

ASSET PURCHASE RULES IN THE EURO AREA AND THEIR EFFECTS ON BOND MARKETS

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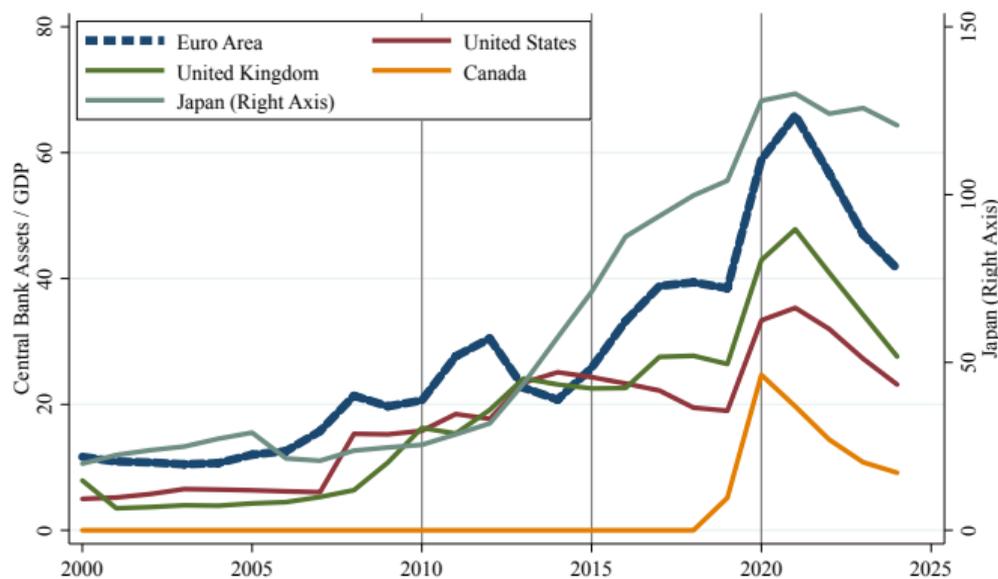
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SITE

THE NEW NORMAL: CENTRAL BANKS IN BOND MARKETS

- ESCB \approx 40% of GDP, 30% of public debt outstanding
- Purchases occur in **bad times**: Euro 2012 / 2020, US 2008 / 2020, ...



Asset purchases as a **dynamic state-contingent** policy

- Market participants do not view as one-off spot decisions, but have expectations on path of purchases depending on state of economy

THE ECONOMICS OF DYNAMIC ASSET PURCHASE POLICIES

One-off purchase / static effect:

- Absorbing bond supply in a given period raises bond prices (lowers bonds yields) through (1) term premium, and (2) credit risk premium

THE ECONOMICS OF DYNAMIC ASSET PURCHASE POLICIES

One-off purchase / static effect:

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Dynamic policy: purchases in “bad times” when sovereign spreads widen

- insurance effect: concentrate impact on highly valued states of the world
- supports future safety of long-term bonds → makes investors more willing to invest today

→ Potent because effects are priced in: *permanently lower and more stable long-term yields*

KEY POINTS

We focus on *sovereign spreads / credit risk premium channel*

- ECB purchase announcements show strong evidence of this channel
- Purchases ↓ net supply of credit risk investors hold, even for “equal weighted” programs

Bond market expects interventions / purchases *based on sov spreads*

- Option price distributions show strong effects in left tail for riskier sovereign bonds and for stock market, consistent with actual purchases being higher when spreads high
- Intervening in high spread states will affect level of spreads based on insurance channel, this force keeps spreads narrow

FRAMEWORK

A MODEL OF QUANTITY AND SOVEREIGN YIELDS

Model similar to Vayanos Vila (2021), Greenwood Vayanos (2014) w credit risk

$$y_{i,n,t} = y_{rf,t} + (y_{i,n,t} - y_{rf,t}) = \text{risk free yield} + \text{spread}$$

$$\text{spread}_{i,n,t} = \frac{1}{n} \sum_{j=1}^n \text{prob def}_{i,t+j} (1 + \text{Sov Cred Premium}_{t+j})$$

■ Two types of agents:

- Inelastic investors (hold passively)
- Active investors (risk averse):

$$\text{Sov Cred Premium}_t = (\text{quantity of bonds})_t \times (\text{bond risk})_t \times (\text{price of risk})_t$$

quantity of bonds = net supply of risky sovereign bonds active investors hold

bond risk = volatility of bond price from default risk or credit risk premium moving

THE EFFECT OF ONE-OFF PURCHASE ANNOUNCEMENTS

- **One-off announcement:** purchase bonds → push price up and spreads down based on slope of investor demand curve

$$\text{Sov Cred Premium}_t = (\text{quantity of bonds})_t \times (\text{bond risk})_t \times (\text{price of risk})_t$$

- *static effect*, **asset quantity**: expected reduction in net bond supply times the expected risk of the bond

