Does monetary policy affect income inequality in the euro area?[1]

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[1]The views expressed do not necessarily reflect the official views of De Nederlandsche Bank, the European Central Bank, and the International Monetary Fund

Synopsis

- Examine how ECB's monetary policy affects income inequality in EA countries over the period 1999-2014

- Channels: labor-market and financial

- Findings
  - Expansionary monetary policy reduces income inequality by raising employment and wages (labor-market channel)
  - There is limited evidence for the financial channel

Plan

1. Motivation

2. Theoretical framework

3. Data

4. Methodology

5. Empirical analysis

6. Conclusions

Background

- Rising wealth and income inequality in advanced countries in recent decades (Piketty, 2014; OECD, 2015) with serious repercussions

- Distributional effects of monetary policy of increasing concern among policy-makers (e.g., Bernanke, 2015; Draghi, 2015)

- Growing theoretical literature studying distributional effects of monetary policy in heterogenous agents (HANK) models (Gornemann et al., 2016; Kaplan et al., 2018; Ravn & Sterk, 2018; Auclert et al., 2019)

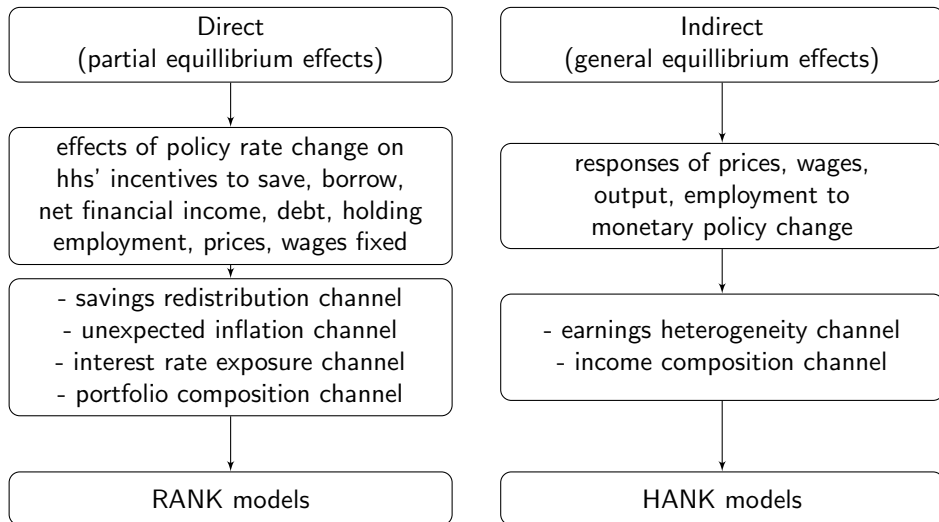- Empirical evidence is mixed (see Colciago et al., 2019)

Previous empirical literature

Table: **Impact of monetary policy on income inequality**

Study	Sample	Monetary policy	Effect
Conventional monetary policy			
Coibion et al. (2017)	US	Restrictive	+
Mumtaz & Theophilopoulou (2017)	UK	Restrictive	+
Guerello (2018)	EA	Restrictive	+
Furceri et al. (2018)	32 adv & eme	Restrictive	+
Inui et al. (2017)	Japan	Expansionary	+
Cloyne et al. (2016)	UK, US	Expansionary	+
Unconventional monetary policy			
Montecino & Epstein (2015)	US	QE	+
Mumtaz & Theophilopoulou (2017)	UK	QE	+
Saiki & Frost (2014)	Japan	QE	+
Casiraghi et al. (2018)	Italy	UMP	-
Lenza & Slačálek (2018)	DE, FR, IT, ES	QE	-
Inui et al. (2017)	Japan	QE	ins

Studying distributional effects of monetary policy in EA

- Evidence remains scant: Guerello (2018), Lenza & Slačálek (2018)

