Financial Frictions, Markups, and Unilateral Trade Liberalization

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Introduction

- Allocation of resources in emerging economies is distorted (e.g. Hsieh/Klenow 2009). Why?
  - Restricted access to credit $\longrightarrow$ longer time to accumulate optimal capital
  - Variable demand elasticities $\longrightarrow$ more efficient firms under-produce relative to less efficient

- Trade liberalization under misallocation:
  - Trade reforms can improve allocation of resources
  - But: trade liberalization could be a second-best policy in the presence of distortions (e.g. Bhagwati 1971)
  - Why? Distortions affect margins of trade and outcomes of trade liberalization

- **Research Question:**
  - What are the welfare and allocative efficiency effects of unilateral trade liberalization in a small open economy facing distortions from financial frictions and variable markups?

What we do

- **Reduced-form evidence**
  - Follow the unilateral trade liberalization between the EU and Ukraine in 2014
  - Use firm level financial and customs data for Ukrainian manufacturing
  - Study reallocation of export sales to the EU among Ukrainian manufacturing firms

- **Small open economy model with two asymmetric countries**
  - Heterogeneous entrepreneurs that own intermediate goods producers
  - Financial frictions as in Kohn et al. 2020
  - Variable markups as in Edmond et al. 2023, Gopinath et al. 2020
  - Home is small and distorted, Foreign is big and undistorted

- **Quantitative exercise**
  - Calibrate model to UA manufacturing data before the EU-UA Association Agreement
  - Effects of a unilateral trade liberalization on welfare and allocative efficiency
  - Counterfactual analysis

Related literature

- **Trade liberalization in the presence of financial frictions:**
  Manova 2013, Kohn et al. 2020/2022/2023, Leibovici 2021, Brooks and Dovis 2020, Telenyi 2022
  → our contribution: how variable markups can dumpen effects for unconstrained firms

- **Trade liberalization with variable markups:**
  Melitz and Ottaviano 2008, Zhelobodko et al. 2012, De Loecker and Warsczinsky 2012, Amiti et al. 2014, Edmond et al. 2015, De Loecker et al. 2016, Parenti et al. 2017, Arkolakis et al. 2019
  → our contribution: how markups interact with financial frictions

- **Resource misallocation in economies with variable markups and financial frictions:**
  Guiliano Zaourak 2017, Galle 2020, Tsiflis 2022, Lehrer 2022, Kim Lee 2023, Altomonte et al. 2022, Li et al. 2025
  → our contribution: how they jointly shape the effects of trade liberalization

Contribution to the literature:

- Unilateral trade liberalization between asymmetric trading partners
- Less efficient country faces distortions due to financial frictions and variable markups
- Effects on welfare and allocative efficiency in a less-efficient trading partner.

Empirical Evidence

Background

- EU-Ukraine Association Agreement (AA) was supposed to be signed in 2013, but ...
  - push-back from the then UA government
  - threats by RU

- The AA, including Deep and Comprehensive Free Trade Area (DCFTA), in 2014:
  - political part in March 2014, economic part in June 2014
  - DCFTA is implemented since January 2016, full scope of the AA - since September 2017

- The EU introduced the Autonomous Trade Preferences (ATP) in April 2014...
  - as one of the stabilizing measures to support Ukrainian economy, its reforms and reallocation of Ukrainian business towards the EU market

- What changed?
  - exports to the EU without MFN tariffs before implementation of DCFTA
  - EU lowered import tariffs according to the 1st year of DCFTA implementation

- April 2014 - December 2015: a period of *a unilateral trade liberalization introduced for an emerging economy by a more economically developed trading partner*

Firm-Level Data

- We construct a firm-level sample using a universe of Ukrainian manufacturing firms' financial statements and customs records from 2011 to 2019

- Financial statements contain information on:
  - annual balance sheets
  - income statements
  - average number of employees in a year
  - industry identifier

- Customs records contain information on
  - destination of exports
  - value and quantity
  - Harmonized System (HS) product code

