countries. As such, using this data might not be representative for the sample as a whole, therefore I choose to use this alternative measure to capture access to credit. Information on labour shares of income will be taken from the dataset created by Karabarbounis et al. (2014), which is based on the UN System of National Accounts among other sources. The dataset covers 103 countries from 1975 to 2012. Data on controls are taken either from the above-mentioned datasets or the World Bank's World Development Indicators database. These controls include the share of government expenditure and the share of industry and agriculture value-added, GDP, the level of trade openness, redistributive policies, financial access and financial depth. These controls have been included following Furceri & Loungani (2018). However, I also include controls for the ageing of the population, considering countries in which the population is older is generally more unequal, and the level of educational attainment as this influences the earning opportunities of a country. Table 1 provides the descriptive statistics for the main variables. A couple of patterns are note-worthy. The averages for the financial measures – integration, access and depth – all become larger the more developed a country is, but so do their standard deviations. The labour share of income also increases as the country becomes more developed. For a full description of the data, including definitions of variables and data sources, see Table A.2.

3.2. Sample

The underlying sample includes 181 countries, of which 30 can be classified as advanced economies, 91 as emerging market economies and 60 as developing countries. A list of the countries included in the sample can be found in Table A.3. This eventual sample does not include tax havens to which the Corporate Tax Haven Index has assigned a Corporate Tax Haven Index (CTHI) value of over 3.0%. This score is calculated by two different scores, their Haven Score and Global Scale Weight. The former is a measure of how much scope for corporate tax abuse a jurisdiction's tax and financial systems

allow. The Global Scale Weight measures the level of financial activity from multinational corporations in the jurisdiction. Combined, these scores give a picture of how much financial activity, worldwide, is put at risk because of corporate tax abuse in that specific jurisdiction (Tax Justice Network, 2021). This excludes 15 countries from the sample, of which six are European countries. For a full list of the countries classified as tax havens, see Table A.4. The reason for excluding tax havens from the sample becomes apparent when looking at the mean and maximum values for the sample including and excluding tax havens (Table 1 and Table A.5). The average level of *de facto* financial integration of tax havens is 55 times larger than the average level for non-tax havens. The maximum value for tax havens is ten times larger than that of non-tax havens. These outliers, also defined as such by using Nicholas Cox's (2003) extremes command in Stata, show such extreme values that they are likely to skew any further analysis of the data. Moreover, the influx of financial flows into these countries says little about the subsequent income inequality within that country, as it is likely that the senders and receivers of these capital flows are not present in this subset of countries. All the tables and graphs in this paper will therefore reflect the sample, excluding tax havens, unless stated otherwise.

3.3. Trends

The data on both the level of income inequality, as measured by the Gini-coefficient, and the level of financial integration show some interesting trends. First, for the level of income inequality, it appears that the average levels of the Gini-coefficient converged towards the end of the time frame, averaging around a Gini-coefficient with a value of 46 for advanced, emerging market and developing countries. Figure 1 also shows a smoothing of the average Gini-coefficients, indicating that the volatility in the Gini-coefficient itself has decreased. Notably, the Gini-coefficient for advanced economies has steadily increased since the beginning of the time frame, contributing to a rise of roughly 5 points in the Gini-coefficient. Interestingly, advanced economies started out with the lowest levels of income inequality, but, as stated, have now converged with the other countries at a higher rate of income inequality. For developing countries, the Gini-coefficient was the most volatile in the period 1970 to 1990 where it sees two large jumps, at one point jumping to a Gini-coefficient value of 48. For emerging market economies, also our largest group in the sample, the average Gini-coefficient has remained relatively steady at a coefficient-level of 46, with the exception of a slight decrease at the beginning of the nineties. Figure 2 shows the average level of *de facto* financial integration, separated by whether the economy of the country is advanced, emerging market or developing. What is interesting to see is that the advent of financial globalisation, in the form of *de jure* financial openness (Figure A.6), starts in the 1990s but significant increases in *de facto* financial integration only really commence from 2000 onwards. *De facto* financial integration spiked up for advanced economies from this period onwards, only showing a steep decline from 2010 onwards. For developing countries, the average level of *de facto* financial integration actually declined and emerging market economies only shows a slight increase towards the end of the first decade of the 20th century.

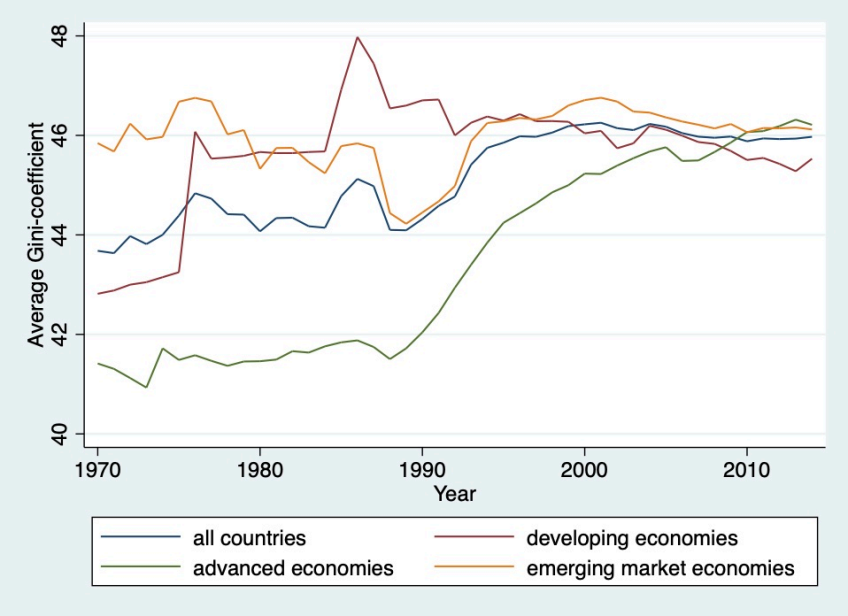

Fig. 1. Average gross Gini-coefficient over time, per country classification

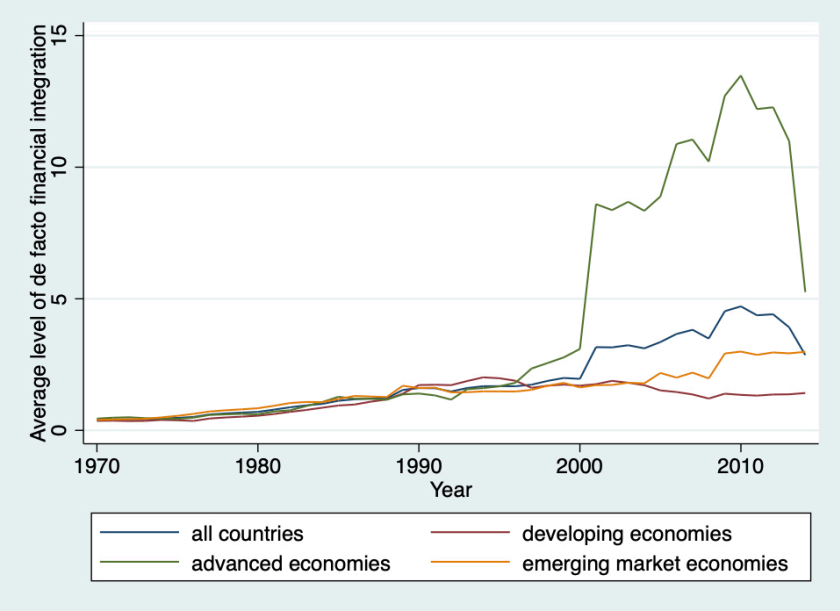

Fig. 2. Average level of *de facto* financial integration, per country classification

Table 1

Descriptive statistics by income groups, excluding tax havens

	N	Average	SD	Min	Max
Panel A. All countries					
Financial integration (%GDP)	7781	204.54	868.58	0	23612.88
Gross Gini	4644	45.51	6.91	21.9	72.5
Labour share (%GDP)	1667	40.68	12.30	3.39	80.25
Financial access	1802	18.21	25.24	0.13	287.24
Financial depth (%GDP)	6289	32.50	37.07	0.0052	972.21
Panel B. Developing economies					
Financial integration (%GDP)	2499	123.73	175.24	0	3368.15
Gross Gini	1281	45.94	6.24	33.7	60.8
Labour share (%GDP)	208	24.95	14.28	3.39	80.25
Financial access	576	5.42	8.28	0.13	46.70
Financial depth (%GDP)	2006	15.99	43.17	0.0052	972.21
Panel C. Emerging market economies					
Financial integration (%GDP)	3722	156.89	360.02	0	7864.90
Gross Gini	2295	46.04	7.69	21.9	72.5
Labour share (%GDP)	708	36.05	9.33	13.88	62.52
Financial access	906	17.87	13.28	0.77	92.17
Financial depth (%GDP)	3175	31.26	22.30	0.80	186.61
Panel D. Advanced economies					
Financial integration (%GDP)	1560	447.68	1825.17	0	23612.88
Gross Gini	1068	43.86	5.52	27.1	52.5

This table displays summary statistics of the main regression variables. Financial integration variables are computed using data from the updated External Wealth of Nations database by Lane and Milesi-Ferretti (2007). Data on the Gini-coefficient is taken from the SWIID. Financial access and depth variables are taken from the Global Financial Development database. Labour share is taken from the dataset created by Karabarbounis and Neiman (2014).

4. Empirical analysis

In this section, I use a dynamic panel model to analyse the within country relationship between financial integration and income inequality. Furthermore, I introduce the specification and estimator used and present the results based on this specification. Lastly, I prove the robustness of the analysis to a variety of alternate measures, the exclusion of financial crises, and the inclusion of financial centres. Here, I also introduce the special case of FDI.

4.1. Specification

Based on the theoretical analysis, I formulate the following hypotheses for the relationship between financial integration and income inequality.

H1: Financial integration has a negative impact on income inequality.
H2: Financial integration has an inverted U-shaped relationship with income inequality.
H3: Financial integration has a positive impact on income inequality.
H4: Financial integration has a U-shaped relationship with income inequality.

To assess these hypotheses, I estimate the following specification using a general method of moments (GMM) estimator and use year fixed effects, captured by τ_t.

$$Y_{it} = \alpha_0 + \tau_t + \alpha_1 FI_{it} + \alpha_2 FI^2{}_{it} + X_{it} + Y_{i,t-1} + \varepsilon_{it} \quad (1.1)$$

Here, α_0 captures a constant and Y_{it} captures the gross Gini-coefficient in country i in year t, FI_{it} and FI^2_{it} capture the level of *de facto* financial integration and α_1 and α_2 are our coefficients of interest. The squared term FI^2_{it} is included since the relationship between financial integration and inequality might also follow an (inverted) U-curve. X_{it} is a vector of control variables and $Y_{i,t-1}$ captures the Gini-coefficient in the year prior to the year of observation. I include this variable since the Gini-coefficient often has a persistent effect. By including this variable, I mitigate the concern that the results are biased because they capture pre-existing income inequality. The vector of control variables includes variables to measure educational attainment, ageing of the population, the level of trade openness, redistributive policies, the share of government expenditure and the share of industry and agriculture value-added, financial access, financial depth and GDP.

4.2. Estimator

As the model included here is a dynamic panel model, it includes lagged levels of the dependent variable as regressors. This poses endogeneity concerns, as the lagged dependent variable is likely to be correlated to the random effects and/or general errors. There are two ways to work around this violation of exogeneity. One is to transform the data to remove the fixed effects, whereas the other is to instrument

the lagged dependent variable that is included as a regressor with variables thought uncorrelated with the fixed effects. These two strategies are Difference GMM and System GMM, respectively. Both strategies provide benefits over the use of, for example, least squares dummy variable (LSDV) to handle dynamic panel bias, but System GMM has a benefit over Difference GMM. System GMM differences the instruments to make them exogenous to the fixed effects, instead of expunging the fixed effects. The assumption lying underneath this approach is that any instrumenting variable must be uncorrelated with the fixed effects. This approach has been put forward by Blundell and Bond (1998) and is especially useful for random walk-like variable. Therefore, I opt for using the system GMM-estimator, using first differences and two-step estimation due to heteroskedasticity. Two-step GMM can lead to more asymptotic efficient estimates, but to correct for this bias I use the Windmeijer's (2005) correction procedure. Although gaps are present in the data, orthogonal deviations are not used over differences as suggested by Roodman (2006), as these gaps are mostly present at the beginning or end of the sample period for each country. The explanatory variables - (squared) financial integration, lagged Gini-coefficient, redistributive policies, financial depth and financial access - are considered endogenous or predetermined and are therefore used as GMM-style instruments, which represents a third of the sample period. I introduce lag limits where needed, to circumvent the problem of "too many instruments" as described by Roodman (2007).

