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Firm heterogeneity and the impact of monetary policy on labour demand

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Motivation

- In many advanced economies including the euro area, labour market tightening despite economic slowdown is at odds with past regularities (e.g. Okun's law); and tightening seems mainly driven by labour demand side (European Commission 2023).

- One explanation is that with an uncertain outlook firms want to hold onto workers - "labour hoard" (Arce et al. 2023, Doornik et al. 2023; Elding et. al 2023)) to ensure against costly recruitment in case future growth picks up

- While labour hoarding dampens the effects of an output shock on overall employment volatility (Burnside et al. 1993), the response of individual firms is heterogeneous

- One potential reason for this heterogenous response is due to their respective financial capacities: firms with greater financial resources have the capacity to labour hoard more (Bäurle, 2021)

- Only a few empirical studies examine monetary policy's direct role in explaining labour hoarding and whether its impact is symmetric (restrictive/accommodative) as well as uniform across different types of firms (Graves et al. 2023 ; Giroud and Mueller 2017)

Key findings

- Monetary policy asymmetrically affects the impact of an output shock on employment and plays an important role in explaining the degree of labour hoarding over the business cycle

- Restrictive monetary policy reduces labour hoarding by 2 to 3 times more than an accommodative policy that increases labour hoarding behaviour

- Firm demographics are an important element in understanding the monetary policy impact on labour hoarding with small firms more affected than large firms

- While firms with a higher gearing ratio labour hoard less, firms that are able to increase their interest cover ratio or profitability labour hoard more

- Findings confirmed based on annual data for Germany, France, Italy and Spain (until 2020) *and* quarterly data for Belgium (until 2023)

Focus of this study

- Preliminary evidence about the influence of monetary policy on the adjustment of employment to variations in output

- A central focus is examining whether the monetary policy impact is symmetric: does a restrictive monetary policy have a different impact on labour hoarding than an accommodative policy?

- The importance of firm demographics is also explored

- Adopt a granular approach:
  - Annual firm-level data for Germany, France, Italy and Spain covering the period 1999-2020
  - Quarterly firm-level data for Belgium until 2023, i.e. including recent MP tightening
  - Year and quarterly data includes manufacturing and services (nace codes: 10-82)
  - High-frequency data from the Euro Area Monetary Policy Event-Study Database

Stylised framework

- Workhorse model dynamic labour demand from Hamermesh (1993) and Nickel (1986)

- $emp_{it} = \alpha_i + \mu_1(emp_{it-1}) + \mu_2(wage_{it}) + \mu_3(output_{it}) + \mu_4(capital_{it}) + \varepsilon_{it}$,

  where emp_{it}, wage_{it}, capital_{it} and output_{it} are in natural logarithms of firm i in year t

- Taking first differences

- $\Delta emp_{it} = +\mu_1(\Delta emp_{it-1}) + \mu_2(\Delta wage_{it}) + \mu_3(\Delta output_{it}) + \mu_4(\Delta capital_{it}) + \xi X_{it} + \varepsilon'_{it}$,

  where X_{it} is a vector of additional time invariant control variables

- Allowing the coefficient for labour hoarding (μ_3) to vary with the level of monetary policy surprises

- $\Delta emp_{it} = \mu_1(\Delta emp_{it-1}) + \mu_2(\Delta wage_{it}) + \mu_3(\Delta output_{it}) + \mu_4(\Delta output_{it} \times MP_{t-1}) + \mu_5(MP_{t-1}) + \xi' X_{it} + \varepsilon'_{it}$

Data

- Orbis: typical annual balance sheet data for Germany, France, Italy and Spain (1999-2020)

- Quarterly Belgian Social Security (wage bill, FTE) and VAT data (turnover), (2010-2023)

- Monetary policy surprises (Altavilla et al. 2019), OIS 2y summed over 6 months, firm-specific timing depending on closing accounting date (similar to Popov and Steininger 2023)

Firm level employment statistics						
Country	# firms	Firm-level employment				Total employment
		Mean	Median	p10	p90	
Germany	60,846	203	62	14	374	12,353,160
Spain	365,322	36	15	10	49	13,252,948
France	268,905	59	18	11	80	15,736,271
Italy	412,124	42	16	11	58	17,225,868
TOTAL (ORBIS)	*1,107,197*	*53*	*17*	*11*	*73*	*58,568,248*
Belgium	44,980	44	16	11	58	1,977,671