- Data challenges with measuring income inequality:
  Hh surveys for EA countries at annual frequency, for a few years
  Alternatives: HFCS (3 waves), EC's Consumer Survey

- Identification of a monetary policy shock

- Testing specific channels of monetary policy impact on income inequality

This paper

- Analyze the impact of ECB's expansionary monetary policy on income inequality in EA countries over 1999-2014, using PVARX model

- Use annual data from SWIID on Gini coefficients of income inequality: available for a continuous long period, standardizes income, captures all income sources

- Three identification approaches for EA monetary policy shocks

- Distinguish two channels – labor-market and financial – through which monetary policy may have opposite distributional effects

- Deal with mixed-frequency data problem

Distributional effects of monetary policy

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┌─────────────────────────┐          ┌─────────────────────────┐
│          Direct         │          │         Indirect        │
│ (partial equillibrium   │          │ (general equillibrium   │
│        effects)         │          │        effects)         │
└─────────────────────────┘          └─────────────────────────┘
              │                                    │
              ▼                                    ▼
┌─────────────────────────┐          ┌─────────────────────────┐
│ effects of policy rate  │          │  responses of prices,   │
│ change on hhs' incentives│         │     wages, output,      │
│ to save, borrow, net    │          │   employment to         │
│ financial income, debt, │          │  monetary policy change │
│ holding employment,     │          │                         │
│ prices, wages fixed     │          │                         │
└─────────────────────────┘          └─────────────────────────┘
              │                                    │
              ▼                                    ▼
┌─────────────────────────┐          ┌─────────────────────────┐
│ - savings redistribution│          │ - earnings heterogeneity│
│   channel               │          │   channel               │
│ - unexpected inflation  │          │ - income composition    │
│   channel               │          │   channel               │
│ - interest rate exposure│          │                         │
│   channel               │          │                         │
│ - portfolio composition │          │                         │
│   channel               │          │                         │
└─────────────────────────┘          └─────────────────────────┘
              │                                    │
              ▼                                    ▼
┌─────────────────────────┐          ┌─────────────────────────┐
│       RANK models       │          │       HANK models       │
└─────────────────────────┘          └─────────────────────────┘
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Expansionary monetary policy shock ($\downarrow$ policy rate)

Direct effects (partial-equilibrium):
$\downarrow$ interest-bearing income, interest payments on debt $\Rightarrow$ $\downarrow\uparrow$ income inequality

Indirect effects (general-equilibrium):
Labor-market channel: $\uparrow$ Y, I, employment, wages $\Rightarrow$ $\downarrow$ income inequality
Financial channel: $\uparrow$ asset prices $\Rightarrow$ $\uparrow$ capital returns $\Rightarrow$ $\uparrow$ income inequality

Data description

- 10 'old' EA countries over 1999Q1–2014Q4

- Income inequality measures: 1) Gini market (pre-tax, pre-transfer) from SWIID; 2) Gini net (post-tax, post-transfer); 3) Theil index of labor earnings inequality from UTIP

- Aggregate EA data: real GDP, headline HICP, stock price index, corporate bond spread

- Country-specific data: real GDP, headline HICP, channel variables

- Labor-market channel: wages (mln eur), employment (ths persons); gross hourly earnings, employment rate

- Financial channel: stock prices; corporate bond spread, house prices, short- and long-term rates, financial income (and its components), rental income

- Monetary policy stance: shadow rate for EA (Krippner, 2015)

- Mixed frequency data – Kalman filter in state-space VAR to interpolate Gini based on quarterly country-specific variables (imputation set as in PVARX)