4.3. Results

Table 2 presents the first set of results of Equation (1.1). Column (1) presents a parsimonious model that only includes the year fixed effects, the lagged dependent variable and the (squared) explanatory variable. Column (2) presents the parsimonious model, including demographic control variables, including controls for education, age, GDP, government expenditure, and agriculture and manufacturing value added. Column (3) presents the full model, including the full vector of control variables. In the parsimonious model, there is no evidence of second-order autocorrelation, as the null hypothesis for the AR(2) test cannot be rejected with a z-value of 0.339. Roodman (2009) has suggested that a slightly larger p-value than the null hypotheses can be rejected only at slightly higher p-values as the p-values become inflated with an increasing number of instruments. Roodman (2009) suggests that a p-value over 0.10 and away from 1.0 is ideal when including many instruments. As my instrument count is low compared to the number of observations, the Hansen statistic of 0.087 still shows the validity of overidentification restrictions. The (unreported) Difference-in-Hansen tests for the instrument subsets all show the validity of the overidentification restrictions. In the full model, again, in line with Roodman (2009), the Hansen statistic shows the validity of identifying restrictions. The AR(2) test cannot be rejected either, although the value is close to the general rule of thumb. In the full model, the point estimates of our coefficients of interest are 1.047 and -0.438 respectively. The positive sign on the financial integration variable suggests that financial integration increases income inequality, in line with the theoretical relationship proposed by Rajan & Zingales (2003). The negative sign for the squared

Table 2
Empirical results for the baseline model

	Inequality		
	(1)	(2)	(3)
Financial integration (log)	0.00838	1.226**	1.047*
	(0.022)	(0.57)	(0.609)
Financial integration (squared)	0.00742***	-0.437**	-0.438*
	(0.00284)	(0.204)	(0.242)
Gross $Gini_{t-1}$	1.009***	1.028***	1.008***
	(0.00284)	(0.0106)	(0.00882)
GDP (log)		0.848**	0.904*
		(0.395)	(0.468)
Financial depth (log)			0.0755
			(0.0827)
Financial access (log)			0.0253
			(0.101)
Trade openness (log)			0.366**
			(0.155)
Redistributive policies			0.00365
			(0.00376)
Constant			25.975**
			(12.276)
Control variables	No	Yes	Yes
Year effects	Yes	Yes	Yes
Observations	4190	1716	810
Groups	167	117	106
Instruments	89	69	95
Hansen p-value	0.087	0.105	0.36
AR(2) p-value	0.339	0.142	0.052

The underlying data is a panel set consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. All separately shown control variables are included as GMM-style instruments. No lag limits are used in Column (1). Lags 2 to 16 are used in Column (2) and Column (3). The collapse option of xtabond2 has been chosen. Windmeijer-corrected two-step standard errors are reported in parentheses. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

term of financial integration suggests an inverted U-shaped relationship, reflecting the hypothesis proposed by Greenwood & Jovanovic (1990). Both relationships prove significant at the 10%-level. A one percent increase in the level of *de facto* financial integration increases the level of income inequality by 0.01047. A one percent increase in the (squared) level of *de facto* financial integration decreases the level of income inequality by 0.00438. Interestingly, in the full model it appears that GDP and trade openness have significant and positive relationships with income inequality. The significant positive

relationship between GDP and income inequality indicates that the more income a country accrues, the more unequal its income distribution. The significant positive relationship between trade openness and income inequality contradicts the findings in Jaumotte et al. (2013) that trade openness reduces income inequality. In all three models, the lagged Gini-coefficient is highly significant and positively correlated with the dependent variable, showing the persistence of income inequality.

In Table 3, the results for the model with the full vector of controls is split out over the three different country classifications: developing countries, emerging market economies and advanced economies. The lag levels chosen for this estimation are restricted to two to six instead of 16 – with the exception of the model for advanced countries, where the lag levels are limited to two and three - as the number of instruments would otherwise exceed the number of countries, causing the problem of "too many instruments" (Roodman, 2019). The results here point towards a more nuanced view of the relationship between financial integration and income inequality. As it appears, the signs between the (squared) financial integration term change depending on whether the country is developing, emerging market or advanced. For developing countries, the relationship for the non-squared term turns negative, contradicting previous findings, suggesting that increased levels of financial integration decrease income inequality, as predicted by by Galor & Zeira (1993) and Banerjee and Newman (1993). The positive sign for the quadratic relationship suggests that the "too much finance"-hypothesis holds as proposed by Tan & Law (2012) and Park & Shin (2017). For emerging market economies, the opposite relationships hold. Rajan and Zingales' (2003) hypothesis holds in that there is a positive relationship between financial integration and income inequality. Moreover, the squared term for financial integration takes the shape of an inverted U-curve, as proposed by Greenwood & Jovanovic (1990). For advanced economies, the coefficients have the same signs as for developing countries, which means that financial integration is negatively correlated with income inequality, following the hypothesis by Galor and Zeira (1993) and Banerjee and Newman (1993) and that the quadratic term again follows a U-curve. The coefficient of -6.742 would indicate that a one percent increase in the level of *de facto* financial integration would correspond in an increase in the average Gini-coefficient from 43.86 to 43.93 Although this seems like a small increase in the Gini-coefficient, due to the Gini's high persistence and relative stability (as shown in Figure 1), it highlights economic significance, especially since this coefficient only reflects the effects of financial integration on income inequality in the same year, not over time. It appears that the level of trade openness present in an emerging market economy are significant in determining income inequality, contradicting Jaumotte et al. (2013). Financial depth seems to only reduce income inequality in advanced countries, which could indicate that a certain level of infrastructure has to be reached before financial depth decreases income inequality. Once the results are split out over the different country classes, it appears that only for emerging market economies GDP increases income inequality. Lagged income inequality is still the main predictor of current income inequality, no matter whether the country is developing, emerging market or advanced. The AR(2) null

Table 3
Empirical results for the baseline model, per country class

	Inequality Developing countries	Emerging market economies	Advanced economies
Financial integration (log)	-0.765	1.591	-6.742
	(1.442)	(1.199)	(6.58)
Financial integration (squared)	0.0623	-0.672	2.81
	(0.392)	(0.521)	(2.867)
Gross $Gini_{t-1}$	1.025***	1.005***	1.024***
	(0.028)	(0.0125)	(0.0644)
GDP (log)	-0.111	1.353	-5.451
	(0.7449)	(0.981)	(5.518)
Financial depth (log)	0.0804	0.246	-1.205
	(0.125)	(0.235)	(1.065)
Financial access (log)	-0.18	0.0274	1.255
	0.273)	(0.19)	(0.785)
Trade openness (log)	0.456	0.671*	0.199
	(0.353)	(0.41)	(1.02)
Redistributive policies	0.00123	0.0225	0.0415
	(0.0359)	(0.0153)	(0.0365)
Constant	-3.72	21.11	(omitted)
	(42.19)	(32.05)	
Control variables	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
Observations	229	407	174
Groups	34	55	17
Instruments	39	39	21
Hansen p-value	0.704	0.318	0.559
AR(2) p-value	0.738	0.055	0.27

The underlying data is a panel set consisting of 181 countries, running from 1970 to 2014. Results are shown based on whether the country is developing, emerging market or advanced. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. All separately shown control variables are included as GMM-style instruments. Lags 2 to 6 are used in Column (1) and (2). Lags 2 and 3 are used in Column (3) due to the "too-many-instruments"-problem. The collapse option of xtabond2 has been chosen. Windmeijer-corrected two-step standard errors are reported in parentheses. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

hypotheses for the three analyses can all *not* be rejected, suggesting no second-order autocorrelation. The Hansen p-values are considerably larger once the analysis is split according to the country class, but fall within the range suggested by Roodman (2009).The baseline analysis confirms the findings in previous literature in that financial integration increases income inequality, however, once the sample is split into developing countries, emerging market economies and advanced economies, this picture blurs. It appears that only for emerging market economies financial integration increases income

inequality, whereas for developing countries and advanced economies, financial integration has an equalising effect. Splitting the sample unfortunately removes the significance, which is why these results do not lend themselves for further interpretation.

4.4. Robustness checks

4.4.1. Different measure of financial integration

To ensure that the results are robust to different measures of financial integration, I re-estimate the equation using the KAOPEN-index from Chinn and Ito (2008), normalising the values of the index using the respective minimum and maximum values to fit in the range [0,100] to help interpretation. As *de facto* financial integration can be a noisy indicator, *de jure* financial indicators may provide a solution as well as the added benefit that reverse causality is unlikely. It seems unlikely that the decision to open up the borders of a country financially is related to the level of income inequality, as previously argued in Furceri & Loungani (2018). The correlation between the measure of *de facto* and *de jure* financial integration is quite low (0.3891). The results for the full model do not confirm that the use of *de facto* financial integration is robust to alternative measures. Results are reported in Table A.7. However, once the sample is split according to country classification, the measure seems robust for developing countries and advanced economies. Using a measure of *de jure* financial integration turns all signs negative, suggesting that income inequality decreases, once the sample is split. It is important to note, however, that *de facto* and *de jure* financial integration are measured very differently and that they do not necessarily cover the same concepts. Whereas *de facto* financial integration examines the actual capital flows flowing in and out of a country, *de jure* measures capture the extent to which a country's capital account is open and is therefore based on restrictions of cross-border financial transactions. A lack of such restrictions, however, does not have to translate into an inflow or outflow of *actual* flows. Another measure often used to capture financial integration is FDI, measured as total FDI assets and liabilities. The analysis is robust to this different measure of financial integration, showing the expected sign, but the coefficients are significantly smaller, see Table A.10.

4.4.2. Different measures of income inequality

The measure for income inequality used so far in the analysis is that of the gross Gini-coefficient. To check whether the use of this measure is robust and to overcome certain flaws that accompany the use of the Gini-coefficient, I check the robust of this measure by measuring income inequality by the net Gini-coefficient, taken met from the SWIID, and the Top-1% and -10% of income shares, taken from the World Inequality Database. As shown in the correlation matrix in Table 4, the gross and net Gini-coefficients are quite highly correlated, but especially the Top-1% and -10% are highly correlated with each other. These top income shares are also more closely correlated to the net Gini-coefficient than the gross Gini-coefficient, possibly since these Top-1% and -10% income shares reflect income after taxes and transfers. Results are reported in Table A.8. The net Gini-coefficient confirms the results found in the main analysis, a positive sign for the relationship between financial integration and income

inequality and a negative sign for the relationship between squared financial integration and income inequality. Using top income shares, however, does not prove that the measure used is robust to alternate measures. In Column (3) and (4) of Table A.8, the signs for the relationship between financial integration and the top income shares is negative, suggesting that financial integration decreases the Top-1% and -10% income shares, while thus decreasing the income shares of the other 99% and 90%, respectively. A possible explanation for this finding might be that the Gini-coefficient can pick up the effects of a growing income share of the upper-middle classes, whereas top income shares cannot. In this case, for example, the lowest incomes might increase their income through financial integration but not as much as the upper middle classes. Relative to the Top-1% and -10% income shares, this would indicate a decrease in the top income shares due to the increase in the income shares of the upper-middle classes, whereas the Gini-coefficient picks up on this effect and therefore shows that income inequality actually rises. Because of this and its robustness to the use of the net Gini-coefficient, the gross Gini-coefficient is still my preferred measure for income inequality.

Table 4
Correlation matrix of the different income inequality measures

		(1)	(2)	(3)	(4)
(1)	Gross Gini	1			
(2)	Net Gini	0.6794	1		
(3)	Top 1%	0.4270	0.6920	1	
(4)	Top 10%	0.4805	0.8419	0.8964	1

The underlying data is a panel set of 181 countries, excluding financial centres.

4.4.3. Sidenote on financial crises

As Furceri & Loungani (2018) show, a channel through which financial integration may increase income inequality is by increasing the likelihood of financial crises. Therefore, the occurrence of financial crises, maybe precipitated by an increased likelihood of crises due to financial integration, could constitute an omitted variable bias. If financial integration affects income inequality through financial crises, I expect this to bias the estimates upward as the financial crises would increase income inequality. Therefore, the exclusion of the occurrence of financial crises through the use of a dummy variable should decrease the estimates. To test whether this relationship through which financial integration affects income inequality is present, I construct a dummy variable for the years in which a financial crisis happened. The date and source country of the financial crises is taken from the database created by Valencia & Laeven (2008). In total there were 375 occurrences of financial crises from 1970 to 2007, consisting of systemic banking crises, currency crises and debt crises. As mentioned by Jaumotte et al. (2013), the use of time dummies may suppress business cycle effects, which is not desirable when studying whether the exclusion of financial crises affects the estimates. Therefore, I drop the time dummies from this estimation.