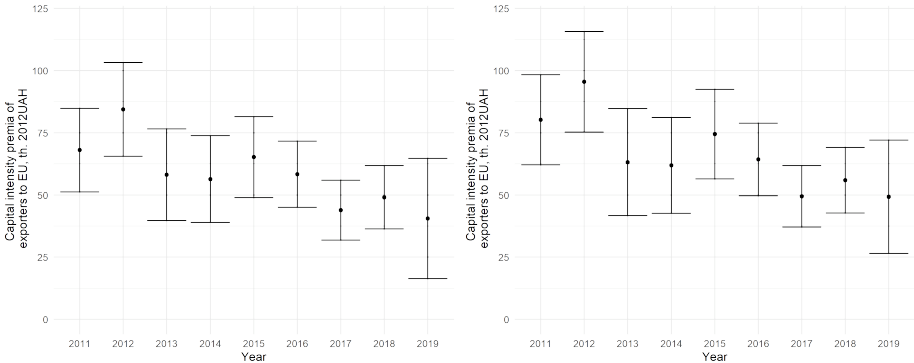
- Match two datasets using unique firm identifiers

Descriptive Statistics

Table: Selected Descriptive Statistics for Sample between 2013 and 2015

Indicator	2013	2014	2015
Main characteristics			
Sales, mean, UAH th.	99,373.2	110,126.9	99,994.2
Capital, mean, UAH th	37,973.6	40,560.7	36,949.3
Assets, mean, UAH th	104,284.6	114,769.1	114,613.3
Employment, mean, persons	194.3	191.0	184.8
Capital-Labor ratio, simple average, UAH th	103.6	103.8	90.3
Capital-Labor ratio, sales-weighted, UAH th	365.7	430.0	430.1
Wage Bill-Output ratio, mean	0.45	0.22	0.20
International trade			
Share of exporters to the EU, %	24.7	29.5	33.0
Share of exports in sales, EU, %	17.6	17.3	18.8
Financial conditions			
Leverage, mean	0.150	0.158	0.158

Empirical Result 1: Exporters to the EU have higher capital intensity



(a) Excluding industry fixed effects (b) Including industry fixed effects

Figure: Capital intensity premia: Exporters to EU vs. non-exporters to EU

Note: The charts show the coefficients from regressing capital-labor ratio on the indicator of the firm, exporting to the EU, for each year in the sample. We construct 90% confidence bands using heteroskedasticity-robust standard errors.

Empirical Result 2: Capital-intensive firms expanded exports faster

- Event-study analysis for a set of continuing exporters to the EU in 2011-2016:

$$\log Y_{ijt} = \beta_i + \beta_{jt} + \sum_{\substack{\tau \in \{2011,2016\} \\ \tau \neq 2013}} \beta^{\tau} \mathbb{1}\{\tau = t\} \times \widetilde{CapLab}_{ij}^{2013} + \Gamma X_{ijt} + \varepsilon_{ijt},$$

where

- Y_{ijt} is volume of export sales to the EU market of firm i in industry j in year t
- $\widetilde{CapLab}_{ij}^{2013}$ is standardized capital intensity of the firm in 2013 (minus average KL for industry, divided by SD)
- $\mathbb{1}\{\tau = t\}$ is an indicator function equal to 1 if year is τ (reference year is 2013)
- β_i is a firm fixed effect, β_{jt} is an industry-year fixed effect
- X_{ijt} is a matrix of controls
- $\{\beta^{\tau}\}_{\tau=2011}^{2016}$ captures exports sales premium of more capital-intensive exporter to the EU

Empirical Result 2: Capital-intensive firms expanded exports faster

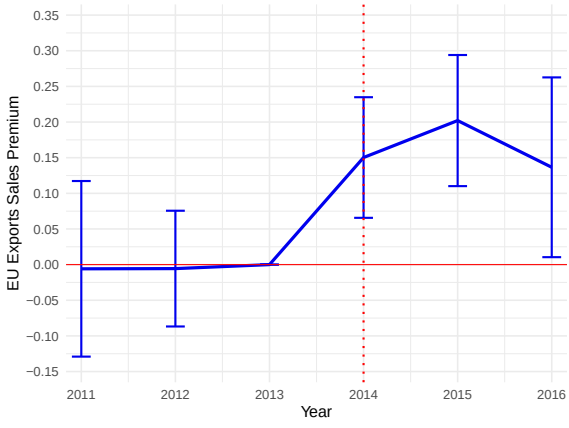


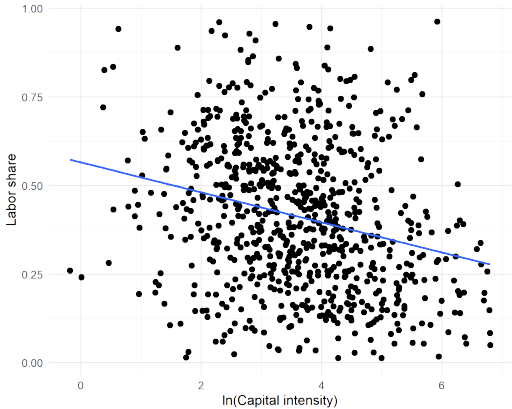
Figure: EU Export Sales Premium of High Capital-Intensive Firms