ASSET PURCHASE RULES

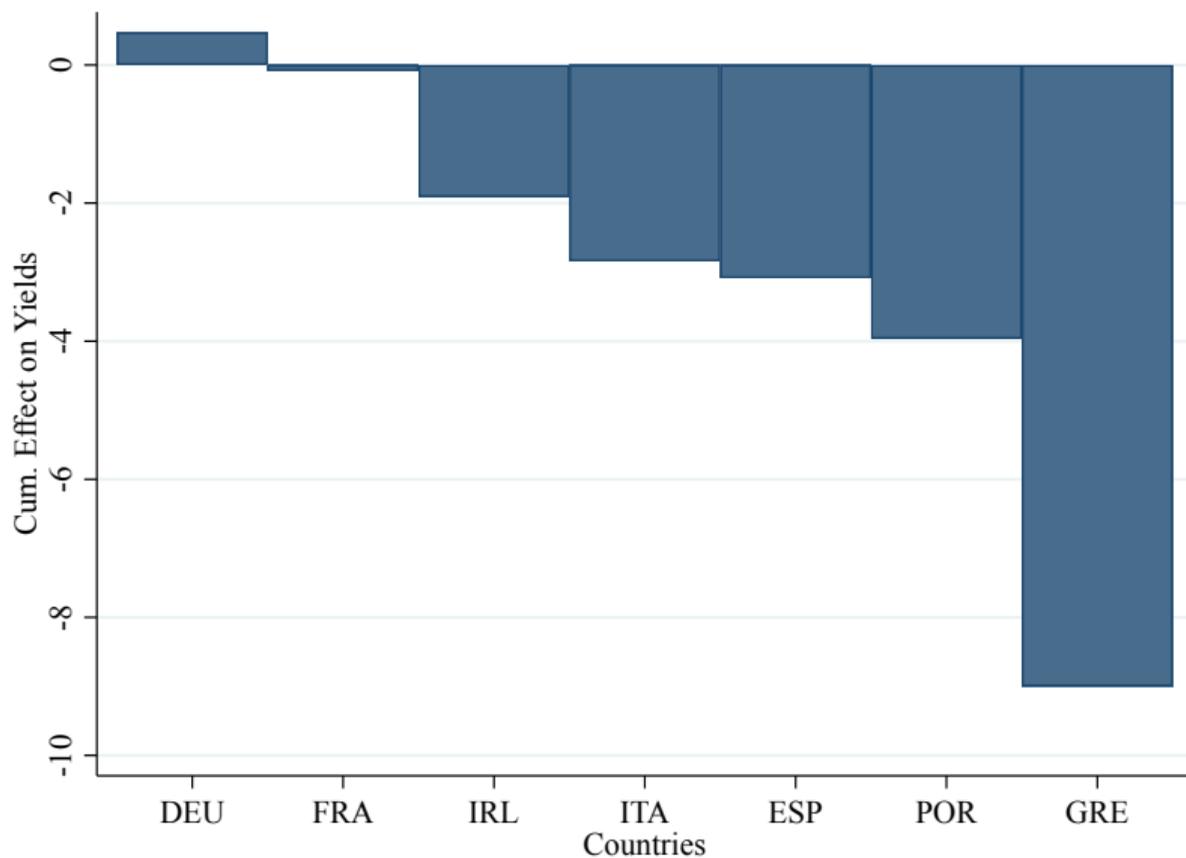
- **Purchase rule:** instead of “one-off” central banks purchase in bad times (crisis, spreads widen, etc).

$$\text{Sov Risk Premium}_t = (\text{quantity of bonds})_t \times (\text{bond risk})_t \times (\text{price of risk})_t$$

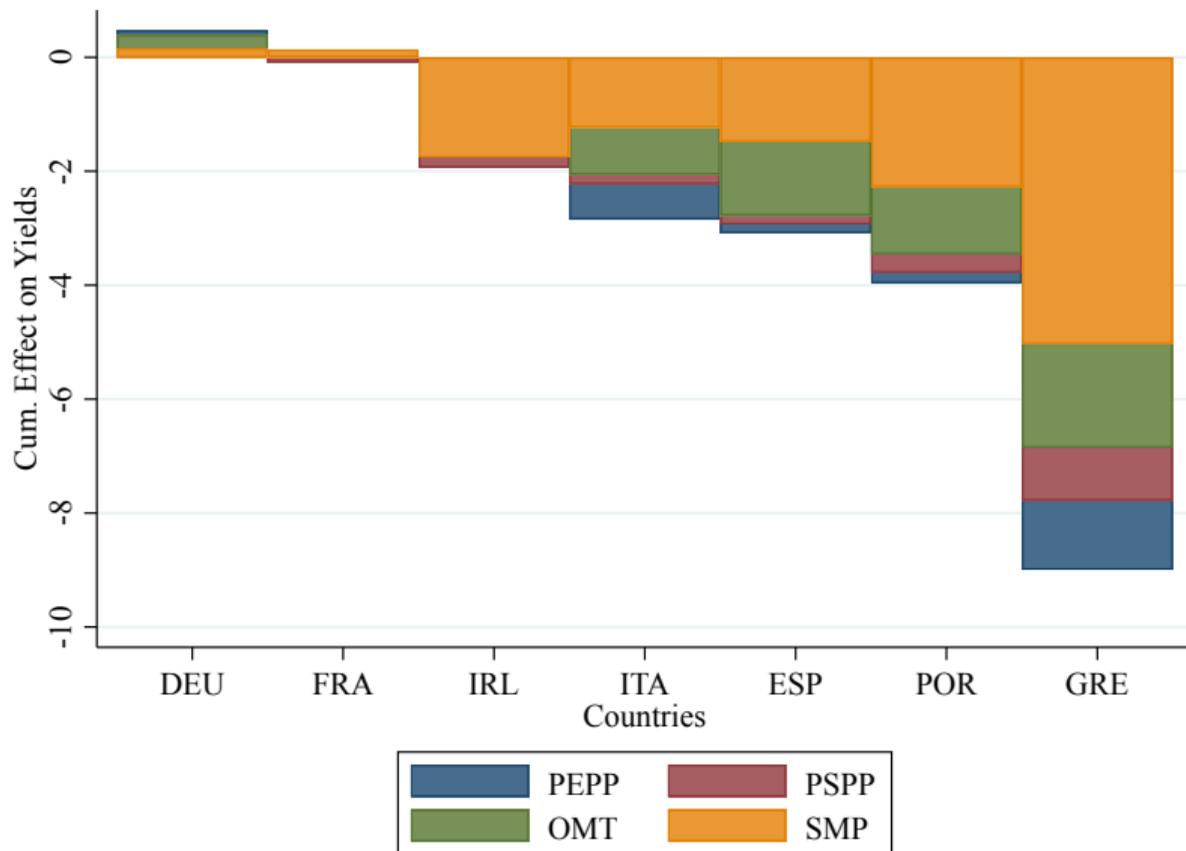
- *static effect:* expected reduction in net bond supply
- **dynamic policy:** absorb bonds and lower spreads in highly valuable states of the world
- stabilizing spreads increase investors' willingness to hold riskier-country bonds → big effect on spreads