When performing the estimation for the full model excluding financial crises, only one observation is dropped, which indicates that the data that is used for the SYS-GMM estimation is barely affected by financial crises. The coefficients for the (squared) term for financial integration only increase in value a little over 1%, which can be ignored. Therefore, the occurrence of financial crises likely does not bias our results. Results for the analysis can be found in Table A.8. Interestingly, it appears that redistributive policies are important determinants of income inequality in the model when year fixed effects are dropped. It appears that there is a positive, albeit small, relationship between redistributive policies and income inequality. This seems counterintuitive as an increase in the percentage reduction in the market-income inequality due to taxes and transfers would likely decrease income inequality.

4.4.4. Including tax havens

As explained in detail in Section 3.2, the sample in the analysis excludes countries that are classified as tax havens by the Corporate Tax Haven Index, however, to ensure that the analysis is robust, I will perform the analysis again now including tax havens. Results are reported in Table A.10 for the full model and in Table A.11 per country class. The main analysis proves robust to the exclusion of tax havens, as the coefficients keep the same sign and remain statistically significant. The coefficients for the full model including tax havens however do decrease in value. The results become interesting when the sample is split per country classifications. Including tax havens in the sample does not change the sign of the coefficients for advanced countries but decreases them significantly, almost to a tenth of the coefficient in the baseline model. The inclusion of tax havens in the sample thus reduces the positive relationship between financial integration and income inequality, once the sample is split, which suggests that tax havens reduce the noon-equalising effects of financial integration. However, I argue that the analysis the exclusion of tax havens from the sample is warranted, as the signs assigned to the relationships when including tax havens point to the same relationships as the baseline model and because of previously mentioned benefits.

4.4.5. The case of FDI

Evidence surrounding the role of FDI in increasing or decreasing income inequality is limited and hypotheses go in both directions. For instance, Choi (2006) and Jaumotte et al. (2013) find that FDI is more inclined to flow into high-skilled sectors and thus increase income inequality. Herzer and Nunnenkamp (2013) find that FDI reduces inequality over the long run, while the short-run effect is positive. To be able to determine the role of FDI in this analysis, I will perform my analysis but now using FDI instead of the measure of *de facto* financial integration as my main explanatory variable. As Herzer and Nunnenkamp (2013) elaborate, FDI might have different effects over the long- and short-term, therefore I also introduce two lagged variables of FDI, one which is lagged two years and the other five years. Results are reported in Table A.12. Interestingly, it appears that FDI has a rather small effect on income inequality, with each coefficient being smaller than 0.1. This analysis does confirm the previous findings from Choi (2006) and Jaumotte et al. (2013), and Herzer and Nunnenkamp. (2013)

in that the effects of FDI are different over the long- and short term but increase income inequality in the short term. FDI in the same year and in the year prior lead to increased income inequality, whereas FDI flows from five years prior decrease income inequality. The coefficients for these results however are neither economically nor statistically significant. It appears that trade openness is an important determinant of income inequality in this analysis, comparable to the analysis of the full model using *de facto* financial integration.

Taken these separate robustness checks together; I argue that the use of a *de facto* measure of financial integration and the use of the gross Gini-coefficient are appropriate. Although using a *de jure* measure of financial integration switches the signs of the estimates, *de jure* and *de facto* integration capture the same concept, but do so very differently, which might explain this switch. The robustness of these measures to each other have been shown in previous papers (Furceri & Lougani, 2018; Furceri et al., 2019) and FDI, commonly used as a proxy for financial integration, also provides support for the use of the *de facto* measure. The gross Gini-coefficient is robust to the alternate use of the net Gini-coefficient and has the added benefit that taxes and transfers are not included, which means that any tax-avoidant behaviour is still captured. Lastly, the results appear robust to financial crises and the inclusion of tax havens. In the case of FDI, it appears that the equalising effects of FDI appear over time.

5. Integration and inequality: channels

This section will elaborate on the possible channels through which financial integration affects income inequality. Following the line of thinking produced by Fetai (2015), I conjure that financial integration affects income inequality through its effect on financial development. Financial development covers both financial depth and width; therefore I look at these two channels separately. As such, these are the first two channels I examine. Lastly, I examine another possible way through which income inequality can manifest itself in a country, which is through the labour share of income.

5.1. Financial development

As detailed in Section 2.1 on the theoretical background on finance and income inequality, there are conflicting view as to the relationship between financial development and income inequality, but empirically, the evidence points towards a linear relationship in which financial development reduces income inequality (Levine, 2007; Akhter & Daly, 2009; Li et al., 1998; Beck et al., 2007)). The vast majority of the empirical literature on this relationship has focused on the size of the financial sector, thus its financial depth, which is a relatively macro perspective, often measured through credit to the private sector by financial intermediaries. This body of literature points towards a negative relationship between financial depth and income inequality, thus financial deepening having an equalising effect (Hamori & Haschiguchi, 2012). A smaller body of empirical work is now focusing on a more micro-

level of financial development, namely the level of financial access. The general hypothesis in this body of literature is that increasing financial access disproportionately benefits the poor, reducing credit constraints, and therefore reducing income inequality (Galor & Zeira, 1993). Empirical evidence also shows that greater financial access reduces income inequality (Mookerjee & Kalipioni, 2010). To determine whether these are the channels through which financial integration affects income inequality, and how these channels affect income inequality, I will perform two regressions. The first analysis will explore the effects of financial integration on the measure of financial development. The second analysis will explore the effect of financial integration through the channel of financial development on income inequality. In the case of financial access, this analysis will be performed using an interaction term. For financial depth, this analysis will be performed with financial depth as the mediator variable to gauge the direct, indirect and total effects of financial integration on income inequality. Figures 3 and 4 depict the direction of the financial development variables on the relationship between financial integration and income inequality, where financial access serves as a moderator and financial depth as a mediator.

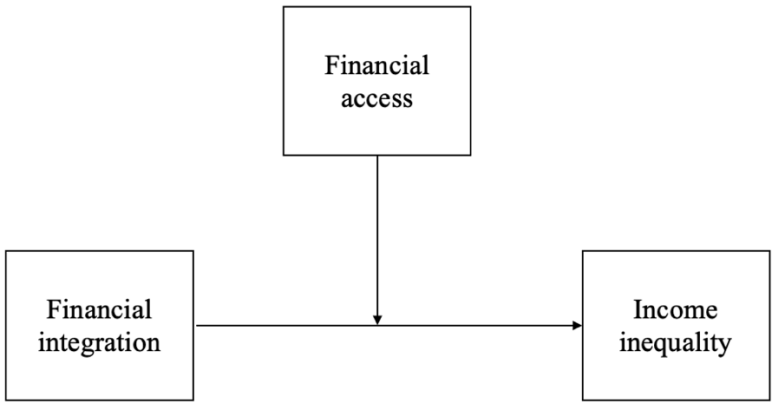

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Fig. 3 Flowchart showing the effect of financial access on the relationship between financial integration and income inequality

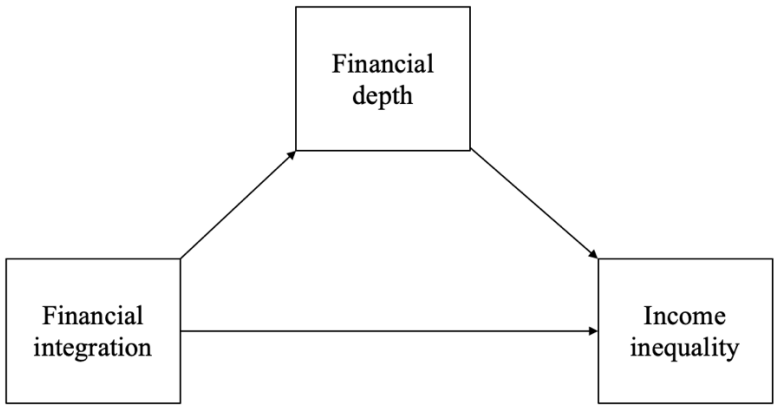

Fig. 4 Flowchart showing the effect of financial depth on the relationship between financial integration and income inequality

5.1.1. Financial access

As stated, the empirical literature on the effect of financial access on income inequality points towards a negative relationship (Mookerjee & Kalipioni, 2010). Whether financial integration, through this channel, affects income inequality positively or negatively depends on the relationship between financial integration and financial access. Frederic Mischkin argues in his 2009 paper that globalisation is a key factor in stimulating financial development. Therefore, I hypothesize that financial integration has a positive effect on financial access.

H5: Financial integration has a positive relationship with financial access

To assess this hypothesis, I estimate the following specification using the same general method of moments (GMM) estimator and use year fixed effects, captured by τ_t.

$$FA_{it} = \alpha_0 + \tau_t + \alpha_1 FI_{it} + X_{it} + Y_{i,t-1} + \varepsilon_{it} \quad (1.2)$$

Here, α_0 captures a constant and FA_{it} captures the level of financial access in country i in year t. Financial access is measured by the number of bank branches per 100,000 adults. FI_{it} capture the level of *de facto* financial integration. $Y_{i,t-1}$ is again included as financial access likely has a persistent effect too – establishing bank branches requires investment and a certain level of infrastructure which make it likely that bank branches will persist over the years. The vector of control variables includes level trade openness, GDP and financial depth. Results are reported in Table 5.

Counterintuitively, it seems that, when studying the whole sample, the relationship between financial integration and financial access is negative, suggesting that increased financial integration reduces the number of bank branches per 100,000 adults. This result however is non-significant both statistically and economically. When splitting the sample per country class, the coefficients take the expected sign for the three groups. The results remain insignificant. Therefore, it seems that financial integration has little effect on financial access. All estimates of interest are not economically significant either. Interesting to note on this analysis is that trade openness appears to have a significant and negative effect on financial access in emerging market economies. The number of bank branches already existing in the year prior to the analysis is an important determinant of the number of bank branches in the subsequent year for all country classes. This analysis, however, does not yet answer the question whether financial integration affects income inequality through financial access, as it could still be the case that the relationship between financial integration and income inequality depends on the level of financial access. The relationship between financial integration and income inequality, as shown in the different hypotheses in Section 4.1 can be either positive or negative, linear or non-linear.

Table 5
Empirical results for effect financial integration on financial access

	Financial access			
	All countries	Developing countries	Emerging market economies	Advanced economies
Financial integration (log)	-0.0132	0.0185	0.0296	0.00618
	(0.0177)	(0.133)	(0.024)	(0.0355)
Financial access$_{t-1}$	0.958***	0.849***	1.0693***	0.924***
	(0.0315)	(0.135)	(0.0215)	(0.0788)
GDP (log)	-0.00716	0.00808	0.0196	-0.00136
	(0.00475)	(0.0391)	(0.0129)	(0.0177)
Financial depth (log)	0.0112	0.0596	-0.00517	0.0468
	(0.0286)	(0.0705)	(0.0381)	(0.0974)
Trade openness (log)	0.0263	-0.00332	-0.131**	0.0104
	(0.0292)	(0.116)	(0.0637)	(0.0883)
Constant	4.051**	-7.384	17.151***	18.345**
	(2.126)	(16.785)	(6.304)	(7.824)
Control variables	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Observations	1315	396	678	241
Groups	141	43	73	25
Instruments	58	23	23	11
Hansen p-value	0.173	0.215	0.902	0.139
AR(2) p-value	0.925	0.882	0.25	0.73

The underlying data is a panel set consisting of 181 countries, running from 1970 to 2014. The dependent variable is financial access, measured by the number of bank branches per 100,000 adults. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. All separately shown control variables are included as GMM-style instruments. Lag 2 to 16 are used in Column (1). Lags 2 to 6 are used in Column (2) and (3) and lags 2 to 3 in Column (4). The collapse option of xtabond2 has been chosen. Windmeijer-corrected two-step standard errors are reported in parentheses. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

I apply these same hypothesize to the following specification, where financial integration is interacted with the measure of financial access. To assess this hypothesis, I estimate the following specification using the same general method of moments (GMM) estimator and year fixed effects, captured by τ_t.

$$Y_{it} = \alpha_0 + \tau_t + \alpha_1 FI_{it} * FA_{it} + \alpha_2 FI^2{}_{it} + X_{it} + Y_{i,t-1} + \varepsilon_{it} \quad (1.3)$$

Here, α_0 captures a constant and Y_{it} captures the gross Gini-coefficient in country i in year t, FI_{it} and FI^2_{it} capture the level of *de facto* financial integration. FA_{it} captures the level financial access for country i in year t, measured by the number of bank branches per 100,000 adults of the population. The

squared term FI^2_{it} is included since the relationship between financial integration and inequality might also follow an (inverted) U-curve. X_{it} is a vector of control variables and $Y_{i,t-1}$ captures the Gini-coefficient in the year prior to the year of observation. I include this variable since the Gini-coefficient often has a persistent effect. By including this variable, I mitigate the concern that the results are biased because they capture pre-existing income inequality. The vector of control variables includes variables to measure educational attainment, ageing of the population, the level of trade openness, redistributive policies, the share of government expenditure and the share of industry and agriculture value-added, financial depth and GDP. Results are reported in Table 6.