Note: Figure plots a set of identified $\{\beta^{\tau}\}_{\tau=2011}^{2016}$ in regression. We cluster standard errors at the firm level. The sample includes only firms continuously exporting to the EU from 2011 to 2016. We plot 90% confidence bands. The reference year is 2013. The red dotted line presents the year of implementing ATP.

Robustness

Empirical Result 3: Capital-intensive firms have higher markups

Figure: Cross-sectional relationship between capital intensity and labor share at the firm level in 2013



Note: The chart scatters the logarithm of firm-level capital intensity against the firm-level ratio of the firm's wage bill to value added for Ukrainian non-exporting firms in 2013. Logarithm of capital intensity is on the horizontal axis, labor share is on the vertical axis.

Empirical Result 3: Capital-intensive firms have higher markups

Table: Cross-sectional relationship between capital intensity and labor share for not exporting firms in 2013

	Labor share		
Intercept	0.57^{**}	0.52^{**}	0.46^{**}
	(0.023)	(0.047)	(0.074)
$log\left(\frac{K}{L}\right)$	-0.042^{**}	-0.038^{**}	-0.021^{**}
	(0.006)	(0.006)	(0.008)
Industry FE	No	2d	4d
Region FE	No	Yes	Yes

Note: The table above presents coefficients of regressing labor shares on the natural logarithm of capital intensity for Ukrainian non-exporting firms in 2013. We put heteroskedasticity-robust standard errors in parentheses. The second equation includes regional and 2-digit industry fixed effects. The third equation includes regional and 4-digit industry fixed effects. ** implies that the coefficient is statistically-significant at the 95% level.

Empirical Results: Summary

- We have established that...

1. Exporters to the EU were more capital-intensive than other firms
2. Revenues from exporting to the EU reallocated toward more capital-intensive firms in 2014-2015 ...among continuing exporters to the EU
3. Cross-sectional correlation between labor shares and capital intensities is negative and statistically significant ...across non-exporters at the firm level

Quantitative Model

Overview of a Small Open Economy Model

- Two asymmetric countries:
  - Domestic - small, with distortions
  - Foreign - large, no distortions

- Agents:
  - Unit measure of infinitely-lived entrepreneurs
  - Intermediate producers owned by entrepreneurs
  - Perfectly-competitive final good producer
  - Non profit-making financial intermediary with access to international financial markets

- Distortions:
  - Domestic economy:
    - domestic intermediate producers invest under collateral constraints
    - variable demand elasticity at the domestic market
  - No distortions at the foreign market

Preferences and Technology

- **Preferences**:
  - A unit measure of infinite-lived entrepreneurs maximize CRRA utility from consuming a final good:

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \frac{C_{idt}^{1+\nu}}{1+\nu}$$

  - Heterogeneous in pre-determined assets (a_{it}) and idiosyncratic productivity (z_{it})
  - Entrepreneurs supply labor and own intermediate producers

- **International trade**:
  - The entrepreneur can sell intermediate goods at home or abroad
  - If exporting:
    - fixed costs $F > 0$ in terms of labor units
    - iceberg-type per-unit transportation costs $\tau_{df} > 1$

Preferences and Technology

- **Technology**:
  - Each entrepreneur i owns an intermediate good firm producing a single variety ω
  - Cobb-Douglas production function to produce variety ω for both markets:

$$y_{dt}(\omega) + \tau_{df} y_{ft}(\omega) = z_t(\omega) k_t(\omega)^{\alpha} l_t(\omega)^{1-\alpha},$$

  - Productivity follows log-normal AR(1) process

$$\log z_t(\omega) = (1-\rho_z)\mu_z + \rho_z \log z_{t-1}(\omega) + \varepsilon_t, \quad \varepsilon_t \sim \mathcal{N}(0, \sigma_\varepsilon^2)$$