PURCHASE ANNOUNCEMENTS: THE SOVEREIGN SPREAD CHANNEL

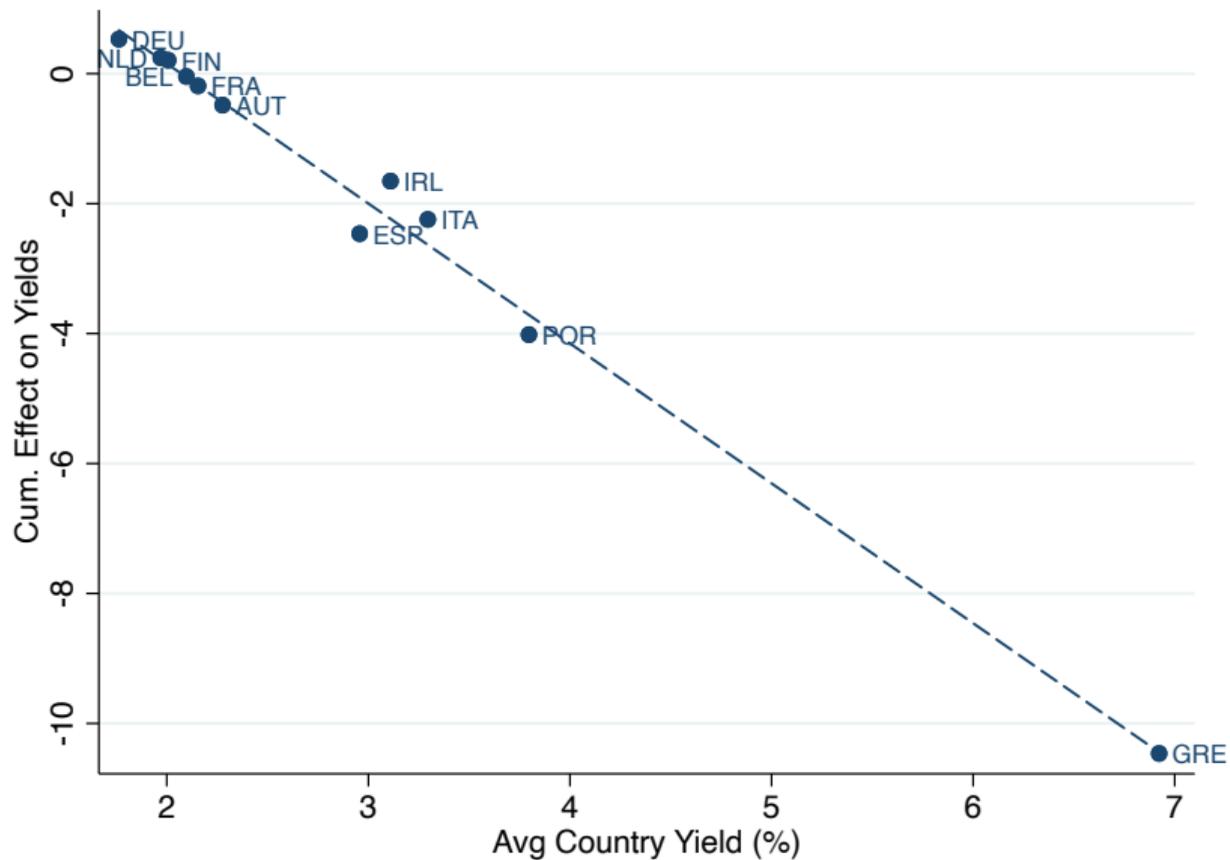
CUMULATIVE EVENT STUDY EFFECTS: 10-YEAR SOV YIELDS