The interaction term has a coefficient of 0.0254 and is economically, but not statistically significant, for the full sample. A coefficient of 0.0254 implies that a one percent increase in the level of *de facto* financial integration, interacted with the average level of financial access for that specific country, raises income inequality by 0.000254. This would imply an increase in the Gini-coefficient of 0.47 over the full sample period, however, because the coefficient is not statistically significant, no further implications can be made from these values. When the sample is split per country class, the values of the estimates for developing countries and advanced economies increases. For emerging market economies, the value becomes negative, suggesting that financial integration influences income inequality negatively depending on the level of financial access. It appears that trade openness increases income inequality, depending on the level of financial access, for developing countries and emerging market economies. To conclude, it appears that financial integration, depending on financial access, would increase income inequality. This counterintuitive result might alternatively be explained through the measure that was used to capture financial access. Although bank branches potentially allow lower-income individuals financial access, if the usage of these bank branches is primarily by the higher-income individuals in a society, it will not reduce inequality. Considering the estimate for the squared term of financial integration is negative, this points to an inverted U-curve and follows the hypothesis by Greenwood and Jovanovic (1990). They also suggest that the costs of joining financial intermediaries are too big a burden to bear in the early stages of development, increasing income inequality at first, decreasing inequality only after time has passed and more (lower income) individuals have been able to join. This does not explain the results for emerging market economies, however, considering here a negative relationship and an inverted U-curve become apparent from the estimates. This would suggest conclusions opposite from those mentioned above, as well as the “too much finance”-hypothesis (Tan & Law, 2012; Park & Shin, 2017). However, none of the results for the financial integration measure are significant, which means that financial access likely has little effect on the relationship between financial integration and income inequality.

Table 6
Empirical results, including interaction term financial access and financial integration

	Inequality			
	All countries	Developing countries	Emerging market economies	Advanced economies
FI#FA (interaction term)	0.0254	0.0486	-0.0784	0.224
	(0.060)	(0.173)	(0.156)	(0.556)
Financial integration (squared)	-0.0575	-0.142	0.129	-0.438
	(0.0723)	(0.131)	(0.195)	(0.945)
Gross $Gini_{t-1}$	1.009***	1.037***	1.023***	0.992***
	(0.007320	(0.0252)	(0.0146)	(0.0906)
GDP (log)	0.162	0.338	-0.119	0.785
	(0.145)	(0.271)	(0.384)	(1.423)
Financial depth (log)	0.076	0.0675	-0.00534	-0.113
	(0.079)	(0.13)	(0.223)	(0.721)
Trade openness (log)	0.246	0.428**	0.981**	-0.143
	(0.154)	(0.217)	(0.5)	(2.354)
Redistributive policies	0.0021	-0.0174	0.0055	0.0306
	(0.0037)	(0.0275)	(0.0125)	(0.0759)
Constant	22.627**	11.029	3.733	5.799
	(10.086)	(32.916)	(31.05)	(347.134)
Control variables	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Observations	810	229	407	174
Groups	106	34	55	17
Instruments	79	34	29	24
Hansen p-value	0.303	0.111	0.705	0.630
AR(2) p-value	0.055	0.938	0.037	0.426
AR(3) p-value	0.837		0.873	

The underlying data is a panelset consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. All separately shown control variables are included as GMM-style instruments. Lags 3 to 16 are used in Column (1). Lags 2 to 6 are used in Column (2), lags 3 to 6 in Column (3), and lags 2 and 4 in Column (4) The collapse option of xtabond2 has been chosen. Windmeijer-corrected two-step standard errors are reported in parentheses. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

5.1.2. Financial depth

The empirical consensus for the effect of financial deepening on income inequality point in a similar direction as the effect of financial access on income inequality, in that financial deepening reduces inequality (Hamori & Haschiguchi, 2012). Whether financial integration, through this mechanism, affects income inequality positively or negatively, again, depends on the relationship between financial integration and financial depth. As Mischkin (2009) argues that globalisation has a positive effect on financial development, I hypothesize that financial integration has a positive effect on financial depth. However, how financial integration, through potential financial deepening, remains a question. As suggested above, the general empirical consensus is that financial deepening reduces income inequality, but as found in the baseline model, financial integration increases income inequality. As such, the direction of the mediating relationship of financial deepening with financial integration and income inequality is still uncertain. Together, these predictions are formulated in the following hypotheses.

H6: Financial integration has a positive relationship with financial depth
H7: Financial depth as a positive mediating effect on the relationship between financial integration and income inequality.
H8: Financial depth as a negative mediating effect on the relationship between financial integration and income inequality.

To assess these hypotheses, I estimate the following specifications using structural equation modelling to perform path analysis on this relationship, including a constant α_0 and β_0, and year fixed effects. I use structural equation modelling to determine the direct, indirect and total effects and am therefore able to determine whether financial integration affects income inequality through affecting financial depth.

$$FD_{it} = \alpha_0 + \tau_t + \alpha_1 FI_{it} + X_{it} + \varepsilon_{it} \tag{1.4}$$

$$Y_{it} = \beta_0 + \tau_t + \beta_1 FI_{it} + \beta_2 FI^2{}_{it} + \beta_3 FD_{it} + X_{it} + Y_{i,t-1} + \eta_{it} \tag{1.5}$$

Here, Y_{it} captures the gross Gini-coefficient in country i in year t, FI_{it} and FI^2_{it} capture the level of *de facto* financial integration. FD_{it} captures financial depth and is measured by private credit to GDP. The squared term FI^2_{it} is included since the relationship between financial integration and inequality might also follow an (inverted) U-curve. X_{it} is a vector of control variables and $Y_{i,t-1}$ captures the Gini-coefficient in the year prior to the year of observation. I include this variable since the Gini-coefficient often has a persistent effect. By including this variable, I mitigate the concern that the results are biased because they capture pre-existing income inequality. I do not include the lagged variable in Equation (1.4). The vector of control variables includes variables to measure educational attainment, ageing of the population, the level of trade openness, redistributive policies, the share of government expenditure

and the share of industry and agriculture value-added, financial access and GDP. Results are reported in Table 7.

In the lower section of Table 7, the results are reported for the relationship between financial integration and financial depth. The relationship appears to be highly significant, both statistically and economically. Considering financial integration grows by almost 2000% of the entire sample period, financial integration has increased financial depth by 737.07%. GDP, trade openness and financial access all have a positive and significant effect on financial depth. The effect of this relationship on subsequent income inequality, however, does not appear to be important, as shown by the non-significant and small coefficients found for the indirect effects (Column (2)). The sign of the estimate for the indirect effect of financial integration on income inequality does take the expected sign, following the general consensus in the literature in that financial depth reduces income inequality.

Column (3) presents the total effects, thus the direct and indirect effects, of the specification. As the indirect effect through financial depth is non-significant and low in value, the total effects do not differ much from the direct effects. The results suggest a positive and significant effect between financial integration and income inequality, in line with the baseline model. A one percent increase in the level of financial integration will result in a subsequent increase in income inequality over 0.00202. Over the entire sample period, this suggests an increase in the Gini-coefficient of 3.71.

Results split per country classifications can be found in Table A.13, A.14 and A.15. For developing countries, the effects – total, direct and indirect – are small and non-significant, suggesting that financial integration might not be an important determinant of income inequality. The estimates take the opposite sign as compared to the analysis including the full sample, suggesting that income inequality decreases with higher financial integration. The non-linear relationship, shown through the squared term of financial integration, suggests a possible U-curve, which indicates that income inequality first decreases with higher financial integration but after a certain point, income inequality starts increasing again (Table A.13). For emerging market economies, the relationship between financial integration and income inequality, through financial depth is significant and positive. Interestingly, for emerging market economies, financial integration decreases financial depth. Subsequently, the indirect effects are positive, as lower financial depth, due to financial integration, then increases income inequality. The total effects are in line with the analysis for the full sample, suggesting a positive relationship, albeit it larger. The non-linear relationship here is significant and suggests an inverted U-curve, where financial integration first increases income inequality up to a certain point, after which it starts decreasing income inequality (Table A.14). For advanced economies, financial integration increases financial integration, and through this indirect channel, financial depth increases income inequality. The total effects are large and significant. With an estimate of 2.095, a one percent increase in financial integration would indicate an increase in the Gini-coefficient of 0.02095. Although this seems small, considering the extremely large growth in financial integration over our sample period, financial integration can explain a large

Table 7
Empirical results, financial integration, financial depth and income inequality

DV: Inequality	Direct effects	Indirect effects	Total effects
Financial depth (log)	0.00261		0.00261
	(0.0184)		(0.0184)
FI (log)	0.201**	-0.00105	0.202**
	(0.0827)	(0.00737)	(0.0844)
Financial integration (squared)	-0.0764**		-0.0764
	(0.0335)		(0.0335)
Gross $Gini_{t-1}$	1.001***		1.0001***
	(0.00183)		(0.00183)
GDP (log)	0.197***	0.000391	0.197***
	(0.0659)	(0.00275)	(0.0665)
Financial access (log)	0.0572***	0.00102	0.0582***
	(0.0208)	(0.00716)	(0.0198)
Trade openness (log)	0.142***	0.000999	0.143***
	(0.0363)	(0.00703)	(0.0361)
Redistributive policies	0.000756	-2.47E-06	0.000753
	(0.0011)	(0.0000173)	(0.00109)
DV: Financial depth			
FI (log)	0.401***		0.401***
	(0.0426)		(0.0426)
GDP (log)	0.15***		0.15***
	(0.0167)		(0.0167)
Financial access (log)	0.389***		0.389***
	(0.0281)		(0.0281)
Trade openness (log)	0.382***		0.382***
	(0.0705)		(0.0705)
Redistributive policies	-0.000945		-0.000945
	(0.0022)		(0.0022)

The underlying data is a panelset consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. Financial depth is measured as private credit over GDP. Robust standard errors are reported in parentheses. A SMRS-value of 0.006 (< 0.08) and a CD-value of 0.999 (close to 1) suggest good fit of the model. Control variables and year effects are included. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

part of the growth in the Gini-coefficient for advanced economies, through the channel of financial depth (Table A.15). It appears that especially for emerging market economies and advanced economies, financial integration increases income inequality, when financial depth acts as a mediator. For developing countries, results are non-significant and low in value, which could potentially reflect the

fact that developing countries receive a substantially lower amount of private credit, the measure for financial depth, and external capital flows, than emerging market economies and advanced economies.

5.2. Labour share of income

As labour is the main source of income for most of the population and the returns to ownership a more important source of income for the wealthy, a decrease in the labour share of income suggests that the returns of ownership might have become a larger component in total income. This would suggest an increase in income inequality. As labour income is also more evenly distributed across households than capital income (Jacobson & Occhino, 2012), a decrease in the labour share – and equivalently an increase in the capital share – lead to higher income inequality and a concentration of capital at the top of the income distribution. Erauskin (2020) finds support for this claim and finds that a lower labour share is associated with a higher Gini-coefficient, where a lower labour share is strongly associated with a smaller income of the bottom 40%. The relationship between capital account openness and the labour share of income has also been studied. Jayadev (2007) finds a robust negative correlation between the degree of openness and the labour share. The paper provides a possible explanation in that openness can alter the conditions of bargaining between labour and capital, whereby the increased bargaining strength of capital relative to labour, increases rents accruing to capital. Figure 5 presents the flowchart of the relationship between the labour share of income, financial integration and income inequality. Just as in Section 5.1.2, where financial depth acted as a mediator, the labour share of income serves as a mediating variable too.

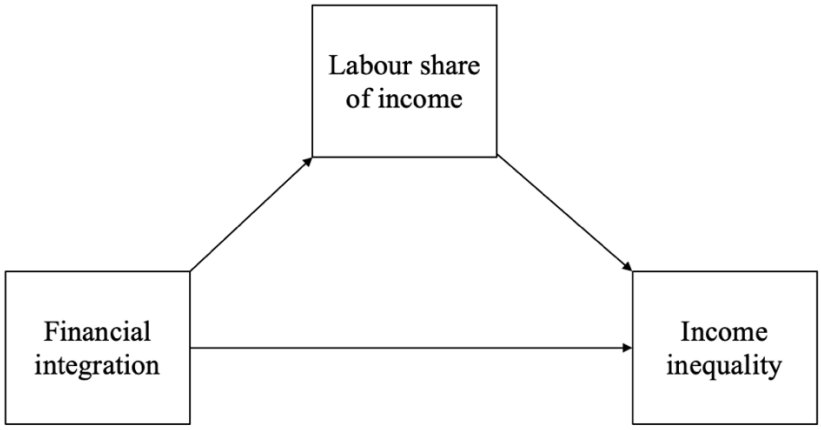

Fig. 5 Flowchart showing the effect of labour share of income on the relationship between financial integration and income inequality

To establish whether the labour share of income is affected by financial integration, and whether financial integration affects income inequality through the labour share of income, I will use structural equation modelling to perform pathway analysis. Following the findings by Jayadev (2007) and Erauskin (2020), I will test the following hypotheses for the relationship between financial integration,

the labour share of income, and income inequality. As the mediating relationship depends on the direct and indirect relationships, I will test hypotheses for both a positive and a negative relationship.