  - Labor is hired at the frictionless competitive market
  - Capital can be financed by pre-determined assets or by issuing one-period non-state-contingent bonds and follows:

$$k_{t+1}(\omega) = (1-\delta) k_t(\omega) + x_t(\omega), \quad 0 < \delta < 1$$

  - Borrowing needs:

$$d_{t+1}(\omega) = (1 + R_{dt})(k_{t+1}(\omega) - a_{t+1}(\omega))$$

  - Borrowing is subject to collateral constraint, restricted by a fraction of the firm's assets

$$d_t(\omega) \leq \theta k_t(\omega) \Longrightarrow k_{dt+1}(\omega) \leq \frac{1 + R_{dt}}{1 + R_{dt} - \theta} a_{dt+1}(\omega)$$

Domestic Final Good Producer

- Similarly to Gopinath et al. (2020), final good is assembled from the continuum of differentiated domestic (d) and imported (m) intermediate input varieties (ω).
- Denote $RER_t = \frac{P_{ft}}{P_{dt}}$.
- Final good producers solve:

$$\max_{y_{dmt}(\omega), y_{ddt}(\omega)} P_{dt} Y_{dt} - \int_{\Omega_{ddt}} p_{ddt}(\omega) y_{ddt}(\omega) d\omega - RER_t \int_{\Omega_{dmt}} p_{dmt}(\omega) y_{dmt}(\omega) d\omega$$

s.t.

$$\frac{1}{|\Omega_{ddt}|} \int_{\Omega_{ddt}} \Upsilon\left(\frac{|\Omega_{ddt}| y_{dt}(\omega)}{Y_{dt}}\right) d\omega + \frac{1}{|\Omega_{dmt}|} \int_{\Omega_{dmt}} \Upsilon\left(\frac{|\Omega_{dmt}| y_{dmt}(\omega)}{Y_{dt}}\right) d\omega = 1,$$

- Inverse demand function for ω is

$$p_{dt}(\omega) = \Upsilon'\left(\frac{y_{dt}(\omega)}{Y_{dt}}\right) \frac{P_{dt}}{D_{dt}} = \frac{\sigma - 1}{\sigma} \exp\left(\frac{1 - \left[\frac{y_{dt}(\omega)}{Y_{dt}}\right]^{\frac{\varepsilon}{\sigma}}}{\varepsilon}\right) \frac{P_{dt}}{D_{dt}}$$

Foreign Final Good Producer

- Final producers abroad solve the following problem

$$\max_{y_{fft}(\omega), y_{fet}(\omega)} P_{ft} Y_{ft} - \int_{\Omega_{fft}} p_{fft}(\omega) y_{fft}(\omega) d\omega - \frac{1}{RER_t} \int_{\Omega_{fft}} p_{fet}(\omega) y_{fet}(\omega) d\omega$$

s.t.

$$\frac{1}{\mid \Omega_{fft} \mid} \int_{\Omega_{fft}} \left[\frac{y_{fft}(\omega)}{Y_{ft}} \mid \Omega_{fft} \mid \right]^{\frac{\sigma-1}{\sigma}} d\omega + \frac{1}{\mid \Omega_{fet} \mid} \int_{\Omega_{fet}} \left[\frac{y_{fet}(\omega)}{Y_{ft}} \mid \Omega_{fet} \mid \right]^{\frac{\sigma-1}{\sigma}} d\omega = 1,$$

- Profit maximization gives CES demand

$$y_{ft}(\omega) = \frac{Y_{ft}}{P_{ft}^{-\sigma}} p_{ft}^{-\sigma}(\omega)$$

- Demand elasticities are constant, no financial frictions in the EU

Financial Market and Balance of Payments

- **Financial market**:
  - Entrepreneurs trade one-period non-state-contingent bonds in the domestic economy and have no direct access to international bond markets
  - A non profit-making financial intermediary purchases one-period bonds on international markets, converts them into domestic one-period bonds and sells them to entrepreneurs
  - Financial intermediary makes no profits and faces debt-elastic interest rate:

$$R_{dt} = R_{ft} + \psi \left(e^{\frac{\int_{\Omega_{dt}} (k_{dt}(\omega) - a_{dt}(\omega)) d\omega - d_0}{Y_{dt}}} - 1 \right)$$