Income inequality in EA: trends and stylized facts

Figure: Development of income ienquality in EA economies, 1999–2014
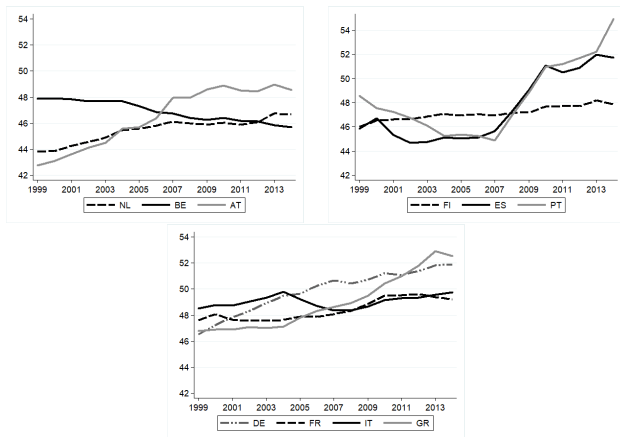
- Most core economies characterized by lower Gini market coefficients compared to periphery, in line with the Kuznets curve theory.

Income inequality in EA: trends and stylized facts

Table: **Growth rates of Gini, wages, and stock prices in EA countries**

Countries	1999-2014			1999-2007			2007-2014		
	Gini	Stock prices	Wages	Gini	Stock prices	Wages	Gini	Stock prices	Wages
AT	13.54	93.63	52.23	**12.13**	262.52	21.80	1.26	-46.59	24.98
BE	-4.52	26.39	50.63	-2.36	52.96	25.03	-2.22	-17.37	20.48
DE	11.55	26.78	37.42	**8.93**	25.30	18.15	2.41	1.18	16.32
ES	12.80	19.24	58.31	-0.50	82.04	36.74	**13.37**	-34.50	15.77
FI	4.13	-3.91	65.92	**2.07**	41.84	35.00	2.02	-32.26	22.90
FR	3.32	14.07	50.91	0.96	40.13	29.78	2.33	-18.60	16.28
GR	12.34	-75.02	39.71	**3.96**	5.82	54.50	**8.06**	-76.40	-9.57
IT	2.56	-27.59	49.49	-0.33	31.10	25.16	**2.90**	-44.77	19.44
NL	6.56	-19.81	39.89	**5.32**	3.13	21.41	1.18	-22.24	15.22
PT	13.07	16.12	30.00	-7.60	69.74	26.07	**22.37**	-31.59	3.12
Average	7.53	6.99	47.45	2.26	61.46	29.36	5.37	-32.31	14.49

- HFCS (wave 1): Transfer income concentrated among the bottom 20% of hhs, ranging from 60% (DE) to 83% (FR) of total hh income
- Transfer and labor income dominate in total income of 20-40% quintile.
- Middle (40-80% group) and top 20% rely on labor income as main income source
- Financial income benefits upper 10%, with high share (27% of total income) in FR

Methodology: identification of EA monetary policy shock

1. **Benchmark**: **Proxy-SVAR** (Mertens & Ravn, 2013; Gertler & Karadi, 2015; Stock & Watson, 2018)

$$A_0 Y_t^{EA} = \sum_{i=1}^{q} B_i Y_{t-i}^{EA} + \varepsilon_t^{EA} \qquad (1)$$

$Y_t^{EA} = [i_t^{EA},\ ln(GDP_t^{EA}),\ ln(HICP_t^{EA}),\ ln(Stock_t^{EA}),\ Spread_t^{EA}]'$
Proxy: monetary policy surprises from Jarocinski and Karadi (2020) – intraday variation in 3-m EONIA interest rate swaps around ECB policy announcements

2. **Sign restrictions**: estimate reduced-form VAR as in benchmark, use sign restrictions for identification of B_0 (Canova & Nicolo, 2002; Uhlig, 2005; Rubio-Ramirez et al., 2010; Gertler & Karadi, 2015; Caldara &Herbst, 2019)

3. **Forward-looking Taylor rule** (Taylor, 1993; Clarida et al., 1998):

$$i_t^{EA} = \rho i_{t-1}^{EA} + \beta_1 E(\pi_{t+1|t}^{EA}) + \beta_2 E(y_{t|t}^{EA}) + \varepsilon_{i,t}^{EA} \qquad (2)$$