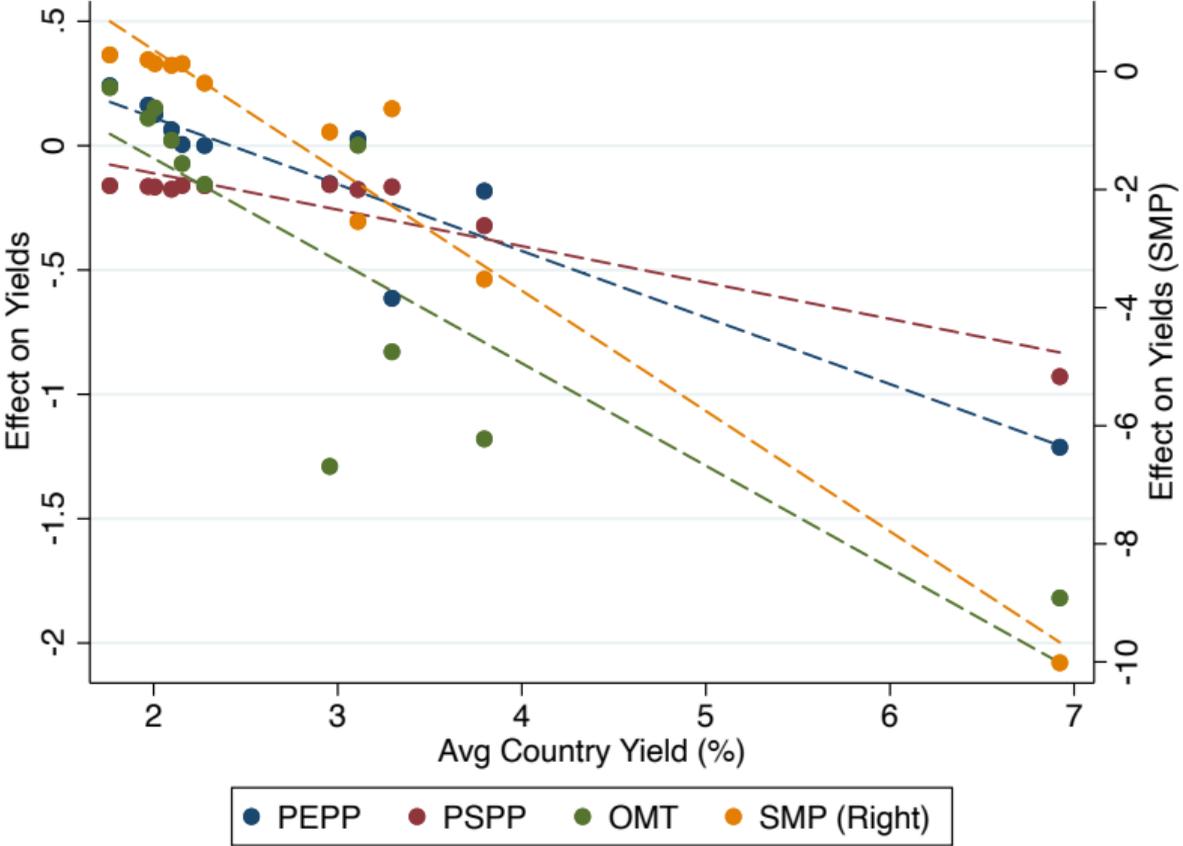
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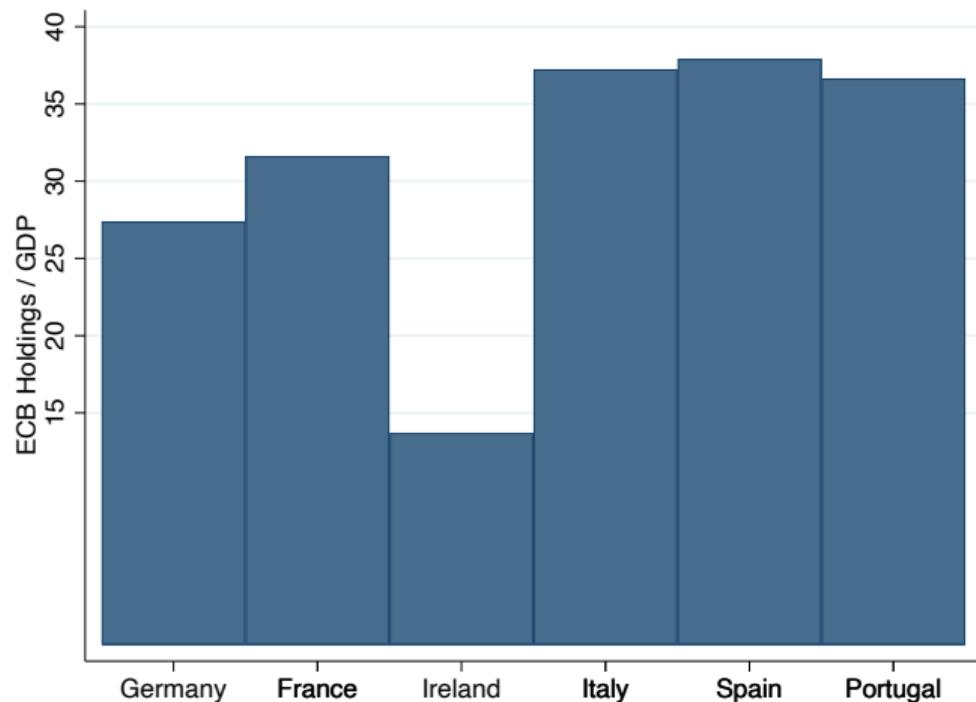
THE SPREAD CHANNEL: CUM EVENT STUDY VS AVG YIELD



SPREAD CHANNEL THERE FOR ALL PROGRAMS



PURCHASES ARE SIMILAR AS SHARE OF GDP



Similar purchases across countries does not mean similar effects
How much sovereign spread risk was purchased?

ECB HOLDINGS REDUCE SUPPLY OF SOVEREIGN SPREAD RISK

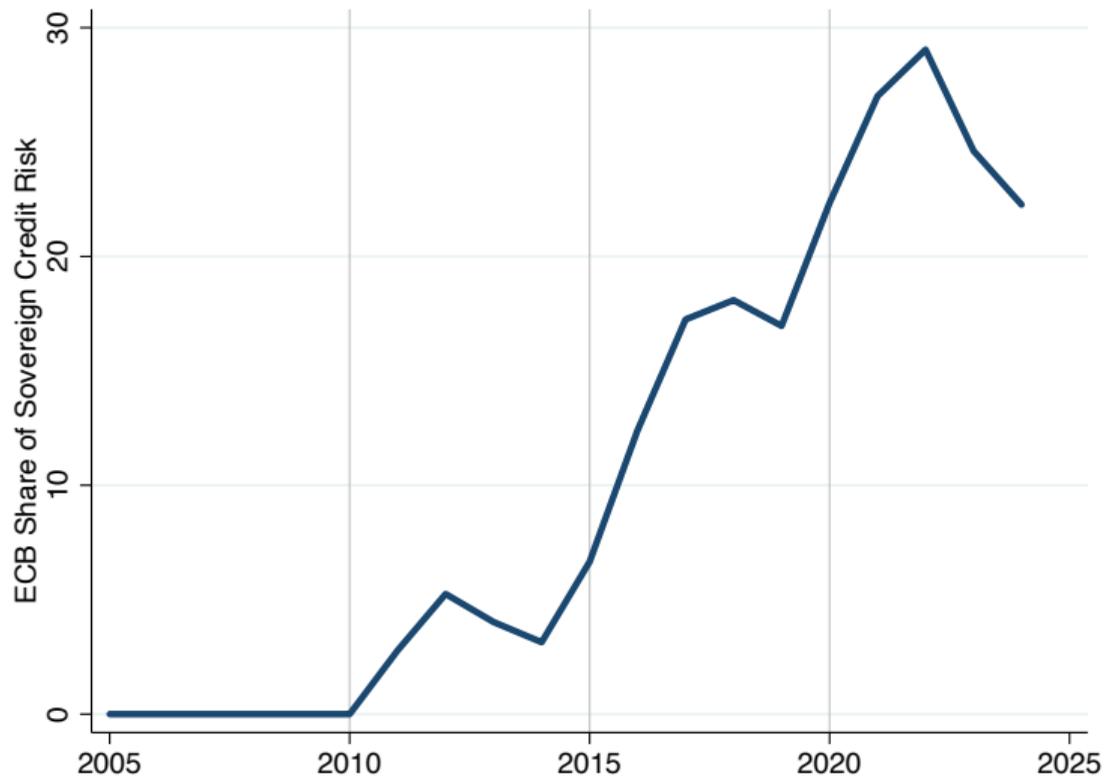
Total supply (blue) = $(\sum_i spread_{i,t} \times debt_{i,t}) / \sum_i GDP_{i,t}$