- **Balance of Payments**:
  - If a bank borrows from abroad, the balance of payments should record the associated transactions
  - Current account records changes in the trade balance and the net interest payment

$$ca_{dt} = tb_{dt} - \text{RER}_{t-1} R_{dt-1} * \frac{d_{dt}}{1 + R_{dt-1}}$$

  - Trade balance should be equal to negative of net interest-rate payments abroad in the steady state

Recursive formulation domestic entrepreneurs' problem

$$V(k,d,z) = \max_{c,a'>0} \frac{c^{1+\nu}}{1+\nu} + \beta \mathbb{E}[g(a',z')]$$
$$\text{s.t. } c + a' + d = W_d + (1-\delta)k + \pi(k,z)$$

where

$$\pi(k,z) = \max_{p_d,p_f,y_d,y_f,k,l,e} p_d y_d + e\text{RER} p_f y_f - W_d l - (R_d+\delta)k - eFW_d$$
$$\text{s.t. } \tau_{df} y_f + y_d = z k^{\alpha} l^{1-\alpha}$$
$$y_f = \frac{A_f}{(P_f \text{RER})^{-\sigma}} \left[\frac{\sigma}{\sigma-1} \frac{W_d^{1-\alpha}(R_d+\delta+\lambda)^{1-\alpha}}{(1-\alpha)^{1-\alpha}\alpha^{\alpha}} \frac{\tau_{df}}{z} \right]^{-\sigma}$$
$$y_d = \left[1 - \varepsilon \ln\left(\frac{p_d D_d}{P_d} \frac{\sigma}{\sigma-1} \right) \right]^{\frac{\sigma}{\varepsilon}} Y_d$$

and

$$g(a',z') = \max_{k',d'} V(k',d',z')$$
$$\text{s.t. } k' - \frac{d'}{1+R} = a'$$
$$d' \leq \theta k'$$

Recursive Stationary Competitive Equilibrium

Consider the state space of entrepreneurs $S = AxZ$ and assume that Y_f, P_f, R_f, W_f are constant. Recursive stationary competitive equilibrium consists of the set of prices, policy functions, value functions, and the measure $\phi : S \longrightarrow [0, 1]$ such that

1. policy and value functions solve the entrepreneurs' problem;
2. policy functions solve the final-good producers' problem;
3. the labor market clears $\int_{s \in S}[l(s) + e(s)F]\phi(s)ds = 1$;
4. the final-good market clears $\int_{s \in S}[c(s) + x(s)]\phi(s)ds = Y_d - tb_d$;
5. given R_d, domestic debt is in zero net supply;
6. the current account is balanced $tb_d - R_d * \int_{s \in S}(k_d(s) - a_d(s))\phi(s)ds = 0$;
7. the measure ϕ is stationary.

Theoretical Mechanism

- First-order conditions for profit maximization with respect to capital and labor:

$$W_d = MC_d(\omega)(1-\alpha)k(\omega)^{\alpha} l(\omega)^{-\alpha}$$
$$R_d = MC_d(\omega)\alpha k(\omega)^{\alpha-1} l(\omega)^{1-\alpha} - \delta - \lambda(\omega)$$

- $\lambda(\omega)$ is the shadow price of relaxing the borrowing constraint:
  - $\lambda(\omega) = 0$ if unconstrained
  - $\lambda(\omega) > 0$ if constrained

- Complementary slackness condition:

$$\lambda(\omega)\left(\frac{1+R_d}{1+R_d-\theta}a(\omega) - k(\omega)\right) = 0$$

Theoretical Mechanism

- Constrained firms:
  - face effective cost of capital equal to $R_d + \delta + \lambda(\omega)$
  - capital used in production is bounded from above: $k(\omega) \leq \frac{1+R_d}{1+R_d-\theta} a(\omega)$
  - demand pressure requires to satisfy the remaining demand by hiring more workers
  - sub-optimal factor allocation drives up unit costs and makes this firm less efficient

- In equilibrium, a firm with a higher effective cost of capital and MRPK faces a smaller capital-labor ratio:

$$\frac{W_d}{R_d + \delta + \lambda(\omega)} = \frac{(1-\alpha)k(\omega)}{\alpha l(\omega)}$$

- Marginal cost:

$$MC_d(\omega) = \left(\frac{W_d}{1-\alpha}\right)^{1-\alpha} \left(\frac{R_d + \delta + \lambda(\omega)}{\alpha}\right)^{\alpha} \frac{1}{z(\omega)}$$

