Stealth Consolidation, Market Power and Income Inequality

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Main Question:
Does an increase in Firms Market Power have an effect on the whole Economy, and can it increase Income Inequality?

Empirical Approach:
Identify exogenous variations in market power and their effect on the economy by using Stealth Consolidation in a Dynamic Factor Model. A novel methodology that allows to overcome limitations in the data.

Stealth Consolidation:
A plethora of anti-competitive deals that go unnoticed by Antitrust Authorities, due to their unassuming size. Transactions below the threshold set by the Hart-Scott-Rodino Act (Wollmann 2019).

Economic Framework

Standard Economic model with Heterogeneous Agents:

An increase in Market Power allows firms to restrain output and increase prices so as to increase their profits. Lower Output drives down marginal costs and thus labor earnings.

$$\begin{matrix}\text{Stealth Consolidation} \\ \uparrow \text{Market Power}\end{matrix} \Rightarrow \begin{cases}\uparrow \text{Markup} \\ \downarrow \text{Output}\end{cases} \Rightarrow \begin{cases}\uparrow \text{Profits} \\ \downarrow \text{Earnings}\end{cases}$$

What does this imply for households?

Profits increase and labor earnings decrease. Therefore richer households gain, while poorer households loose. Income inequality increases.

$$\begin{cases}\uparrow \text{Profits} \\ \downarrow \text{Earnings}\end{cases} \Rightarrow \begin{cases}\uparrow \text{Rich Income} \\ \downarrow \text{Poor Income}\end{cases} \Rightarrow \uparrow \text{Inequality}$$

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Identification: Market Power Shock

Source of variation: Difference between Horizontal and Non Horizontal M&A, only for Stealth mergers. Graph

Stealth M&A wave: Use NH and H as known factors. Construct the vector $FF_t = (F_t, NH_t, H_t)$ and use a Cholesky scheme:

$$H_t = h_m + \alpha_{1,m} NH_t + \alpha_{2,m} F_t + \\ + \beta_m H_{t-1} + \gamma_m NH_{t-1} + \delta_m F_{t-1} + \ldots + \\ + \underbrace{u_{1,t} + u_{2,t} + \ldots + u_{M,t}}_{\epsilon_t}$$

$u_{M,t}$ affects only H_t contemporaneously, and it influences other variables only through H_t.

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Results - Macro Variables

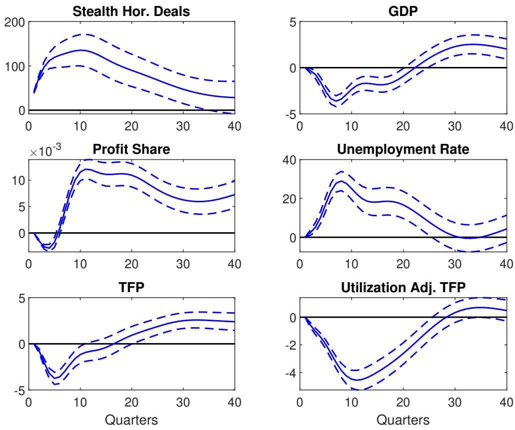


Figure: Impulse Response Function of macro variables to a shock of M&A Deals. Confidence bands are computed by bootstrap methods on the process generating factors. Bands represent one standard deviation (or 68%) of the distribution of bootstrapped IRFs.