ECB holdings (red) = $(\sum_i spread_{i,t} \times ECB\ holdings_{i,t}) / \sum_i GDP_{i,t}$



HOLDINGS REDUCE SUPPLY OF SOVEREIGN SPREAD RISK

$$\text{Share held by ECB} = (\sum_i \text{spread}_{i,t} \times \text{ECB holdings}_{i,t}) / (\sum_i \text{spread}_{i,t} \times \text{debt}_{i,t})$$



STATE-CONTINGENCY OF PURCHASE
RULES: ROLE OF HIGH SPREAD
STATES

STATE-CONTINGENCY FROM OPTION PRICES

Suppose announcement leads market to expect more purchases if Italian yields rise

- Should affect *distribution* of Italian bond prices
- Option prices in “left-tail” should respond a lot (Haddad Moreira Muir 2025)

STATE-CONTINGENCY FROM OPTION PRICES

Suppose announcement leads market to expect more purchases if Italian yields rise

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Let p denote the future price of bond, p' denote future price after announcement

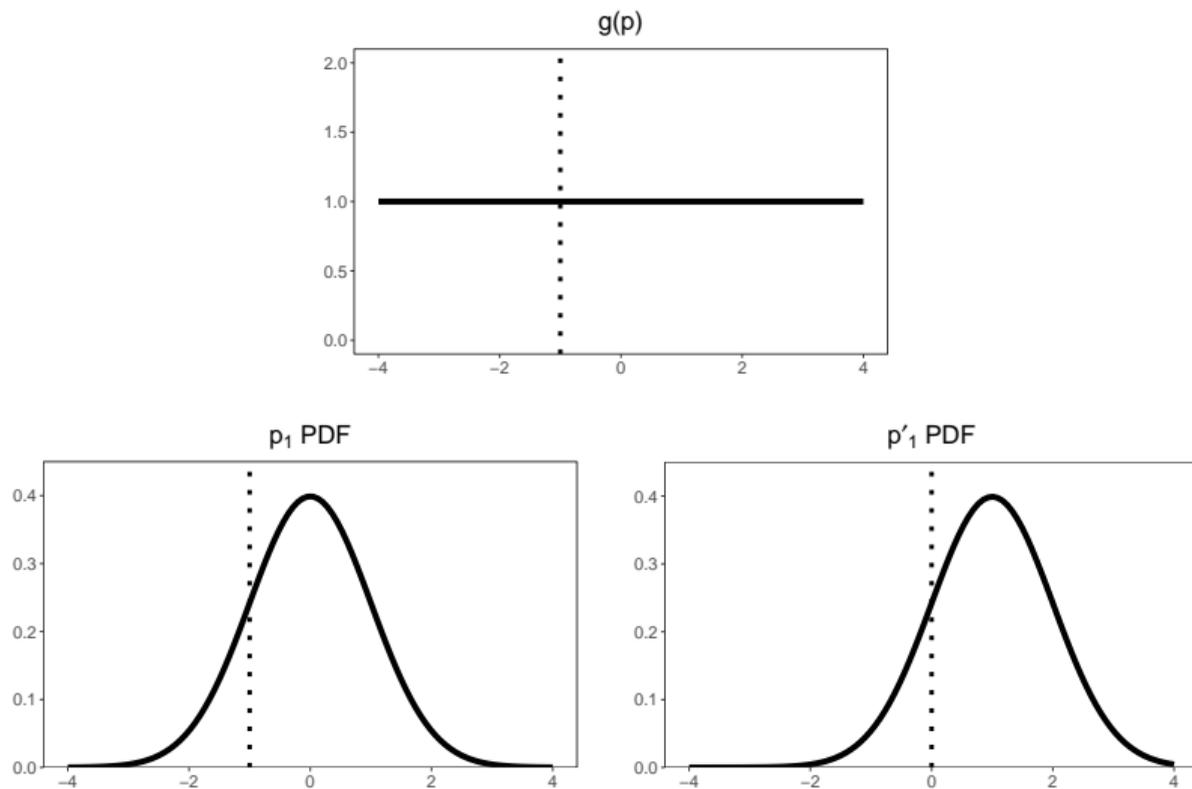
- State-contingent **price support function** $g(\cdot)$

$$p'_1 = p_1(1 + g(p_1))$$

- ▶ Intervene more when spreads widen: $g(\text{low bond price}) > g(\text{high bond price})$
- ▶ I.e., you raise bond prices in future states where they would fall
- **Option prices reveal change in distribution from p_1 to p'_1 → gives $g(p_1)$ by solving**
$$F_{p_1}(p_1) = F_{p'_1}(p_1(1 + g(p_1)))$$