H9: Financial integration has a negative relationship with the labour share of income
H10: The labour share of income as a positive mediating effect on the relationship between financial integration and income inequality.
H11: The labour share of income has a negative mediating effect on the relationship between financial integration and income inequality.

To assess these hypotheses, I estimate the following specification using SEM, where α_0 and β_0 are constant, and year fixed effects τ_t are included.

$$LS_{it} = \alpha_0 + \tau_t + \alpha_1 FI_{it} + \alpha_2 FI^2{}_{it} + X_{it} + \varepsilon_{it} \quad (1.6)$$

$$Y_{it} = \beta_0 + \tau_t + \beta_1 FI_{it} + \beta_2 FI^2{}_{it} + \beta_3 LS_{it} + X_{it} + Y_{i,t-1} + \eta_{it} \quad (1.7)$$

Here, Y_{it} captures the gross Gini-coefficient in country i in year t and LS_{it} captures the labour share of income. FI_{it} and FI^2_{it} capture the level of *de facto* financial integration. I include the squared term of financial integration in this regression to test for a potential non-linear relationship. Considering the value of the labour share of income is dependent on the capital share of income, and as capital is mobile, I assume that the labour share of income has no persistent effect and therefore do not include the lagged dependent variable as an explanatory variable in Equation (1.6). In Equation (1.7), however, I do include the lagged Gini-coefficient, see Section 4. X_{it} is a vector of control variables and includes variables to measure educational attainment, ageing of the population, the level of trade openness, redistributive policies, the share of government expenditure and the share of industry and agriculture value-added, financial access, financial depth and GDP. Results are reported in Table 8.

A more direct approach for testing the effects of changing ratios between capital and labour share of income on income inequality exists, namely, examining the effect of financial globalisation on returns to ownership – which drives the increase in capital income and decrease in labour income – and subsequently on income inequality. This approach, however, is fraught with reverse causality issues since higher or lower returns to ownership likely influence the level of financial globalisation as well, considering this is measured as the sum of the external asset and liability positions of countries. Therefore, I use the labour share of income instead. One other concern with using the labour share of income to capture the extent that financial globalisation is causing income inequality comes from how labour share of income is measured itself. Considering it is a share of total income and I expect an increase in the share of capital to decrease the share of labour, I have to make an additional assumption

in that the labour share of income itself did not decrease due to other factors. This problem is mitigated by including the range of control variables as mentioned above. Most of the major determinants of changes in labour share of income –trade openness and financial development – are included (Jacobson & Occhino, 2012). Since these are included, they remove any effects that might decrease the labour share of income that are unrelated to financial integration from the estimates found, which thus allows me to reliably attribute any increases or decreases in the labour share of income to changes in the capital share of income, which are themselves due to financial integration.

In the lower section of Table 8, the estimates for the relationship between financial integration and the labour share are shown. This negative estimate is in line with Hypothesis H9, but as the result is non-significant, I cannot make any further conclusions from this relationship. This non-significance is reflected in the indirect effects, shown in Column (2), which shows that the financial integration, through the labour share of income, has little to no effect on income inequality. In Column (3), total effects are depicted which suggests a decrease in income inequality, through the labour share of income, due to financial integration. The coefficient of -0.525 suggests that, through the labour share of income, the Gini-coefficient drops by 9.65 over the entire sample period. This result is statistically and economically highly significant.

Results for this analysis split per country class are presented in Tables A.16, A.17 and A.18. For developing countries, financial integration does affect the labour share of income, increasing it by 4.99% over the entire sample period. This increase in the labour share, however, does not appear to have an effect on subsequent income inequality, as the results for both the indirect effects and total effects are non-significant. Contrary to the main analysis, the estimate for financial integration in Column (3) is positive, suggesting that financial integration, through the labour share of income, increases income inequality (Table A.16). For emerging market economies, the relationship between financial integration and the labour share of income is positive, but non-significant. The total effects are not significant either but keep their negative sign, again pointing towards a decrease in income inequality due to financial integration through the labour share of income (Table A.17). For advanced economies, the relationship between financial integration and the labour share of income, and the mediating relationship between financial integration, through the labour share of income is non-significant (Table A.18)

This analysis shows that the labour share of income is a channel through which financial integration decreases income inequality. None of the indirect effects are statistically significant – not for the full model, nor per country class - and only for developing countries the relationship between financial integration and the labour share of income is significant. For developing countries and advanced economies, when the relationship is mediated through the labour share of income, financial integration increases income inequality. For emerging market economies, this relationship appears to have the opposite effect.

Table 8
Empirical results, financial integration, labour share and income inequality

DV: Inequality	Direct effects	Indirect effects	Total effects
Labour share	-0.237		-0.237
	(0.275)		(0.275)
FI (log)	-0.527**	0.00175	-0.525**
	(0.267)	(0.0121)	(0.267)
Financial integration (squared)	0.131	-0.00165	0.13
	(0.0863)	(0.0047)	(0.0866)
Gross $Gini_{t-1}$	1.002***		1.002***
	(0.00338)		(0.00338)
GDP (log)	-0.215	0.00712	-0.208
	(0.164)	(0.0113)	0.0508
Financial depth (log)	0.0684	-0.0176	(0.0482)
	(0.0477)	(0.0207)	(0.00859)
Financial access (log)	0.0604	0.00139	0.0617
	(0.039)	(0.002)	(0.039)
Trade openness (log)	0.064	0.00454	0.0685
	(0.0814)	(0.00571)	(0.0809)
Redistributive policies	0.00115	0.000234	0.00139
	(0.00172)	(0.000259)	(0.00169)
DV: Labour share			
FI (log)	-0.00739		-0.00739
	(0.0504)		(0.0504)
Financial integration (squared)	0.00696		0.00696
	(0.0187)		(0.0187)
GDP (log)	-0.03		-0.03
	(0.0362)		(0.0362)
Financial depth (log)	0.0742***		0.0742***
	(0.00858)		(0.00858)
Financial access (log)	-0.00586		-0.00586
	(0.00447)		(0.00447)
Trade openness (log)	-0.0191		-0.0191
	(0.0137)		(0.0137)
Redistributive policies	-0.000985***		-0.000985***
	(0.000274)		(0.000274)

The underlying data is a panelset consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. Labour share is measured as compensation of employees divided by GDP. A SMRS-value of 0.003 (< 0.08) and a CD-value of 1.000 (close to 1) suggest good fit of the model. Control variables and year effects are included. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

For all three channels presented here, it appears that it is mainly financial depth that is a strong mechanism through which financial integration affects income inequality, notably for emerging market economies and advanced economies. Interacting financial integration with financial access reduces the estimates and the results have no statistical significance, which is why financial access is likely not a channel through financial integration affects income inequality. For the labour share of income, the relationship between financial integration and income inequality turns negative, suggesting an equalising effect once this relationship is mediated for by the labour share of income. For the full model, the larger non-equalising effects of financial depth and the somewhat smaller equalising effects of the labour share of income might explain the increase in the Gini-coefficient from the recent years.

6. Conclusion

6.1. Concluding remarks and policy implications

This paper started out by exploring financial integration and income inequality. We know that globalisation, part of which is financial integration, can generate an array of benefits from welfare to economic growth. But whether these benefits are evenly shared across the population is a question still unanswered. Both financial integration and income inequality have increased since the 1970s and, as such, one might wonder whether the increase in the former inspired the increase in the latter. The aim of this paper was to answer this question and by looking at a sample of 181 countries from 1970 to 2014, I find that financial integration is associated with statistically significant increases in income inequality. The full model suggests that, over the sample period studied, a ten percent increase in financial integration leads to an increase in the Gini-coefficient of 0.1047. Considering the immense growth of financial integration over the sample period, these results prove that financial integration is a main determinant of the phenomenon of rising income inequality. The relationship blurs once the sample is split in developing countries, emerging market economies and advanced economies. For developing and advanced economies, financial integration decreases the Gini-coefficient, whereas for emerging market economies, financial integration increases the Gini-coefficient. Considering emerging market economies show the greatest increase in their levels of financial integration over the sample period, it seems that financial integration has the most equalising effects for those countries that are either in the early stages of development or have been developed for a longer time. The results are robust to a number of alternate measures, financial crises and the inclusion of tax havens. Concerning the channels through which financial integration might have an effect on income inequality, it appears that financial depth is the main channel out of the three channels studied. Financial depth increases with financial integration, which increases income inequality. These findings apply to the full model including all countries as well as for emerging market and advanced economies separate. Financial access appears to play little to no role in determining how financial integration affects income inequality. The labour share of income appears to have a negative mediating effect, whereby financial integration has an equalising effect.

The findings in this paper do not suggest that financial integration should be withheld completely, however, the results do nudge towards a more cautious approach whereby the characteristics of the country are kept in mind. Considering my results change depending on whether the country has a developing, emerging market or advanced economy, it could be that different stages of development come with different levels of financial institutions and infrastructure, which then further predict how financial integration affects income inequality. This could be an interesting path for future research. As to the different channels mentioned here, the level of financial depth in junction with financial integration appears to have strong non-equalising effects. Policymakers should keep this in mind

whenever conversations on opening up financially or regulating capital flows come up. Considering the labour share of income has a negative impact on income inequality, giving the economy incentives in a way which promotes the labour share of income over that of capital, can reduce income inequality.

6.2. Discussion

This paper is subject to a number of limitations, which either have to do with the identification strategy or estimation procedure, or potential measurement error. Concerning the identification strategy, I have opted to not include any lags of the explanatory variable financial integration. Papers such as the ones by Furceri & Loungani (2018), Furceri et al. (2019) and Li & Su (2021) examine the effects of *de jure* capital account liberalisation episodes five years or ten years after the occurrence of said episode. As such, they examine the influence of financial integration on income inequality over a longer period of time, allowing for the effects of financial integration to appear only after a certain amount of time has passed. As I look at *de facto* financial integration, I reason that the *actual* capital flows appear in the income distribution at least within the same year and therefore only focus on the short-term effects. But, as shown in the analysis on FDI (Section 4.4.5), the more long-term effects of financial integration might be different. This can be due to, as in the case of FDI, the benefits of FDI trickling down over time, decreasing income inequality. Whether this is the case for other external capital flows remains a question and further research should examine whether the short-term and long-term effects of these flows differ. A second problem with the identification strategy constitutes omitted variable bias, which takes the shape of technology and corruption. I have not included a control variable for technology because of data limitations. Using the World Development Indicators database from the World Bank, a good measure for technology is the ICT investment as a percentage of GDP. This measure, however, is scarcely available and therefore omitted whenever a regression is run. But, considering technology is an important determinant inequality, as shown by Jaumotte et al. (2013), the estimates found in this paper might be biased upward. This should be kept in mind when interpreting the results. A measure for corruption is also not included in the paper, although this might increase inequality as well, especially if through corruption financial integration gets distributed to the top of the income share. An explicit measure for corruption is not included, but since I include the relative distributive policies, possible corruption is dealt with indirectly as how much wealth is actually distributed through taxes and transfers is included in the specification.

Concerning the estimation procedure, I make use of the System GMM-estimator as proposed by Blundell and Bond (1998). Using a GMM-estimator, especially the use of the System-GMM, has a number of advantages. First of all, the GMM estimator allows for treating the explanatory variables as either exogenous or endogenous and deals with possible endogeneity efficiently. Second of all, according to Beck et al. (2000), using System GMM exploits the time-variation in the data, thus accounting for unobserved country fixed effects, which therefore controls better for possible endogeneity. As such, System GMM satisfies the exogeneity assumption relatively well. Moreover, as

I use two-step estimation, with the Windmeijer-corrected standard errors, and log transformation of a certain number of variables - including financial integration, financial depth, financial access, trade openness and GDP – my estimation deals with heteroskedasticity efficiently. However, one problem concerning the estimation remains which is possible reverse causality. As explained by Leszczensky and Wolbring (2019), many panel models, including the one proposed by Arellano and Bond, on which my estimator is based, are sensitive to the correct specification of temporal lags. When the causal effect is lagged, as is the case for income inequality in my identification specification, the use of System GMM underestimates the actual causal effect, with coefficients potentially even switching signs (Leszczensky & Wolbring, 2019). The use of Maximum Likelihood Structural Equation Modelling (ML-SEM), when including a contemporaneous and lagged effect of X on Y, can provide estimates that do not suffer from reverse causality. As such, System GMM deals with endogeneity and unobserved heterogeneity well, but for inference, potential reverse causality should be kept in mind. In the context of this paper, this might very well be a potential concern, as "*wealth begets wealth*" (Piketty, 2013); if the top income share of the population holds more wealth, they also beget more wealth, leading to more income inequality. Other papers that want to study the effects of financial integration on income inequality might therefore take note on the suggestions made by Leszczensky and Wolbring (2019) and implement ML-SEM using both the contemporaneous and lagged effect of X on Y.