Results - Markups

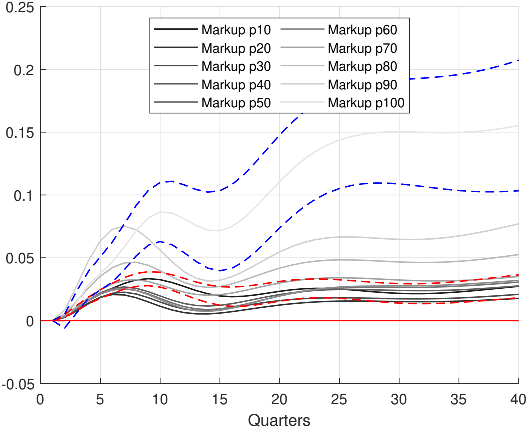
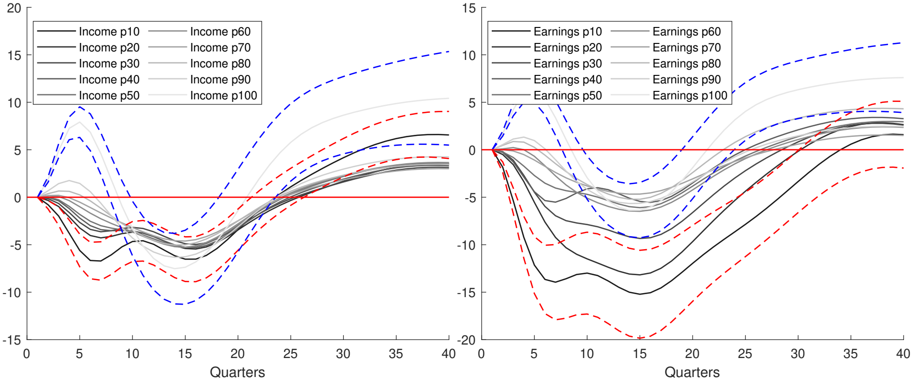


Figure: Impulse Response Function of the distribution of firms markups to a shock of M&A Deals. Confidence bands are computed by bootstrap methods on the process generating factors. Bands represent one standard deviation (or 68%) of the distribution of bootstrapped IRFs.

Results - Households



(a) Income (b) Labor Earnings

Figure: Impulse Response Function of the distribution of Hoouseholds variables to a shock to M&A Deals. Confidence bands for the 10th decile are reported in blue and for the 1st decile are reported in red. Confidence bands are computed by bootstrap methods on the process generating factors. Bands represent one standard deviation (or 68%) of the distribution of bootstrapped IRFs.

Results - Inequality

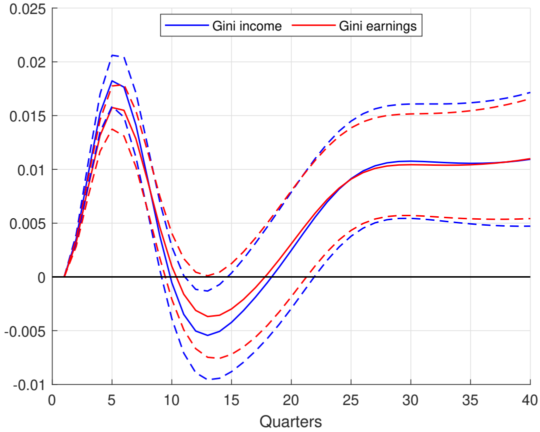


Figure: Impulse Response Function of Gini index for Income, Earnings and Consumption to a shock of M&A Deals. Confidence bands are computed by bootstrap methods on the process generating factors. Bands represent one standard deviation (or 68%) of the distribution of bootstrapped IRFs.

Robustness

- Reverse Cholesky ordering $FF_t = (F_t, NH_t, H_t)$ Appendix
- Use M&A Value rather thank the number of M&A Deals
- Use different measures of Markpus (no fixed costs or LI)
- Use simple VEC rather than Factor ECM.
- Use GDP as control and Horizontal M&A Deals as indentifying variable
- Agnostic identification through sign restrictions on M&A Deals(↑), GDP(↓) and Stock Prices(↑) Appendix

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Conclusions

Novelty: Identification of an exogenous Market Power shock, by exploiting Stealth Consolidation in a DFM.

Results: The identified market power shock increases income and earnings inequality, both in the short and in the long run.

- It can explain 20% of the variation in Income Gini Index.
- It increased Income Gini by 0.4 points in the 6 years following 2001, and it can increase Gini index by 1 point in the long run.

