

Do Financial Markets React to Tax Policy Announcements?

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*Evaluating Tax Reforms
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Tax Policy Affects Financial Markets: Key Channels

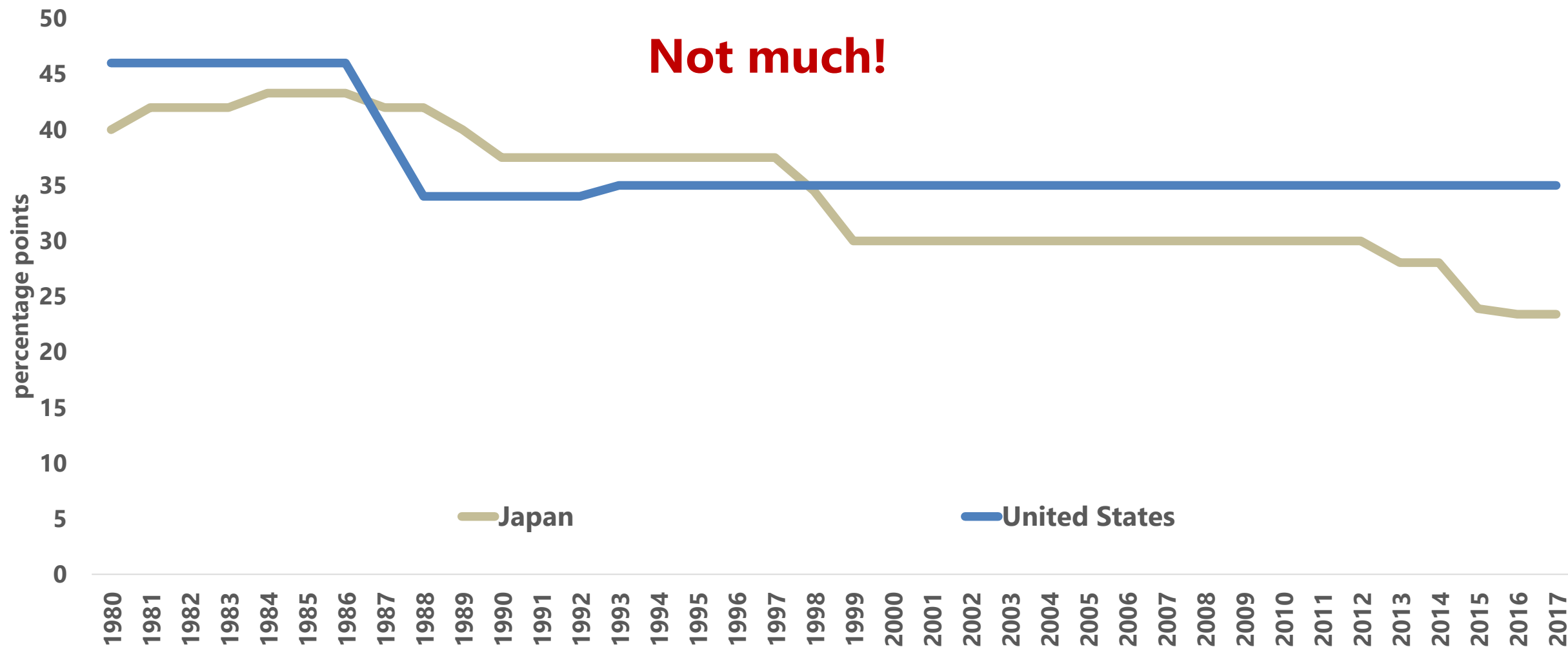
- **Directly through changes in corporate income taxation:**
 - E.g., Higher tax rates on business income can discourage investment
 - E.g., Eliminating interest deductibility reduces after-tax profits
- **Indirectly through changes in the economy:**
 - E.g., Changes in taxation affect savings, investment, economic growth thereby indirectly financial markets
 - Conditional on monetary policy response

We focus on the direct effects of CIT changes

How Financial Markets React to CIT Changes?