Theoretical Mechanism

- A closed-form expression of the demand for a variety ω in the foreign market:

$$y_f(\omega) = \frac{Y_f}{(\text{RER}P_f)^{-\sigma}} \left[\frac{\sigma}{\sigma - 1} \frac{W_d^{1-\alpha}(R_d + \delta + \lambda(\omega))^{\alpha}}{(1-\alpha)^{1-\alpha}\alpha^{\alpha}} \frac{\tau_{dft}}{z(\omega)} \right]^{-\sigma}$$

- Domestic market: max π and set markups that increase in relative size of a firm

$$\frac{p_d(\omega)}{MC_d(\omega)} = \frac{\sigma}{\sigma - q_d(\omega)^{\frac{\varepsilon}{\sigma}}}, \quad q_d(\omega) = \frac{y_d(\omega)}{Y_d}$$

- Short-run effect of reduction in τ_{df} (keeping factor prices constant):
  - $\frac{\partial y_f(\omega)}{\partial \tau_{df}} < 0$, $\frac{\partial y_f(\omega)}{\lambda(\omega)} < 0$, $\frac{\partial y_d(\omega)}{\lambda(\omega)} < 0$
  - $\tau_{df} \downarrow \rightarrow \lambda(\omega) \uparrow \rightarrow \mu_d(\omega) \downarrow, q_d(\omega) \downarrow$ for constrained exporters
  - $y_d(\omega) \downarrow$ for constrained exporters $\rightarrow Y_d \downarrow \rightarrow \mu_d(\omega) \uparrow, q_d(\omega) \uparrow$ for unconstrained exporters, non-exporting firms and importers

Results

Parametrization: Externally-calibrated parameters

Name	Parameter	Value	Source
Real interest rate, foreign	R_f	0.01	Zero-lower bound
Depreciation rate	δ	0.1	Standard
Capital output elasticity	α	0.33	Kohn et al. (2020)
Coefficient of relative risk aversion	ν	-2	Kohn et al. (2020)
Average demand elasticity	$\bar{\sigma}$	5	Gopinath and Itshoki (2010), Klenow and Willis (2015)
Superelasticity	$\frac{\varepsilon}{\bar{\sigma}}$	0.138	Data
Measure of imported varieties	γ_{dm}	0.09	Data
Persistence parameter of a productivity process	ρ_z	0.894	Autoregression of normalized productivity for non-exporters
Average debt level	d_0	0	Alessandria et al. (2023)
Discount factor	β	0.81	Kohn et al. (2022)

Details on estimating super-elasticity

Parametrization: Internally-calibrated parameters

Parameter	Value	Target moment	Data	Model
F	0.00025	Share of exporters	0.25	0.256
τ_{df}	3.89	Exports intensity (export sales / total sales)	0.14	0.14
$\tau_{fd} W_f^{1-\alpha}$	31.38	Imports penetration	0.08	0.08
σ_ϵ	0.712	Standard deviation of log export sales	2.39	2.36
θ	0.822	Credit/GDP	0.46	0.46
Y_f	722.2	Relative absorption	32.0	32.2
ψ	0.188	Real interest rate	0.06	0.06

Effects of Trade Liberalization

- Model reduction of iceberg transportation costs for domestic exports by 4%
- Evaluate computationally the effects of the decrease in transportation costs by the EU and compare the effects across the ***four*** scenarios:
  - Trade liberalization in the baseline economy
  - Trade liberalization in the economy without financial frictions
  - Trade liberalization in the economy with constant demand elasticity
  - Trade liberalization in the economy no frictions

Effects of trade liberalization on welfare

Model	Δ CEU*	$\Delta \frac{W_d}{P_d}$	$\Delta \frac{R_d}{P_d}$	ΔC_d	ΔY_d
Baseline	+0.26%	+1.6%	-0.54%	+3.2%	+3.1%
No Financial Frictions (NFF)	+0.05%	+2.16%	+0.4%	+2.01%	+2.09%
Constant Markups (CM)	+0.24%	+1.22%	-0.97%	+2.57%	+2.53%
NFF + CM	+0.05%	+2.59%	+0.3%	+2.7%	+2.77%

* CEU - consumption-equivalent units

- Some takeaways:
  - Welfare gains due to higher real wages and lower real interest rate
  - Real interest rate under financial frictions falls due to slower growth of debt
  - Consumption grow slower without financial frictions because of intertemporal substitution

