Do asset purchase programs shape industry dynamics? Evidence from the ECB's SMP on plant entries and exits

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7th ProdTalk, March 2, 2021

Do banks take tough decisions when drowning in liquidity?

Motivation:

- Unconventional monetary policy (UMP) sparks (risky) lending.
- Implications for industry dynamics are unclear.

Research question: Do asset purchase programs (APPs) change exit and entry rates of German plants and therefore hamper factor reallocation?

Analyses:

- **Micro** analysis on plant level.
- **Aggregate** analysis of entry and exit dynamics at the region or sector levels.

Preview of results:

- Plants tied to UMP banks are 20% less likely to exit.
- Industry dynamics are thawrted - entry and exit rates are suppressed.

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Caballero and Hammour (1994, 1996); Osotimehin and Pappadá (2017).

Entry dynamics have been researched - exits rarely so
Cetorelli and Strahan (2006); Kerr and Nada (2009, 2010); Bertrand et al. (2007).

Lending to unproductive units
Acharya et al. (2019); Jiménez at al. (2014); Caballero et al. (2008).

The SMP lowered government bond yields, caused increases in credit supply and stimulated the macroeconomy.
Eser and Schwaab (2016); Koetter (2020) and Gibson et al. (2016).

Our contribution:

First granular paper that provides evidence on the impact of UMP on industry dynamics.

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- May 10, 2010 until Sept 6, 2012, volume of 218 billion Euro.

- ECB purchased sovereign debt from Italy, Portugal, Ireland, Spain, Greece.

- Good testing ground: regime shift, response to crisis in Southern European countries, primary aim to lower government bond yields (sterilization) (as in Koetter (2020)).

- Banks holding SMP eligible assets ("treated banks") could benefit by selling (liquid reserves), or holding (evaluation effect).

Hypothesis: Probability of default decreases for plants linked to a treated bank.
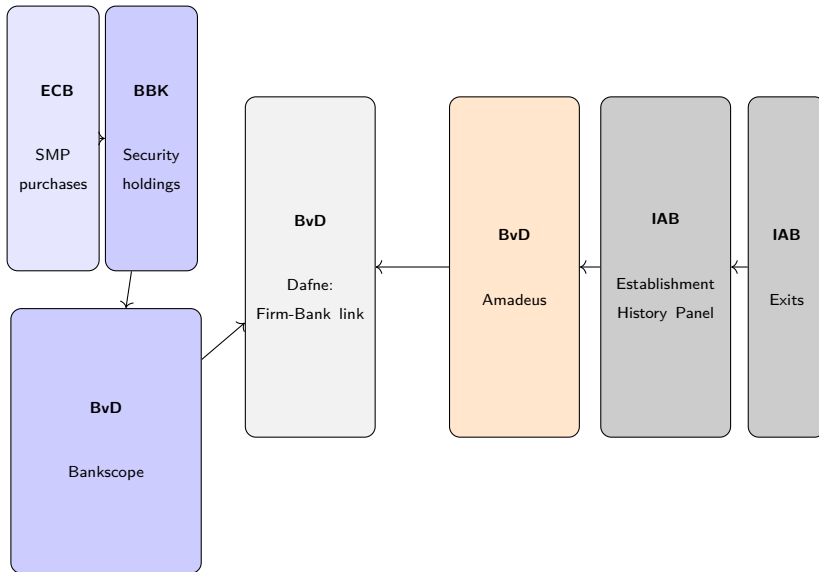
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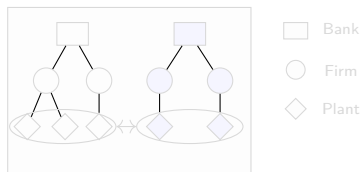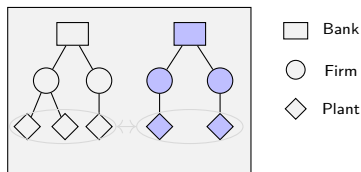
In the micro-level analysis, we compare treated and non-treated plants.

- Regional banks, single bank relationship, small and median plants.

- Fixed effects control for industry and regional demand shocks.

- We distinguish between weak and strong banks, as well as productive and unproductive plants.

- 202,386 plant-year observations, 31,877 plants, 2007–2013.