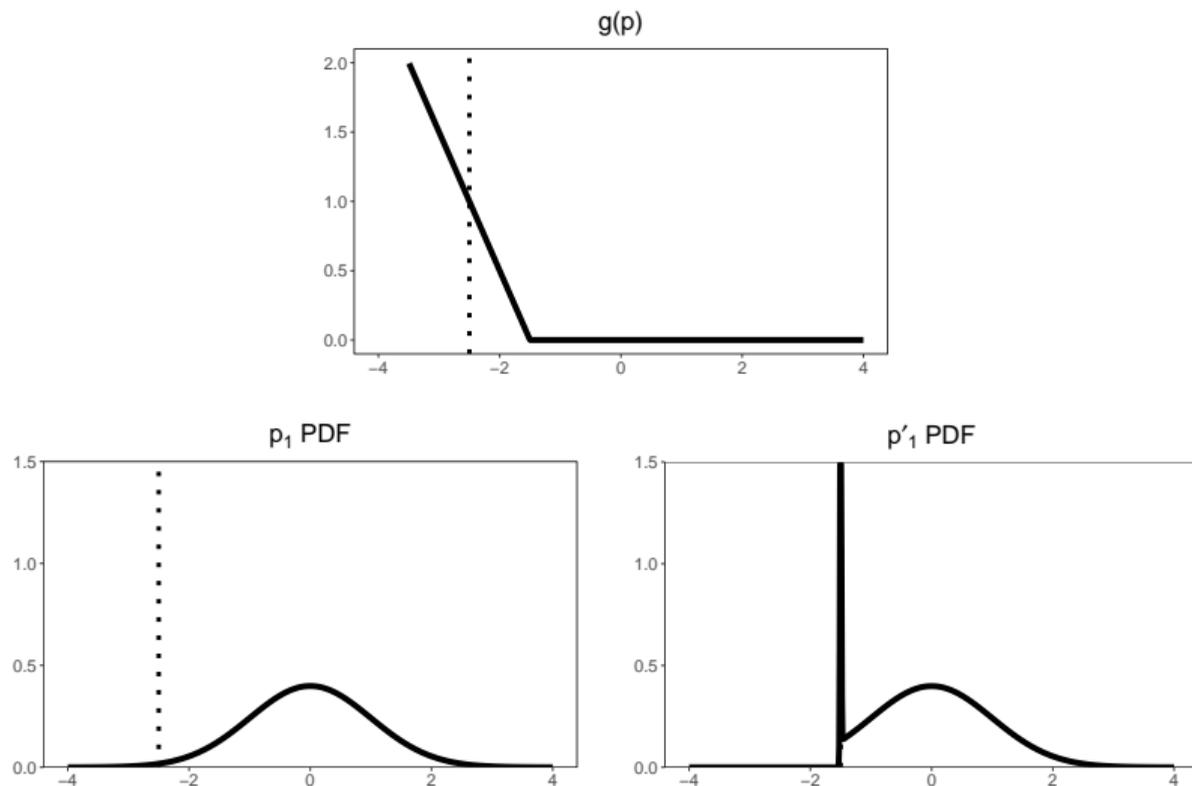
EXAMPLE 1: CONSTANT PRICE SUPPORT / CONSTANT PURCHASES

$p' = p + c$, i.e., no state-contingent impact



EXAMPLE 2: POLICY PUT / PRICE FLOOR

$p' = \max(p, \underline{p})$: buy “whatever it takes” to cap yield



WHICH STATES DO BOND MARKETS EXPECT INTERVENTIONS?

March 12th, 2020 ECB press conference:

“We are not here to close spreads, this is not the function or the mission of the ECB”

European Central Bank

Lagarde triggers investor jitters as ECB launches virus response

Italian bond yields rise as central bank president distances herself from Draghi's legacy

FT: 'remarks came across like the inverse of [Mr] Draghi's whatever it takes moment'

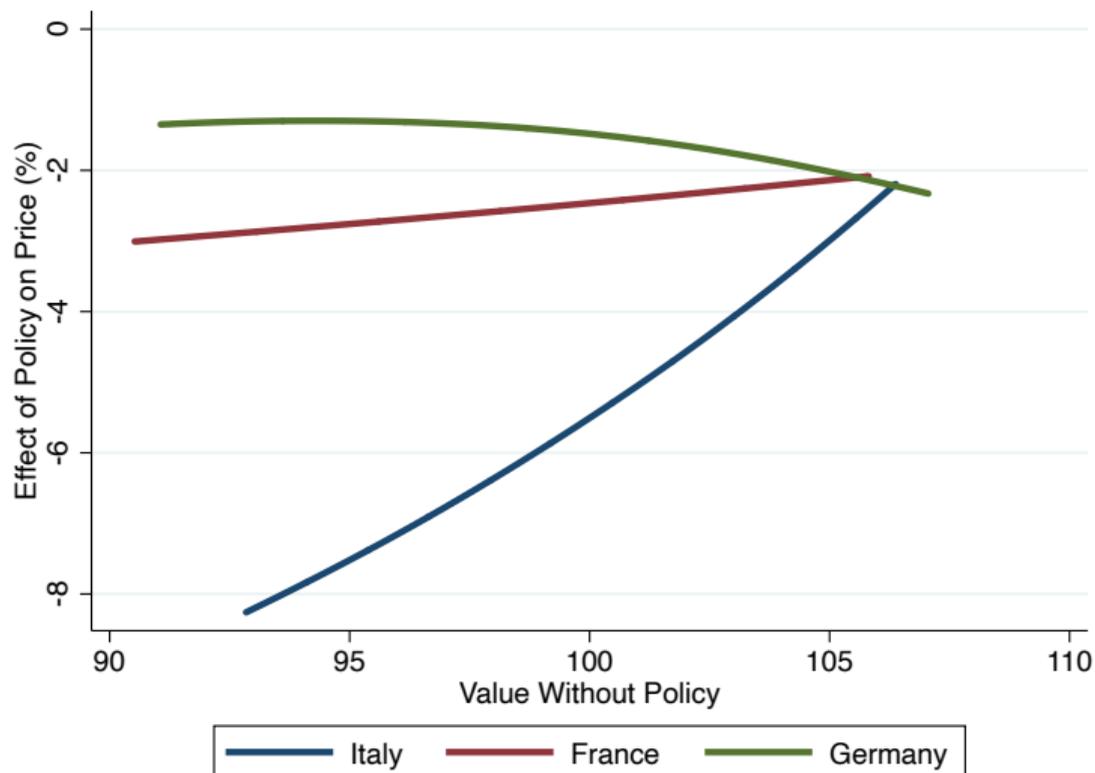
→ Italian 10-year yield rose *60bps* relative to Germany on the news