This paper adds to the debate on whether merger regulation should be made more stringent, by showing that **Stealth Consolidation increases Inequality**.

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Factor Error Correction Model

One can write the process generating the economy in state space form, where the observation equation is:

$$x_t = \chi_t + \xi_t = \Lambda F_t + \xi_t$$

And the states, also called factors F_t, evolve according to a **Vector Error Correction (VEC)** process in the state equation:

$$G(L)\Delta F_t = h + \alpha\beta' F_{t-1} + u_t$$

By modeling explicitly the cointegratio feature of the VEC process, one can draw reliable conclusions on **long run responses**.

$x_t = (x_{1t}, ..., x_{Nt})'$, $\chi_t = (\chi_{1t}, ..., \chi_{Nt})'$, $\xi_t = (\xi_{1t}, ..., \xi_{Nt})'$, $\Lambda = (\lambda_1, ..., \lambda_N)'$

Estimation

Barigozzi, Lippi, and Luciani (2016) show that factors F_t and factor loadings Λ of non stationary data can be consistently estimated by using **principal components**, the standard tool of DFM.

Given the sample covariance $\hat{\Gamma} = T^{-1}\Delta x \Delta x'$, one can compute the n x r matrix $\hat{W}$ containing the r eigenvectors of $\hat{\Gamma}$ corresponding to the r largest eigenvalues of $\hat{\Gamma}$. Then the estimated factors and factor loadings are:

$$\hat{\Lambda} = \sqrt{N}\hat{W}, \qquad \hat{F}_t = \frac{1}{\sqrt{N}}\hat{W}x_t = \frac{1}{N}\hat{\Lambda}'x_t$$

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Impulse Response Functions

$$\begin{cases} x_t & = \Lambda F_t + \xi_t \\ G(L)\Delta F_t & = h + \alpha\beta' F_{t-1} + u_t \end{cases}$$

Given the aforementioned factor model, one can estimate the IRF for the VEC process on the estimated factors $\hat{F}_t$:

$$IRF^{VECM} = \left[\hat{A}^{VECM}(L)\right]^{-1} R$$

And lastly one can use the estimated factor loadings $\hat{\Lambda}$ so as to estimate the IRF of all variables in the dataset:

$$IRF^{FECM} = \hat{\Lambda}\left[\hat{A}^{VECM}(L)\right]^{-1} R$$

More Details

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Impulse Response Functions of VEC

$$G(L)\Delta F_t = h + \alpha\beta' F_{t-1} + K u_t$$

With regard to the estimation of the Impulse Response Function of a VECM one can refer to Lütkepohl (2006). Given the number of lags p

$$\hat{A}^{VECM}(L) = I_r - \sum_{k=1}^{p+1} \hat{A}_k^{VECM} L^k$$

With coefficients given by:

$$\begin{aligned}
\hat{A}_1^{VECM} &= \hat{G}_1 - \alpha\beta' + I_r \\
\hat{A}_k^{VECM} &= \hat{G}_k - \hat{G}_{k-1}, \quad k = 2, ..., p \\
\hat{A}_{p+1}^{VECM} &= -\hat{G}_p
\end{aligned}$$

So that the IRF of the VECM in the factors is:

$$IRF^{VECM} = \left[\hat{A}^{VECM}(L)\right]^{-1} \hat{K} R$$

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Technology Shock - Macro Variables

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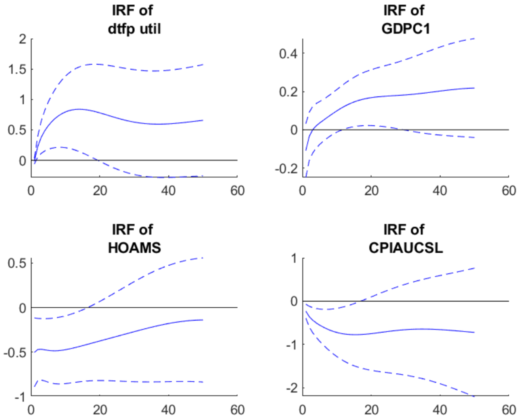

Figure: Impulse Response Function of macro variables to a shock of M&A Deals. Confidence bands are computed by bootstrap methods on the process generating factors. Bands represent one standard deviation of the distribution of bootstrapped IRFs.