- Treated banks in blue, non-treated in white:

- Bank
- Firm
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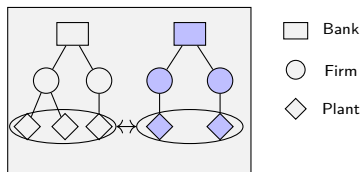
What is the effect of the SMP on the probability of default of plants?

$$Exit_{it} = \alpha_i + \alpha_{rt} + \alpha_{kt} + \gamma SMP_i \times Post_t + \delta_x X_{it-1} + \epsilon_{it}.$$

- We use a linear probability model.
- Dependent: $Exit_{it}$ equals 1 if plant i exits in year t.
- Treatment: SMP_i equals 1 if bank held SMP assets in all three years.
- Time dimension: $Post$ equals 0 in 2007–2009, equals 1 in 2010-2013.
- Plant fixed effects, Region x Time fixed effects, Industry x Time fixed effects.
- Lag of bank and firm level controls X_{it-1}.

For an affected plant, the probability of market exit is more than 20% lower compared to non-affected plants.

	I	II	III	IV	V
Post*SMP	-0.003*	-0.004**	-0.005**	-0.005**	-0.005**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Firm age	Yes	Yes	Yes	Yes	Yes
Bank controls	-	Yes	Yes	Yes	Yes
Plant FE	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	-	-	-
Region-Time FE	-	-	Yes	-	Yes
Sector-Time FE	-	-	-	Yes	Yes
N	202,386	202,386	202,386	202,386	202,386
R2	0.248	0.248	0.250	0.251	0.253
Mean Exit	0.023	0.023	0.023	0.023	0.023
SD Exit	0.150	0.150	0.150	0.150	0.150

▶ Weak banks and low productive firms drive lower exit rates.
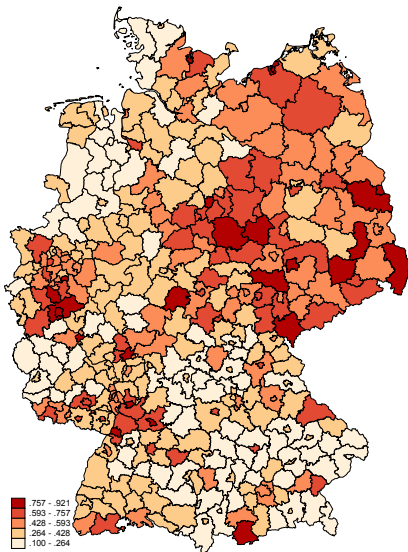
- We aggregate > 10 million plant-year observations on the region or sector level to obtain aggregate entry and exit dynamics.

- There are 402 German regions and 66 sectors.

- We calculate the share of treated plants on region or sector level.

- Research question: How does the share of treated plants in regions or sectors shape entry and exit dynamics?

What is the SMP effect on aggregate exit and entry dynamics?

$$Y_{rt} = \alpha_r + \alpha_t + \gamma SMPshare_r \times Post_t + \epsilon_{rt}.$$

- Dependent: Y_{rt} entry or exit rate of region or sector r in year t.
- Treatment: $SMPshare_r$ share of treated plants per region or sector.
- Region or sector fixed effects, Time fixed effects.
- Time dimension: $Post$ equals 0 2007–2009, equals 1 2010-2013.

Entry and exit rates are lower in more affected regions and sectors.

Entry rate in region with average SMPshare is reduced by around 6% compared to region with low SMPshare.

	Region		Sector	
	Entry	Exit	Entry	Exit
	I	II	III	IV
Post*SMPshare	-0.007***	-0.004***	-0.023	-0.027**
	(0.001)	(0.001)	(0.022)	(0.012)
Time FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	-	-
Sector FE	-	-	Yes	Yes
N	2,814	2,814	462	462
R2	0.782	0.746	0.782	0.880
Mean dependent	0.050	0.055	0.055	0.055
SD dependent	0.010	0.009	0.030	0.028
Mean SMPshare	0.418	0.418	0.476	0.476
SD SMPshare	0.188	0.188	0.106	0.106

▸ Low productive regions drive lower entry and exit rates. Sectors with large plants drive lower exit rates.

- No results in placebo estimations. ▸ Placebo estimations
- Weakest 30% of banks and from the 15th until the 60th pecentile of firms are affected. ▸ Weak bank indicator ▸ Weak firm indicator
- Aggregate results results stay robust when we exclude financial centers. ▸ Excluding financial centers
- T-tests confirm parallel trend assumption. ▸ T-tests
- Leads and lags estimations confirm parallel trend assumption. ▸ Leads and lags

Thank you!