Effects of trade liberalization on allocative efficiency

Model	ΔTFP	$\Delta Var(\log(TFPR))$	$\Delta SD(MRPK)$	$\Delta SD(\mu)$	$\Delta Cov(\mu, MRPK)$
Baseline	-2.1%	+0.3%	+0.6%	-0.2%	+0.6%
No Fin Frictions (NFF)	+5.6%	-0.3%	0	-0.5%	0
Constant Markups (CM)	-1.3%	+0.34%	+1.4%	0	0
NFF + CM	+3.9%	0	0	0	0

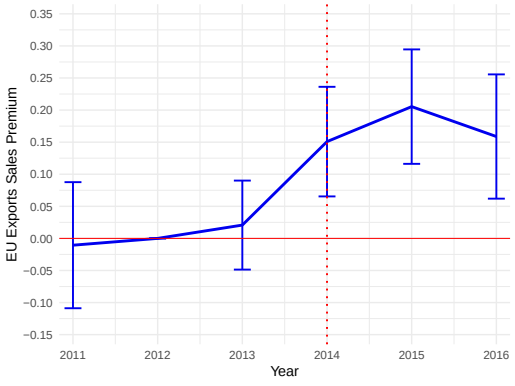
- Some takeaways:
  - Financial frictions reduce gains because of higher capital misallocation
  - Variable markups improve gains due to indirect pro-competitive effects
  - Variable markups magnify effect of capital misallocation

Conclusions

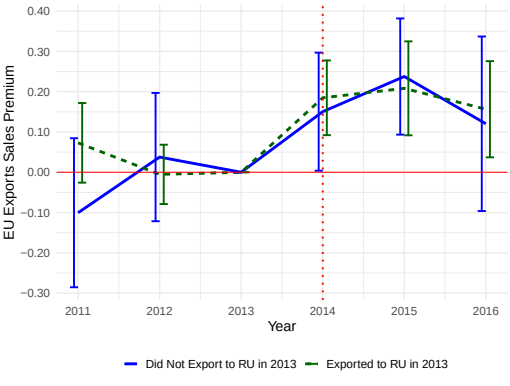
- Evidence from the EU-Ukraine trade liberalization suggests that financial frictions and variable markups can jointly determine reallocation of resources
- We develop a small open economy model that contains both channels
- Unilateral trade liberalization improves welfare and productivity, but worsens allocative efficiency in the second-best environment
- Allocative efficiency worsens, as negative effects from an increase in capital misallocation dominate positive effects due to declining markup dispersion.
- Variable markups magnify the negative effects of financial frictions
- Unilateral trade liberalization could improve allocative efficiency if access to credit improves.

Additional Slides

Robustness Check for Empirical Result 2



(a) Placebo exercise



(b) Role of exporting to RU

Note: Figure shows a set of coefficients $\{\beta^{\tau}\}_{\tau=2011}^{2016}$ in regression. Standard errors are clustered at the firm level. The sample only includes firms which continuously exported to the EU in 2011-2016. 90% confidence intervals are reported. In panel (a), reference year is 2012 and treatment occurs in 2014. In panel (b), reference year is 2013 and treatment occurs in 2014. The line "Did Not Export to RU in 2013" presents coefficients in regression when the sample is restricted to firms not exporting to the Russian market in 2013. The line "Exported to RU in 2013" presents coefficients in regression when the sample is restricted to firms that exported to the Russian market in 2013.

Back

Calibration: Estimation of super-elasticity

- We estimate the regression equation for the sample of non-exporters in 2013:

$$\frac{1}{\mu_{ist}} + \log\left(1 - \frac{1}{\mu_{ist}}\right) = b_0 + b_1 \log(s_{ist})$$

Table: Estimating super-elasticity

	$\frac{1}{\mu_{ist}} + \log\left(1 - \frac{1}{\mu_{ist}}\right)$	
Intercept	-2.02^{**}	-1.88^{**}
	(0.209)	(0.236)
$log(s_{ist})$	0.151^{**}	0.138^{**}
	(0.021)	(0.022)
Industry FE	No	Yes

Note: Observations with labor share below $1 - \alpha$ are excluded. The left column presents the results without controls, the right column presents the results controlling for 2-digit industry fixed effects. ** implies that the coefficient is statistically-significant at the 95% level.

Back