MARCH 12TH EVENT

Use option prices on 10-year bond futures for Italy, France, Germany

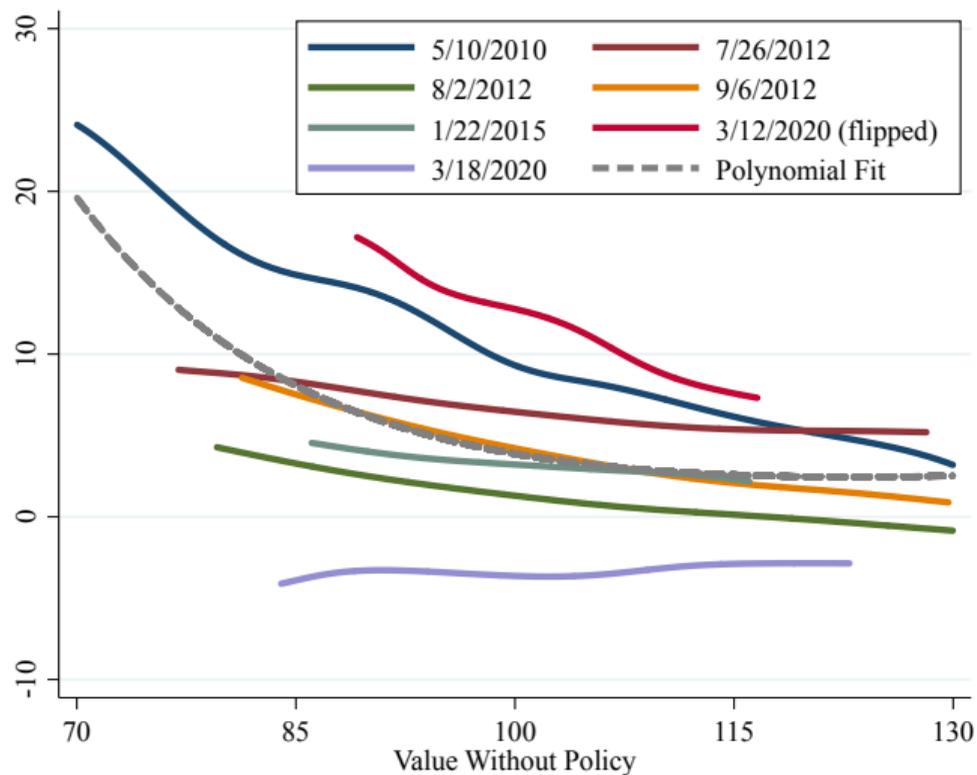
MARCH 12TH EVENT

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WHICH STATES DO MARKETS EXPECT INTERVENTIONS?

Euro Stoxx options across all announcements

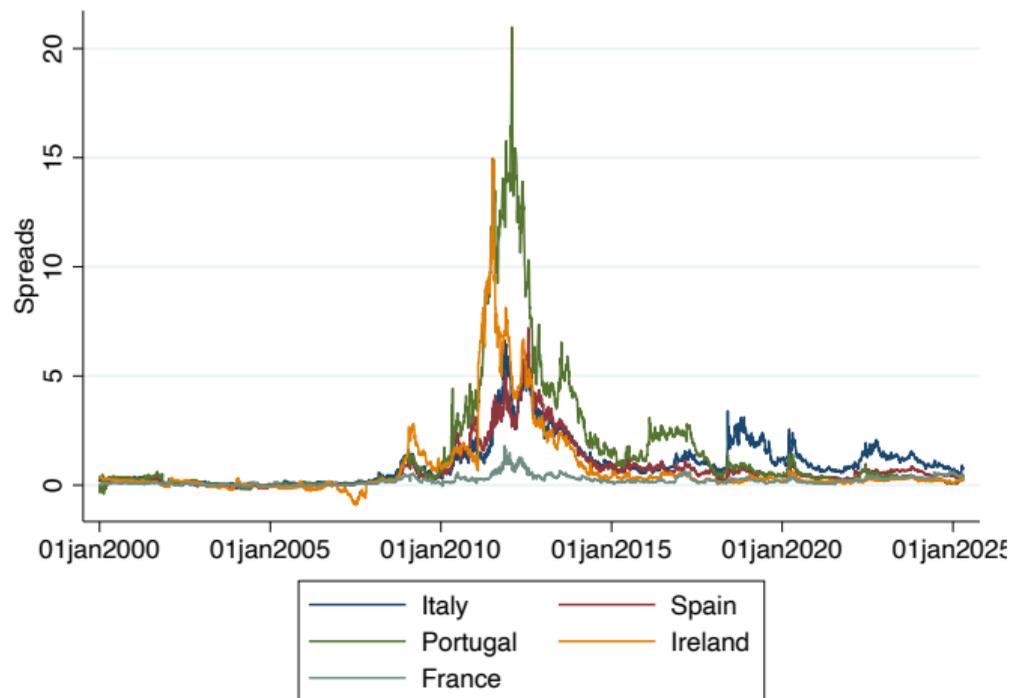


TAKING STOCK

- Purchase announcements work largely through lowering sovereign spreads
 - ECB holdings remove large share of sov credit risk from private investors, more so when spreads are high
 - Option prices: bond markets expect ECB to lean against widening of sovereign spreads
- Reduced spread risk and reduced supply of sov risk should lower spreads *persistently*