One last apprehension concerning the estimation procedure is the use of the Stata command xtabond2, which is subject to a bug which results in incorrect degrees of freedom for the overidentification test if time dummies are specified with factor variable notation. In this case, some dummies will be omitted from the regression but xtabond2 will still list them in the regression output. As such, the p-values from the overidentification tests are incorrect. Considering the use of xtabond2 in Stata is most common when applying System-GMM, few time dummies are omitted and my overidentification tests all report values that are significantly higher than the p-value, I contest that my results still hold. Alternatively, the new Stata command xtdpdgmm, using teffects, might provide a solution, as this command performs the same estimation as xtabod2, but does not suffer from this bug (Kripfganz, 2019).

Lastly, the study might suffer from measurement error. Although the use of the SWIID is common, Jenkins (2015), among other papers, pose serious questions as to the imputation model on which the SWIID is based, which may lead to bias. Therefore, some papers have started using the Estimated Household Income Inequality (EHII) database compiled by the University of Texas Inequality Project (UTIP). The EHII circumvents the problems faced by the SWIID and other inequality databases as it derives the economic relationship between the Deininger-Squire Gini and a Theil-index-based measure of the industrial sector pay dispersion, while including controls for manufacturing employment-to-population ratio and other variables. Missing observations are accounted for by replicating the Deininger-Squire dataset with estimated measures of household income inequality (Galbraith et al., 2016). As such, the EHII might now be the most comprehensive and comparable source

of income Gini-coefficients. However, as the use of this database for income inequality is far from widespread as compared to the SWIID, the SWIID has the benefit of allowing for comparisons between papers. Moreover, *de facto* measures of financial integration face another limitation which is the inconsistent reporting and treatment of FDI over countries and time. As such, this might constitute a measurement error for the main explanatory variable. Lastly, the dataset created by Lane and Milesi-Ferretti (2006), includes development aid, which does not reflect private investors' decisions and might therefore present endogeneity concerns as the stances of the domestic and foreign governments, in the form of development aid, can bias the estimates. Steiner (2018) find that when adjusting the dataset by excluding development aid and central banks' international reserves, the measure differs significantly from the Lane and Milesi-Ferreti (2006) measure, especially in developing countries and in emerging markets. Considering international development aid is usually focused toward helping the poor, this likely will bias the estimates downward in my analysis.

The main limitation that affects the results and subsequent interpretation of this paper is the omitted variable bias in the form of technology. Considering technology increases income inequality, omitting this variable biases the estimates upward. The other limitations mentioned above, such as the measurement error, inclusion of government aid in financial integration, and the problem of reverse causality, all bias the estimates downward and therefore do not threaten the interpretation of the results as these estimates are more cautious. Future research on this topic might implement the suggestions made in this section to improve the empirical strategy, especially by including technology as a control variable, to make the literature on the relationship between financial integration and income inequality as robust as possible.

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Appendix A

Table A.1

Table accompanying literature review

Paper	*Objective and sample*	*Measure of financial integration*	*Methodology*	*Results*
Furceri & Lougani (2018)	Analyses the effect of a capital account liberalisation episode on inequality & three channels through which these impacts could occur (financial depth/inclusion, when followed by a financial crisis, labour share of income) Sample: 224 episodes of liberalisation among 149 countries from 1970-2010	Chinn-Ito de jure financial integration	Autoregressive Distributed Lag (ARDL) approach using OLS on an unbalanced panel & IV	(+) effect Widening inequality Channels: Financial depth: (-) effect Effect on inequality decreases with depth Financial inclusion: (-) effect Effect on inequality decreases with inclusion Financial crisis: (+) effect Widening inequality Labour share of income: (-) effect Widening inequality
Eichengreen et al. (2021)	Reviews the debate on the association of financial globalisation with inequality			
Jaumotte et al. (2013)	Examines the relationship between trade and financial globalisation and the rise of income inequality Sample: 51 countries from 197-2003	Chinn-Ito de jure financial integration and de facto financial integration	Fixed effects specification	(+) effect Widening inequality
Li & Su (2020)	Investigates the relationship between capital account liberalisation and income inequality Sample: 126 countries from 1970-2014	De jure financial integration	DID model estimated using GMM	(+) effect
Furceri et al. (2019)	Takes a fresh look at the aggregate and distributional effects of policies to liberalize international capital flows Sample: 228 capital account liberalisation episodes spanning 149 advanced and developing countries from 1970 to the present	De jure financial integration	Cross-country analysis: OLS on an unbalanced panel Industry-level analysis: DID	(+) effect
Bumann & Lensink (2016)	Theoretical and empirical contribution to the literature on financial liberalisation and income inequality.	De jure financial integration	GMM estimator (Blundell and Bond, 1998)	Theoretical model: If high financial depth, (-) effect Narrowing inequality Empirically:

	Sample: 106 countries from 1973 to 2008			Liberalisation lowers income inequality only when financial depth exceeds 25%
Liu et al. (2020)	Examines the implications of capital account policy for income distribution both empirically and theoretically. Sample: 87 countries, excluding offshore financial centers, from 2002-2018	De facto financial integration	IV approach (the world interest rate by movements in the two-year U.S. Treasury yields)	Long run: (-) effect Narrowing inequality Short run: (+) effect Widening inequality
Asteriou et al. (2014)	Investigates the relationship. Between income inequality and globalisation with both trade and financial variables. Sample: EU27 countries from 1995-2009	De jure financial integration	GMM estimator (Arellano and Bond, 1995)	(+) effect Widening inequality
Zhang & Naceur (2019)	Studies financial depth, stability, access and liberalisation in order to provide an extensive investigation of the finance and income distribution nexus Sample: 143 countries from 1961-2011	Abiad et al. (2008) & the ratio of consolidated foreign claims of Bank for International Settlements to GDP	IV approach	(+) effect Widening inequality
Das & Mohaparta (2003)	Studies how equity market liberalisations have shifted the distribution of income Sample: 11 countries from 1986-1995	Equity market capitalisation normalised by GDP	Regression analysis and event-study model	(+) effect Widening inequality
Agnello et al. (2012)	Assess the impact of financial reforms on income inequality Sample: 62 countries from 1973-2005	Abiad et al.	Regression analysis	(-) effect Narrowing inequality
Jayadev (2007)	Investigates the relationship between capital account openness and the share of labour in national income	De jure financial integration (Quinn)	OLS	(-) effect Decreasing labour share of income (widening inequality)
De Haan & Sturm (2017)	Examines how financial development, financial liberalisation and banking crises are related to income inequality Sample: 121 countries from 1975-2000	Abiad et al. & Fraser Institute's measure of economic freedom	Dynamic panel model	(+) effect Widening inequality

Table A.2

Table with variables, measures and data sources

Variables	*Measures*	*Sources*
Income inequality	Gross Gini-coefficient (pre-tax, pre-transfer)	SWIID
	Net Gini-coefficient (post-tax, post-transfer)	SWIID
	Top-1% income share	World Inequality Database
	Top-10% income share	World Inequality Database
De facto financial integration	Sum of external asset and liability positions, divided by GDP	External Wealth of Nations II by Lane and Milesi-Ferretti (2016)
De jure financial integration	Based on binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's AREAER	KAOPEN-index by Chinn and Ito (2008)
Financial depth	Private credit over GDP	World Bank's Global Financial Development database
Financial access	Bank branches per 100,000 adults	World Bank's Global Financial Development database
Labour share of income	Compensation of employees divided by GDP	Karabarbounis et al. (2014)
Educational attainment	Primary completion rate (% of relevaant age group)	World Bank’s World Development Indicators database.
Ageing of the population	Population ages 65 and above (% of total population)	World Bank’s World Development Indicators database.
Goverment expenditure	General government final consumption expenditure (% of GDP)	World Bank’s World Development Indicators database.
Industry value-added	Manufacturing, value added (% of GDP)	World Bank’s World Development Indicators database.
Agriculture value-added	Agriculture, forestry and fishing, value-added (% of GDP)	World Bank’s World Development Indicators database.
GDP	In current US$,converted from domestic currency using the period-average exchange rate	External Wealth of Nations II by Lane and Milesi-Ferretti (2016)
Trade openness	Trade (% of GDP)	World Bank’s World Development Indicators database.
Redistributive policies	Estimated relative redistribution, the percentage reduction in market-income in-equality due to taxes and transfers	SWIID
Tax haven dummy	Those countries with a Corporate Tax Haven Index of over 3.0%	Corporate Tax Haven Index

Country classification dummy	Country is either developing, emerging market or advanced.	IMF's Fiscal Monitor database.
Banking crisis dummy	Based on the data and source country of the crisis.	Systemic Banking Crisis database by Valencia & Laeven (2008)

Table A.3

Country list

Developing countries	*Emerging market economies*		*Advanced economies*
Afghanistan	Albania	Palau	Andorra
Anguilla	Algeria	Panama	Australia
Bangladesh	Angola	Paraguay	Austria
Benin	Antigua and Barbuda	Peru	Belgium
Bhutan	Argentina	Philippines	Canada
Burkina Faso	Armenia	Poland	Czech Republic
Burundi	Aruba	Qatar	Denmark
Cambodia	Azerbaijan	Romania	Estonia
Cameroon	Bahrain	Russia	Finland
Central African Republic	Barbados	Samoa	France
Chad	Belarus	Saudi Arabia	Germany
Comoros	Belize	Serbia	Greece
Congo, Dem. Rep. of	Bolivia	Seychelles	Iceland
Congo, Republic of	Bosnia and Herzegovina	South Africa	Israel
Côte d'Ivoire	Botswana	Sri Lanka	Italy
Djibouti	Brazil	St. Kitts and Nevis	Japan
Ethiopia	Bulgaria	St. Lucia	Korea
Gambia	Cape Verde	St. Vincent & Grens.	Latvia
Ghana	Chile	Suriname	Lithuania
Guinea	China	Syria	Malta
Guinea-Bissau	Colombia	Thailand	New Zealand
Haiti	Costa Rica	Tonga	Norway
Honduras	Croatia	Trinidad and Tobago	Portugal
Kenya	Dominica	Tunisia	San Marino
Kiribati	Dominican Republic	Turkey	Slovakia
Kyrgyzstan	Ecuador	Turkmenistan	Slovenia
Laos	Egypt	Tuvalu	Spain
Lesotho	El Salvador	Ukraine	Sweden
Liberia	Equatorial Guinea	Uruguay	Taiwan
Madagascar	Fiji	Vanuatu	United States
Malawi	Gabon	Venezuela	
Mali	Georgia		
Mauritania	Grenada		
Moldova	Guatemala		
Mozambique	Guyana		
Myanmar	Hungary		
Nepal	India		
Nicaragua	Indonesia		
Niger	Iran		

Nigeria	Iraq
Papua New Guinea	Jamaica
Rwanda	Jordan
São Tomé and Príncipe	Kazakhstan
Senegal	Kosovo
Sierra Leone	Kuwait
Solomon Islands	Lebanon
Somalia	Libya
South Sudan	Macedonia
Sudan	Malaysia
Swaziland	Maldives
Tajikistan	Mauritius
Tanzania	Mexico
Timor-Leste	Micronesia
Togo	Mongolia
Uganda	Montenegro
Uzbekistan	Morocco
Vietnam	Namibia
Yemen	Nauru
Zambia	Oman
Zimbabwe	Pakistan

The country classification into either advanced economies, emerging market economies or developing countries is taken from the IMF's Fiscal Monitor database.