- **Theoretical literature suggests a negative correlation:**
 - *Sialm 2006; McGrattan and Prescott 2005, Auerbach and Hassett, 2005; Lang and Shackelford, 2000.*
- **Empirical literature is less definitive:**
 - Negative correlation for US: *Sialm 2009, and Tavares and Valkanov, 2001;*
 - No or positive correlation: *Afonso and Sousa 2011; and Agnello and Sousa, 2013*

What Can we Infer from CIT Top Rate Changes?



We Address the Following Questions...

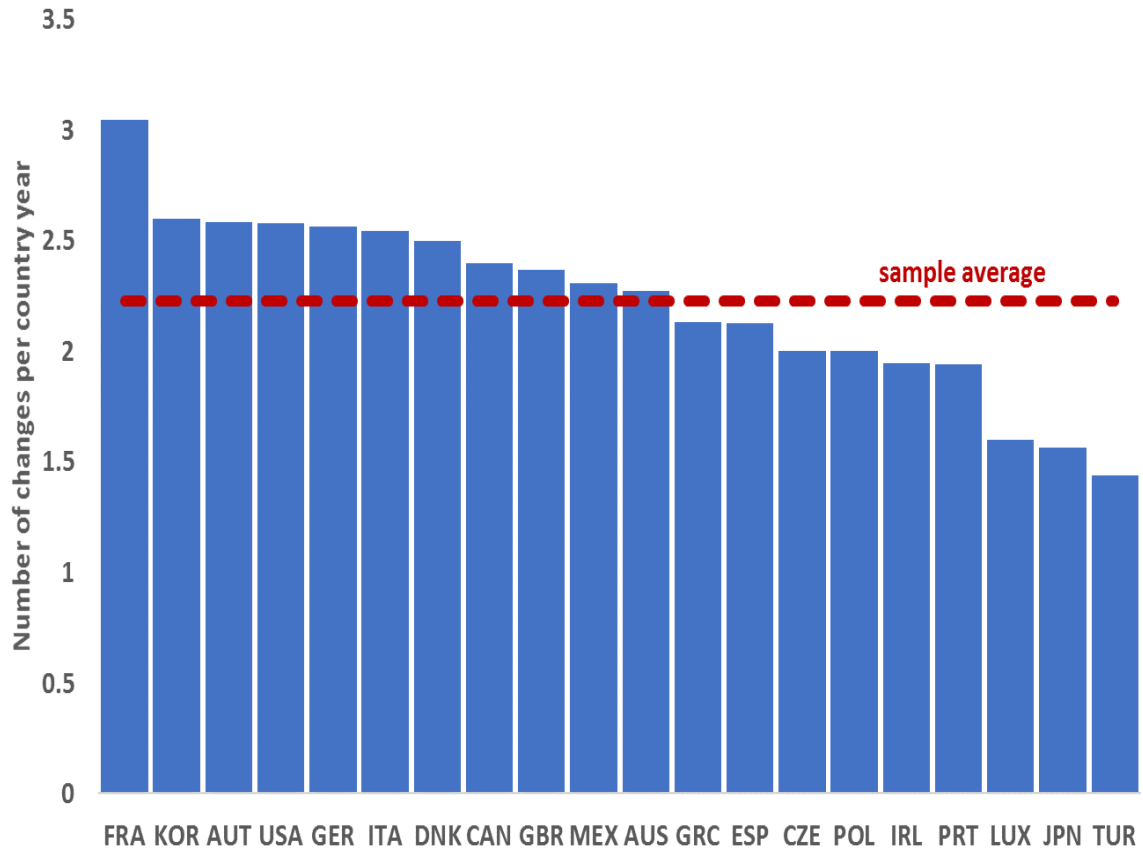
- Do CIT (rate and base) changes affect stock market valuations of firms?
- Does the impact of CIT changes depend on cyclical conditions (expansion vs. recessions)?
- Does the effect of CIT changes differ across different sectors of the economy?