Technology Shock - Markups

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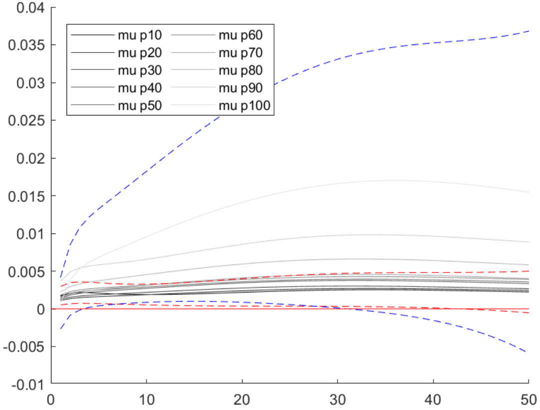

Figure: Impulse Response Function of the distribution of firms markups to a shock of M&A Deals. Confidence bands are computed by bootstrap methods on the process generating factors. Bands represent one standard deviation of the distribution of bootstrapped IRFs.

Technology Shock - Inequality

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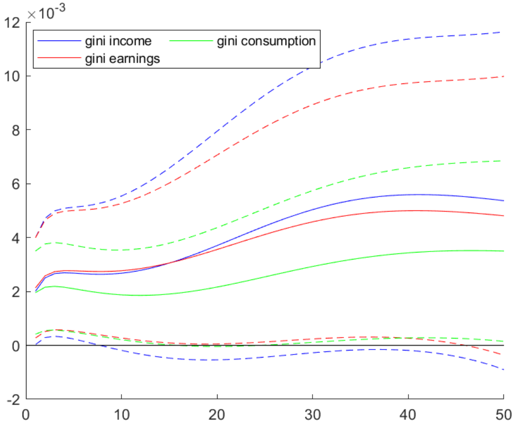

Figure: Impulse Response Function of Gini index for Income, Earnings and Consumption to a shock of M&A Deals. Confidence bands are computed by bootstrap methods on the process generating factors. Bands represent one standard deviation of the distribution of bootstrapped

EVD - More Variables

MnA/EVD_Vars1.png

Figure: Error Variance Decomposition of the common component of several variables. The shock of interest is the MA Shock, while the GDP shock is the one used as a control. The other shocks are the ones driving factors and thus the rest of the variables in the dataset ← Back

Identification - Wollmann (2019)

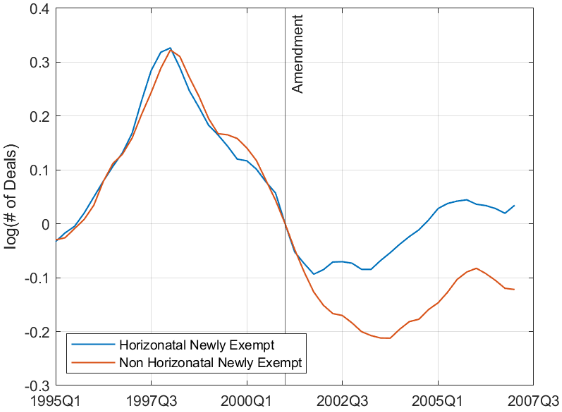

Figure: Number of M&A Deals. Horizontal Deals refer to Delas between parites in the same four-digit SIC code. Newly Exempt Deals refer to Deals that are exempt from reporting under the Amendment to the Hart-Scott-Rodino Act. So as to facilitate comparison, both series are brought to 0 in the year of the Amendment. ← Back