Table A.4

List of tax havens

Bahamas, The	Luxembourg
Bermuda	Netherlands
British Virgin Islands	Netherlands Antilles
Cayman Islands	Singapore
Cyprus	Switzerland
Hong Kong	United Arab Emirates
Ireland	United Kingdom
Jersey	

Taken from the Corporate Tax Haven Index

Table A.5
Descriptive statistics, tax havens

	N	Average	SD	Min	Max
Panel A. All countries					
Financial integration (%GDP)	8420	1042.53	9495.56	0	233956.1
Gross Gini	4952	45.50	6.78	21.9	72.5
Labour share (%GDP)	1837	41.38	12.20	3.39	80.25
Financial access	1908	19.22	25.54	0.13	287.24
Financial depth (%GDP)	6704	35.41	39.28	0.0052	972.21
Panel B. All countries, excluding tax havens					
Financial integration (%GDP)	7781	204.54	868.57	0	23612.88
Gross Gini	4644	45.51	6.91	21.9	72.5
Labour share (%GDP)	1667	40.68	12.30	33.86	80.25
Financial access	1802	18.21	25.24	0.13	287.24
Financial depth (%GDP)	6289	32.50	37.07	0.0052	972.21
Panel C. Tax havens					
Financial integration (%GDP)	639	11233.35	32680.86	0	233956.1
Gross Gini	308	45.38	4.28	38.2	56.4
Labour share (%GDP)	170	48.29	8.59	19.44	63.00
Financial access	106	36.52	24.54	9.32	110.94
Financial depth (%GDP)	415	79.50	45.10	6.61	218.94

The values for the variables in the table come from the External Wealth of Nations database, the SWIID, the Global Financial Development database and Karabarbounis and Neiman (2014). The distinction between tax haven and non-tax haven is from the Corporate Tax Haven Index.

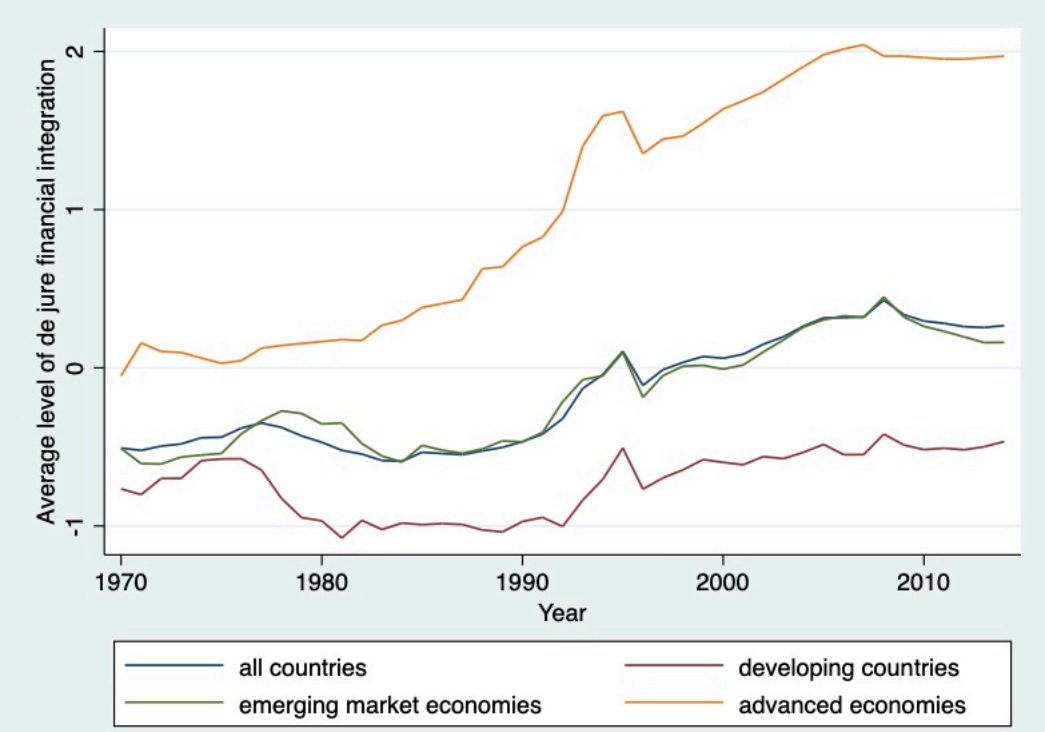

Fig. A.6. Average levels of *de jure* financial integration, captured by the Chinn-Ito measure

Table A.7

Empirical results for the baseline model, per country class using *de jure* financial integration

	Inequality			
	All countries	Developing countries	Emerging market economies	Advanced economies
FI (*de jure*)	-0.00203	-0.00386	-0.00316	-0.00599
	(0.00128)	(0.0027)	(0.00296)	(0.0117)
Gross $Gini_{t-1}$	1.02***	1.036***	0.983***	1.057***
	(0.0121)	(0.0277)	(0.0242)	(0.0504)
GDP	0.0165	0.155	-0.0375	0.0279
	(0.0571)	(0.104)	(0.112)	(0.384)
Financial depth	0.0897	0.109	0.172	-0.109
	(0.0825)	(0.0949)	(0.264)	(0.686)
Financial access	-0.0257	-0.0639	0.32	0.0399
	(0.0996)	(0.25)	(0.252)	(0.706)
Trade openness	0.302**	0.256	0.127	0.575
	(0.0155)	(0.259)	(0.482)	(1.186)
Redistributive policies	0.00533	-0.00918	0.0268**	-0.00879
	(0.00519)	(0.0204)	(0.0112)	(0.0588)
Constant	14.5	16.569	13.159	162.36
	(15.81)	(29.94)	(45.344)	(155.42)
Control variables	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Observations	797	229	493	174
Groups	103	34	52	17
Instruments	88	38	38	20
Hansen p-value	0.0290	0.746	0.715	0.528
AR(2) p-value	0.049	0.910	0.086	0.477
AR(3) p-value	0.986			

The underlying data is a panelset consisting of 181 countries, running from 1970 to 2014. Results are shown based on whether the country is developing, emerging market or advanced. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the KAOPEN-index (Chinn and Ito, 2008). All separately shown control variables are included as GMM-style instruments. Lags 3 to 16 are used in Column (1). Lags 2 to 6 are used in Column (2) and (3). Lags 2 to 3 are used in Column (3) due to the "too many instruments"-problem. The collapse option of xtabond2 has been chosen. Windmeijer-corrected two-step standard errors are reported in parentheses. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

Table A.8

Empirical results for the baseline model, using different measures of inequality

	Inequality			
	Gross Gini	Net Gini	Top-1% income share	Top-10% income share
Financial integration (log)	1.047*	0.874	-0.0334	-0.0279**
	(0.609)	(0.746)	(0.0134)	(0.0126)
Financial integration (squared)	-0.438*	-0.399	0.0134	0.0112**
	(0.242)	(0.274)	(0.00995)	(0.00476)
Gross $Gini_{t-1}$	1.008***	1.02**	0.879***	0.963***
	(0.00882)	(0.0114)	(0.117)	(0.0395)
GDP (log)	0.904*	0.801	-0.0255	-0.021**
	(0.468)	(0.521)	(0.0189)	(0.0092)
Financial depth (log)	0.0755	0.198**	-0.0033	-0.00262
	(0.0827)	(0.00553)	(0.0028)	(0.00205)
Financial access (log)	0.0253	-0.139	0.00362	0.0048
	(0.101)	(0.119)	(0.00355)	(0.00326)
Trade openness (log)	0.366**	0.38**	-0.00286	-0.0000128
	(0.155)	(0.167)	(0.00541)	(0.00397)
Redistributive policies	0.00365	0.0141***	0.0000748	0.0000471
	(0.00376)	0.00553	(0.0001325)	(0.000168)
Constant	25.975**	25.016**	-0.26	-0.0872
	(12.276)	(12.26)	(0.346)	(0.401)
Control variables	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes
Observations	810	810	799	799
Groups	106	106	104	104
Instruments	95	89	95	95
Hansen p-value	0.36	0.395	0.42	0.484
AR(2) p-value	0.052	0.041	0.402	0.310
AR(3) p-value		0.072		

The underlying data is a panel set consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross and net Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Other measures for income inequality are the Top-1% and -10% income shares. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. All separately shown control variables are included as GMM-style instruments. Lags 3 to 16 are used in Column (2) due to serial correlation in the idiosyncratic error term. Lags 2 to 16 are used in Column (1), (3) and (4). The collapse option of xtabond2 has been chosen. Windmeijer-corrected two-step standard errors are reported in parentheses. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

Table A.9

Empirical results for the baseline model, excluding banking crisis, 1970-2007

	Inequality		
	Including financial crises	Including financial crises	Excluding financial crises
FI	0.426	0.277	0.27
	(0.805)	(0.524)	(0.499)
FI (squared)	-0.167	-0.113	-0.108
	(0.27)	(0.189)	(0.182)
Gross $Gini_{t-1}$	0.991***	0.988***	0.988***
	(0.0112)	(0.00945)	(0.00935)
GDP	0.337	0.225	0.215
	(0.512)	(0.352)	(0.34)
Financial depth	-0.00799	-0.014	-0.0134
	(0.0744)	0.0634	(0.064)
Financial access	0.000627	-0.00576	-0.00195
	(0.0734)	(0.0782)	(0.0776)
Trade openness	0.0253	-0.0222	-0.0308
	(0.156)	(0.144)	(0.142)
Redistributive policies	0.00829	0.0099**	0.00984**
	(0.00577)	(0.00456)	(0.00455)
Constant	64.899**	-0.0225	-0.168
	(28.195)	(1.149)	(1.13)
Control variables	Yes	Yes	Yes
Year effects	Yes	No	No
Observations	283	283	282
Groups	91	91	91
Instruments	88	87	87
Hansen p-value	0.425	0.511	0.515
AR(2) p-value	0.149	0.183	0.183

The underlying data is a panel set consisting of 181 countries, running from 1970 to 2007. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. All separately shown control variables are included as GMM-style instruments. Lags 2 to 16 are used in Column (1), (2) and (3). The collapse option of xtabond2 has been chosen. Windmeijer-corrected two-step standard errors are reported in parentheses. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

Table A.10

Empirical results for the baseline model, including tax havens

	Inequality		
	(1)	(2)	(3)
Financial integration (log)	0.0234	1.321***	0.534*
	(0.0158)	(0.497)	(0.304)
Financial integration (squared)	0.00763***	-0.499***	-0.248**
	-2.82E-03	(0.181)	(0.119)
Gross $Gini_{t-1}$	1.01***	1.025***	1.01***
	(0.00838)	(0.0098)	(0.00812)
GDP (log)		0.968	0.517**
		(0.351)	(0.227)
Financial depth (log)			0.122
			(0.078)
Financial access (log)			0.0269
			(0.103)
Trade openness (log)			0.256**
			(0.121)
Redistributive policies			0.00238
			(0.0034)
Constant			26.354**
			(10.587)
Control variables	No	Yes	Yes
Year effects	Yes	Yes	Yes
Observations	4477	1790	834
Groups	175	122	110
Instruments	89	69	89
Hansen p-value	0.063	0.068	0.666
AR(2) p-value	0.185	0.137	0.044
AR(3) p-value			0.811

The underlying data is a panel set consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. All separately shown control variables are included as GMM-style instruments. No lag limits are used in Column (1). Lags 2 to 16 are used in Column (2). Lags 3 to 16 are used in Column (3) due to serial correlation in the idiosyncratic error term. The collapse option of xtabond2 has been chosen. Windmeijer-corrected two-step standard errors are reported in parentheses. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

Table A.11

Empirical results for the baseline model, per country class including tax havens

	Inequality Developing countries	Emerging market economies	Advanced economies
Financial integration (log)	-0.765	1.591	-0.721
	(1.442)	(1.199)	(5.745)
Financial integration (squared)	0.0623	-0.672	0.245
	(0.392)	(0.521)	(2.571)
Gross $Gini_{t-1}$	1.025***	1.005***	0.877***
	(0.028)	(0.0125)	(0.0982)
GDP (log)	-0.111	1.353	-0.198
	(0.7449)	(0.981)	(4.705)
Financial depth (log)	0.0804	0.246	-2.263
	(0.125)	(0.235)	(2.504)
Financial access (log)	-0.18	0.0274	1.566
	0.273)	(0.19)	(1.236)
Trade openness (log)	0.456	0.671*	0.124
	(0.353)	(0.41)	(1.709)
Redistributive policies	0.00123	0.0225	0.0785
	(0.0359)	(0.0153)	(0.0586)
Constant	-3.72	21.11	-87.515
	(42.19)	(32.05)	(129.93)
Control variables	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
Observations	229	407	198
Groups	34	55	21
Instruments	39	39	21
Hansen p-value	0.704	0.318	0.433
AR(2) p-value	0.738	0.055	0.944

The underlying data is a panel set consisting of 181 countries, running from 1970 to 2014. Results are shown based on whether the country is developing, emerging market or advanced. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. All separately shown control variables are included as GMM-style instruments. Lags 2 to 6 are used in Column (1) and (2). Lags 2 and 3 are used in Column (1) due to the "too-many-instruments"-problem. The collapse option of xtabond2 has been chosen. Windmeijer-corrected two-step standard errors are reported in parentheses. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