PERSISTENT EFFECTS ON SPREADS

THE RISE AND FALL OF EURO AREA SOVEREIGN SPREADS

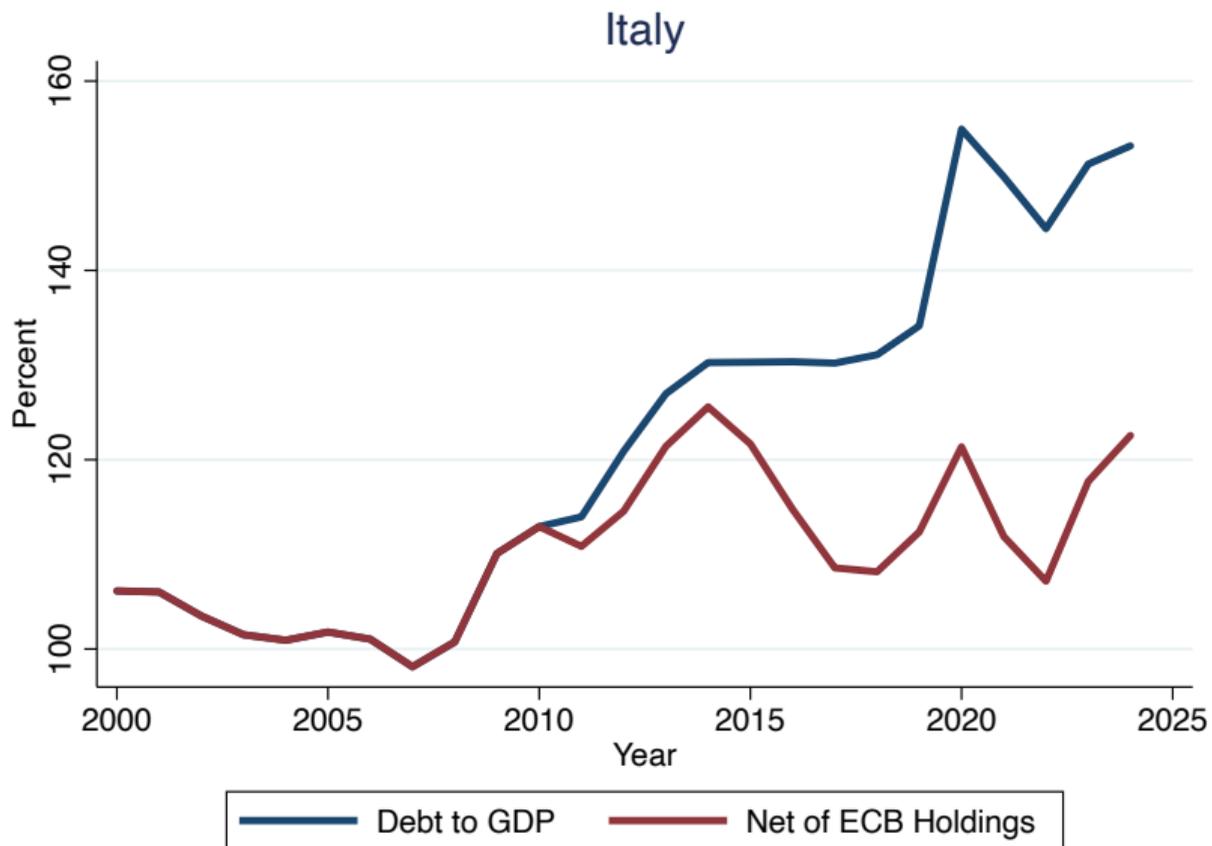


Spreads today are low: Italy \approx 0.56%, Spain \approx 0.30% on 5-year bonds, despite BBB/A ratings

SPREADS AND FUNDAMENTALS: PANEL REGRESSION

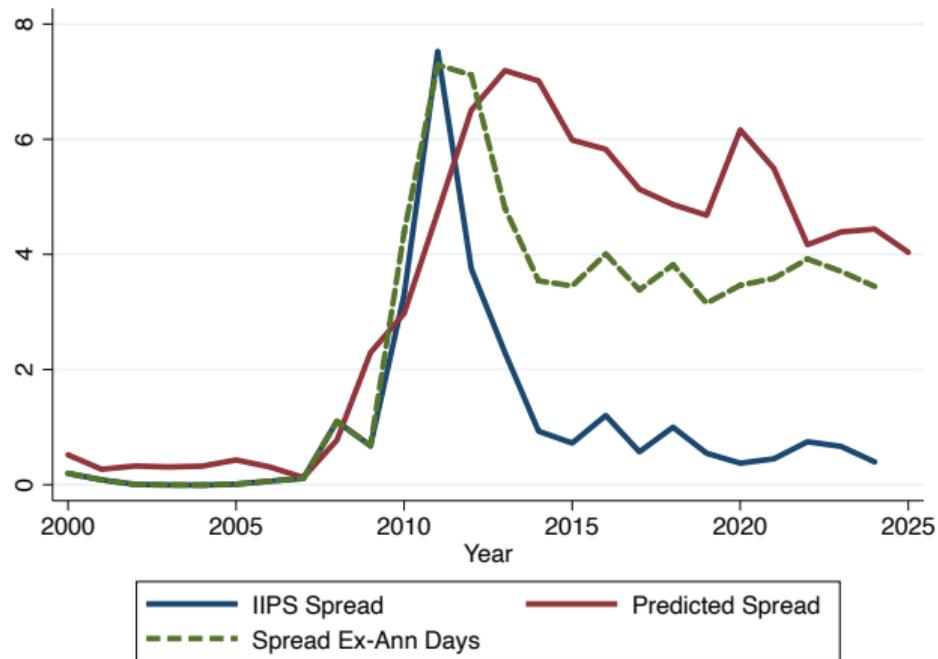
	(1) 2000-2011	(2) 2012-2025
$\ln(\text{Debt}/\text{GDP})$	0.09*** (0.03)	-0.01* (0.01)
Government Deficit as % of GDP	0.07 (0.05)	-0.07 (0.06)
GDP Growth	-0.03 (0.02)	-0.02** (0.01)
Unemp	0.13** (0.06)	0.13*** (0.03)
Observations	110	130
R-squared	0.56	0.65
Number of groups	10	10

PURCHASES STABILIZED DEBT SUPPLY FOR PRIVATE INVESTORS



“PREDICTED” PATH OF SPREADS FOR HIGHER RISK COUNTRIES

Use 2000-2011 regression and path of macro variables



Purchase policy potential major force in keeping spreads today low

CONCLUSION

Asset purchases as a policy rule

- Euro area: purchases of sovereign bonds used in bad economic times (2012 / 2020)
- Buying in bad times (sov spreads widen) stabilizes spreads, gives insurance effect
- Announcements: sovereign risk premia channel important
- Option prices: strong evidence of purchase policies lowering left tail risk
- Appears to have large effects on both level of spreads and their dynamics