Main results

Table 2: Regression results

	(1) Yearly data $\Delta employment$	(2) Yearly data $\Delta employment$	(3) Quarterly data $\Delta employment$	(4) Quarterly data $\Delta employment$
$\Delta employement_{t-1}$	0.0338*** (0.00211)	0.0338*** (0.00212)	-0.174*** (0.00233)	-0.174*** (0.00233)
$\Delta output$	0.303*** (0.00192)	0.301*** (0.00164)	0.0958*** (0.000986)	0.0946*** (0.00107)
$\Delta output \times MP$	-0.000724*** (0.0000957)		-0.000441*** (0.0000435)	
$\Delta output \times MP$ (MP > 0)		-0.000549*** (0.000141)		-0.000366*** (0.0000510)
$\Delta output \times MP$ (MP ≤ 0)		-0.00107*** (0.000225)		-0.000900*** (0.0001783)
$\Delta wage$	-0.500*** (0.0118)	-0.501*** (0.0118)	-0.0189*** (0.00142)	-0.0189*** (0.00142)
$\Delta capital$	0.00828*** (0.000138)	0.00828*** (0.000138)	0.000333*** (0.0000252)	0.000332*** (0.0000252)
Fixed effects	year, year × country	year, year × country	quarter	quarter
N	3201478	3201478	775816	775816
R square	0.394	0.394	0.300	0.300

Accommodative MP: more hoarding
Restrictive MP: less hoarding

Asymmetric. Effective of restrictive MP 2x – 3x higher

Note: Results hold with IV (output instrumented by sector-level output)

Results interpretation

- Using the coefficient from column (4), a positive (more accommodative) MP shock of +10bps implies a quarterly labour hoarding coefficient of 0.091 vs 0.104 for a negative (more restrictive) MP shock of -10bps (-10bps to +10bps is approx. p10 to p90 of MP surprises)

- More concrete: a firm employing 1000 FTE that experiences a negative output shock of -10% would reduce its work force with 9.1 FTE in case of +10bps accommodative shock, 9.5 FTE in case of a neutral monetary policy and with 10.4 FTE in case of -10bps restrictive shock

- A p10 vs. p90 MP shock would imply a difference in workforce of 0.13%

Results - heterogeneity

Table 3: Summary of regression results based on yearly data for main Euro countries

	Manufacturing	Services	Large firms	Small firms
Δoutput × MP	-0.000303*	-0.000692***	0.0000829	-0.00106***
Δoutput × MP (MP > 0)	-0.0000837	-0.000732***	0.00146***	-0.00179***
Δoutput × MP (MP ≤ 0)	-0.000777*	-0.000623*	-0.00272***	0.000306

Table 4: Summary of regression results based on quarterly data for Belgium

	Manufacturing	Services	Large firms	Small firms
Δoutput × MP	-0.000593***	-0.000392***	-0.000236***	-0.000540***
Δoutput × MP (MP > 0)	-0.000584***	-0.000301***	-0.000104	-0.000460***
Δoutput × MP (MP ≤ 0)	-0.000648+	-0.000935***	-0.00104***	-0.00102***

More impact on small firms than large firms

Table 5: Regression results – *Financial constraints*

	(1) Yearly data *Δemployment*	(2) Yearly data *Δemployment*	(3) Yearly data *Δemployment*
$\Delta employement_{t-1}$	0.0346*** (0.00210)	0.0341*** (0.00215)	0.0353*** (0.00222)
$\Delta output$	0.296*** (0.00192)	0.301*** (0.00204)	0.253*** (0.00310)
$\Delta output \times$ gearing	0.00489*** (0.000597)		
$\Delta output \times$ interest cover		-0.000659* (0.000305)	
$\Delta output \times$ profitability			-0.0190*** (0.000936)
$\Delta wage$	-0.512*** (0.0118)	-0.505*** (0.0121)	-0.529*** (0.0123)
$\Delta capital$	0.00832*** (0.000149)	0.00820*** -0.505***	0.00826*** (0.000149)
Fixed effects	year, year × country	year, year × country	year, year × country
N	3046170	3183645	2835537
R square	0.398	0.398	0.402

- Higher gearing (more debt vs. equity) → less labour hoarding

- Higher interest cover or profitability → more labour hoarding behaviour

- Firms went into the current tightening cycle with a lot of cash → could (partially) explain why labour market is still strong

Preliminary conclusions

- Monetary policy asymmetrically affects the impact of an output shock on employment in a selection of euro area economies

- Combining firm-level data with high frequency monetary policy surprises we show how the monetary policy amplifies the labour hoarding behaviour of firms in response to an output shock

- Accommodative monetary policy can cushion the employment adjustment over the business cycle, while restrictive monetary policy amplifies employment changes. However, this impact is asymmetric, with a restrictive monetary policy reducing labour hoarding behaviour by 2 to 3 times more than an accommodative policy that increases labour hoarding behaviour

- Findings highlight the role of monetary policy in explaining labour market dynamics, particularly in times of economic flux; preliminary results using quarterly data point to shorter transmission lags compared to typical MP transmission lags

OIS 2Y (moving 6 month sum)

Accommodative

Restrictive