Table A.12

Empirical results for the baseline model, FDI

	Inequality		
	No lags	One lag	Two lags
FDI	-0.0374	0.00798	0.00923
	(0.057)	(0.0561)	(0.055)
FDI_{t-2}		-0.0434	0.00614
		(0.0486)	(0.0228)
FDI_{t-5}			-0.0485
			(0.0429)
Gross $Gini_{t-1}$	1.013***	1.014***	1.017***
	(0.00951)	(0.00995)	(0.00967)
GDP	0.0927	0.0891	0.0799
	(0.0827)	(0.0762)	(0.719)
Financial depth	0.0735	0.0764	0.0849
	(0.0741)	(0.0728)	(0.0747)
Financial access	-0.00287	-0.0273	-0.0423
	(0.00231)	(0.109)	(0.114)
Trade openness	0.321**	0.318**	0.3*
	(0.147)	(0.147)	(0.157)
Redistributive policies	0.00283	0.00281	0.00305
	(0.00402)	(0.00371)	(0.00391)
Constant	17.92	15.567	15.33
	(12.09)	(12.989)	(13.43)
Control variables	Yes	Yes	Yes
Year effects	Yes	Yes	Yes
Observations	812	812	812
Groups	107	107	107
Instruments	88	89	88
Hansen p-value	0.314	0.330	0.358
AR(2) p-value	0.046	0.045	0.050
AR(3) p-value	0.838	0.897	0.919

The underlying data is a panel set consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. FDI is measured by the sum of FDI assets and liabilities. All separately shown control variables are included as GMM-style instruments. Lags 2 to 16 are used in Column (1) and (2). The collapse option of xtabond2 has been chosen. Windmeijer-corrected two-step standard errors are reported in parentheses. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

Table A.13

Empirical results for developing countries, financial integration, financial depth and income inequality

DV: Inequality	Direct effects	Indirect effects	Total effects
Financial depth (log)	-0.0263		-0.0263
	(0.0238)		(0.0238)
FI (log)	0.0282	-0.0336	-0.00542
	(0.272)	(0.0337)	(0.256)
Financial integration (squared)	0.0169		0.0169
	(0.0741)		(0.0741)
Gross $Gini_{t-1}$	1.005***		1.005***
	(0.00368)		(0.00368)
GDP (log)	0.0128	-0.00406	0.0087
	(0.144)	(0.00376)	(0.1421)
Financial access (log)	-0.00732	-0.00994	-0.0173
	(0.0267)	(0.000893)	(0.0242)
Trade openness (log)	0.0186	0.00431	0.0229
	(0.0382)	(0.00636)	(0.381)
Redistributive policies	-0.000102	0.000963	0.000861
	(0.00311)	(0.000893)	(0.0033)
DV: Financial depth			
FI (log)	1.279***		1.279***
	(0.309)		(0.309)
GDP (log)	0.155***		0.155***
	(0.0421)		(0.0421)
Financial access (log)	0.379***		0.379***
	(0.0819)		(0.0819)
Trade openness (log)	-0.164		-0.164
	(0.158)		(0.158)
Redistributive policies	-0.0367***		-0.0367***
	(0.0099)		(0.0099)

The underlying data is a panelset consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. Financial depth is measured as private credit over GDP. Robust standard errors are reported in parentheses. A SMRS-value of 0.0012 (< 0.08) and a CD-value of 0.999 (close to 1) suggest good fit of the model. Control variables and year effects are included. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

Table A.14

Empirical results for emerging market economies, financial integration, financial depth and income inequality

DV: Inequality	Direct effects	Indirect effects	Total effects
Financial depth (log)	0.038		0.038
	(0.0284)		(0.0284)
FI (log)	0.443***	0.00945	0.452***
	(0.135)	(0.00706)	(0.138)
Financial integration (squared)	-0.155***		-0.155***
	(0.0593)		(0.0593)
Gross $Gini_{t-1}$	0.997***		0.997***
	(0.00221)		(0.00221)
GDP (log)	0.333***	0.00432	0.337***
	(0.117)	(0.00328)	(0.119)
Financial access (log)	0.0703**	0.1002	0.0803***
	(0.0293)	(0.00739)	(0.0293)
Trade openness (log)	0.179***	0.0259	0.205***
	(0.0547)	(0.0192)	(0.0532)
Redistributive policies	0.00238*	-0.000156	0.00222
	(0.00128)	(0.000132)	(0.00127)
DV: Financial depth			
FI (log)	-0.249***		-0.249***
	(0.0304)		(0.0304)
GDP (log)	0.114***		0.114***
	(0.0164)		(0.0164)
Financial access (log)	0.264***		0.264***
	(0.0477)		(0.0477)
Trade openness (log)	0.681***		0.681***
	(0.0777)		(0.0777)
Redistributive policies	-0.0041*		-0.0041*
	(0.00232)		(0.00232)

The underlying data is a panelset consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. Financial depth is measured as private credit over GDP. Robust standard errors are reported in parentheses. A SMRS-value of 0.003 (< 0.08) and a CD-value of 0.999 (close to 1) suggest good fit of the model. Control variables and year effects are included. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

Table A.15
Empirical results for advanced economies, financial integration, financial depth and income inequality

DV: Inequality	Direct effects	Indirect effects	Total effects
Financial depth (log)	0.419***		0.419***
	(0.166)		(0.166)
FI (log)	2.011**	0.0835**	2.095***
	(0.775)	(0.0349)	(0.799)
Financial integration (squared)	-0.951***		-0.951***
	(0.337)		(0.337)
Gross $Gini_{t-1}$	0.992***		0.992***
	(0.0148)		(0.0148)
GDP (log)	1.75***	0.0489**	1.799***
	(0.641)	(0.0241)	(0.657)
Financial access (log)	0.1112	0.1005**	0.212**
	(0.107)	(0.0416)	(0.0986)
Trade openness (log)	-0.201	0.0808	-0.12
	(0.211)	(0.0625)	(0.216)
Redistributive policies	0.00883	-0.000497	0.00834
	(0.00989)	(0.00164)	(0.0103)
DV: Financial depth			
FI (log)	0.199***		0.199***
	(0.0407)		(0.0407)
GDP (log)	0.117***		0.117***
	(0.0335)		(0.0335)
Financial access (log)	0.24***		0.24***
	(0.0337)		(0.0337)
Trade openness (log)	0.193		0.193
	(0.122)		(0.122)
Redistributive policies	-0.00119		-0.00119
	(0.00393)		(0.00393)

The underlying data is a panelset consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. Financial depth is measured as private credit over GDP. Robust standard errors are reported in parentheses. A SMRS-value of 0.002 (< 0.08) and a CD-value of 0.998 (close to 1) suggest good fit of the model. Control variables and year effects are included. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

Table A.16
Empirical results for developing countries, financial integration, labour share and income inequality

DV: Inequality	Direct effects	Indirect effects	Total effects
Labour share	0.0551		0.0551
	(0.672)		(0.672)
FI (log)	0.606	0.0314	0.638
	(1.304)	(0.379)	(1.319)
Financial integration (squared)	-0.000593	-0.00678	-0.00737
	(0.298)	(0.0817)	(0.298)
Gross $Gini_{t-1}$	0.956***		0.956***
	(0.0188)		(0.0188)
GDP (log)	0.2	0.00843	0.209
	(0.567)	(0.101)	(0.573)
Financial depth (log)	0.034	0.00252	0.0366
	(0.0835)	(0.0308)	(0.0765)
Financial access (log)	-0.178	0.00633	-0.171
	(0.174)	(0.0774)	(0.13)
Trade openness (log)	0.122	-0.0022	0.12
	(0.115)	(0.0269)	(0.1)
Redistributive policies	0.000422	0.000208	0.00063
	(0.00786)	(0.00254)	(0.00703)
DV: Labour share			
FI (log)	0.57**		0.57**
	(0.292)		(0.292)
Financial integration (squared)	-0.123**		-0.123**
	(0.0633)		(0.0633)
GDP (log)	0.153		0.153
	(0.127)		(0.127)
Financial depth (log)	0.0458***		0.0458***
	(0.0108)		(0.0108)
Financial access (log)	0.115***		0.115***
	(0.0238)		(0.0238)
Trade openness (log)	-0.0399*		-0.0399*
	(0.022)		(0.022)
Redistributive policies	0.00378***		0.00378***
	(0.000703)		(0.000703)

The underlying data is a panelset consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. Labour share is measured as compensation of employees divided by GDP. A SMRS-value of 0.000 (< 0.08) and a CD-value of 1.000 (close to 1) suggest good fit of the model. Control variables and year effects are included. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

Table A.17
Empirical results for emerging market economies, financial integration, labour share and income inequality

DV: Inequality	Direct effects	Indirect effects	Total effects
Labour share	-0.207		-0.207
	(0.256)		(0.255)
FI (log)	-0.302	-0.00408	-0.306
	(0.624)	(0.0222)	(0.621)
Financial integration (squared)	0.0879	0.00363	0.0916
	(0.184)	(0.00843)	(0.183)
Gross $Gini_{t-1}$	1.001***		1.001***
	(0.00378)		(0.00378)
GDP (log)	-0.253	-0.00264	-0.255
	(0.352)	(0.0142)	(0.351)
Financial depth (log)	-0.0181	-0.0129	-0.031
	(0.071)	(0.0163)	(0.067)
Financial access (log)	0.067	0.00141	0.0685
	(0.0503)	(0.00282)	(0.0498)
Trade openness (log)	0.0374	0.0036	0.0409
	(0.127)	(0.00636)	(0.126)
Redistributive policies	0.00104	0.000324	0.00136
	(0.00201)	(0.000385)	(0.00199)
DV: Labour share			
FI (log)	0.0197		0.0197
	(0.099)		(0.099)
Financial integration (squared)	-0.0175		-0.0175
	(0.0311)		(0.0311)
GDP (log)	0.0127		0.0127
	(0.0636)		(0.0636)
Financial depth (log)	0.0623***		0.0623***
	(0.015)		(0.015)
Financial access (log)	-0.00682		-0.00682
	(0.00852)		(0.00852)
Trade openness (log)	-0.0173		-0.0173
	(0.0208)		(0.0208)
Redistributive policies	-0.00156***		-0.00156***
	(0.000368)		(0.000368)

The underlying data is a panelset consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. Labour share is measured as compensation of employees divided by GDP. A SMRS-value of 0.003 (< 0.08) and a CD-value of 1.000 (close to 1) suggest good fit of the model. Control variables and year effects are included. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.

Table A.18
Empirical results for advanced economies, financial integration, labour share and income inequality

DV: Inequality	Direct effects	Indirect effects	Total effects
Labour share	-0.199		-0.199
	(1.126)		(1.126)
FI (log)	2.946	-0.0286	2.917
	(2.161)	(0.163)	(2.149)
Financial integration (squared)	-1.33	0.0134	-1.317
	(0.85)	(0.0762)	(0.843)
Gross $Gini_{t-1}$	1.01***		1.01***
	(0.0218)		(0.0218)
GDP (log)	2.368	-0.023	2.345
	(1.604)	(0.131)	(1.59)
Financial depth (log)	0.481	-0.039	0.442**
	(0.302)	(0.221)	(0.201)
Financial access (log)	0.194	0.00921	0.194
	(0.187)	(0.0519)	(0.155)
Trade openness (log)	-0.563**	0.00294	-0.56**
	(0.283)	(0.0181)	(0.291)
Redistributive policies	0.0137	0.0000884	0.0137
	(0.0147)	(0.000512)	(0.0144)
DV: Labour share			
FI (log)	0.143		0.143
	(0.156)		(0.156)
Financial integration (squared)	-0.0673		-0.0673
	(0.0619)		(0.0619)
GDP (log)	0.116		0.116
	(0.116)		(0.116)
Financial depth (log)	0.196***		0.196***
	(0.0157)		(0.0157)
Financial access (log)	-0.0462***		-0.0462***
	(0.00697)		(0.00697)
Trade openness (log)	-0.0148		-0.0148
	(0.0289)		(0.0289)
Redistributive policies	-0.000444		-0.000444
	(0.000629)		(0.000629)

The underlying data is a panelset consisting of 181 countries, running from 1970 to 2014. The dependent variable is income inequality, measured by the gross Gini-coefficient, whereby a higher Gini-coefficient signals higher income inequality. Financial integration is measured by the sum of external assets and liabilities, divided by GDP. Labour share is measured as compensation of employees divided by GDP. A SMRS-value of 0.008(< 0.08) and a CD-value of 0.998 (close to 1) suggest good fit of the model. Control variables and year effects are included. Stars ***, **, * indicate significance at the 1%, 5% and 10%-level, respectively.