Methodology: PVARX model

$$Y_{it} = \sum_{j=1}^{p} C_j Y_{i,t-j} + \sum_{j=1}^{g} D_j x_{t-j} + e_{it} \tag{3}$$

Y_{it} – country-specific endogenous variables: real GDP, HICP, employment, wage, stock prices, Gini coefficient; included with 1 lag
Endogenous variables are included in log-levels
x_t – exogenous monetary policy shock, included contemporaneously and with 2 lags

Estimate PVARX for different units separately, then average results across units

Average change in Gini mkt btw 1999 and 2014 was 7.1% (0.46% per year)
100 bps expansionary monetary policy shock decreases Gini mkt by -0.23% (half of annual change)
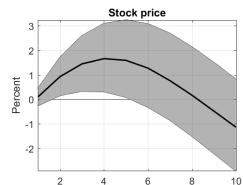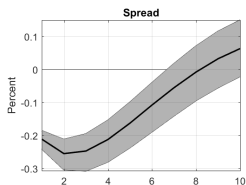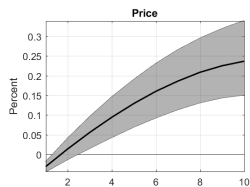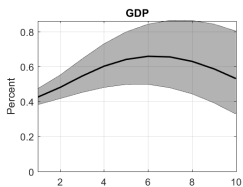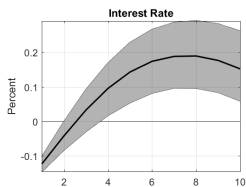
Scenario analysis: responses of Gini mkt to an expansionary monetary policy shock, baseline vs. scenarios

Sensitivity analysis

- Alternative identification of monetary policy shock (sign restrictions, Taylor rule)

- Two alternative variables sets for imputing Gini

- PVARX using annual data: 1) assign annual Gini value to each quarter in corresponding year; 2) all variables are included at annual frequency

- Linear local projections

- One-step procedure: estimate PVARX conditional on each draw of the shock

- Estimate two models: for 1999Q1-2009Q3 and 1999Q1-2012Q2

Conclusions
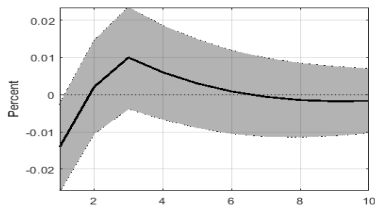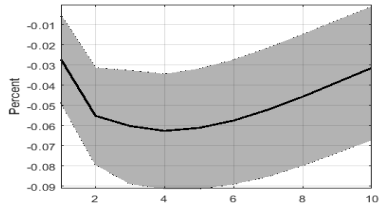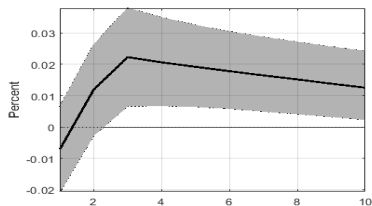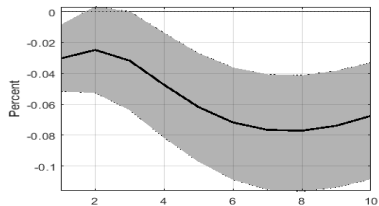
- Expansionary monetary policy of the ECB reduces income inequality in the EA, especially in the periphery

- Labor-market channel enhances the equalizing effect: higher wages and employment contribute to inequality-reducing impact of monetary easing

- Evidence for the financial channel is limited

- Distributional impact of monetary policy mainly reflected in GE effects on economic activity, labor earnings, and job creation...
  .. while changes in asset prices associated with wealth distribution rather than income

- Effects of monetary policy evident in short run

- Other policies and economic forces responsible for inequality rise (e.g., fiscal austerity, technological change, globalization, decline in labor share)

Thank you