...Using the Tax Policy Reform Database

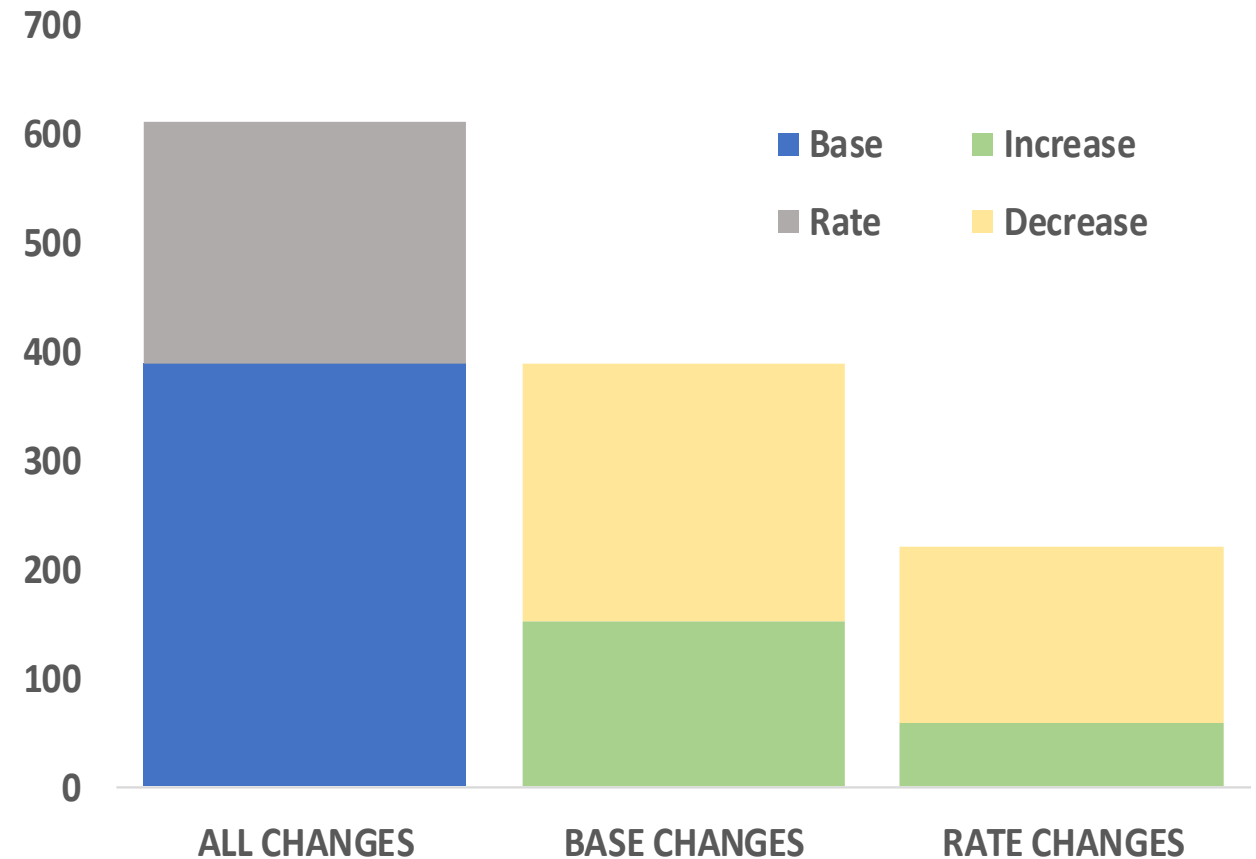
- **IMF's Tax Policy Reform Database (TPRD) has information on:**
 - Major CIT rate changes ($\geq |1\text{pp}|$);
 - Major CIT base changes (based on Kawano and Slemrod, 2017);
 - Precise announcement and implementation dates (i.e., day, month, year based on IBFD news clips).
- **Advantages of the TPRD:**
 - Announcements dates reduce the risk of incorrectly identifying tax policy shocks;
 - Implementation lags (90-days lag) attenuate endogeneity issues.

Major CIT Changes Are Frequent...

On average, two tax changes per year

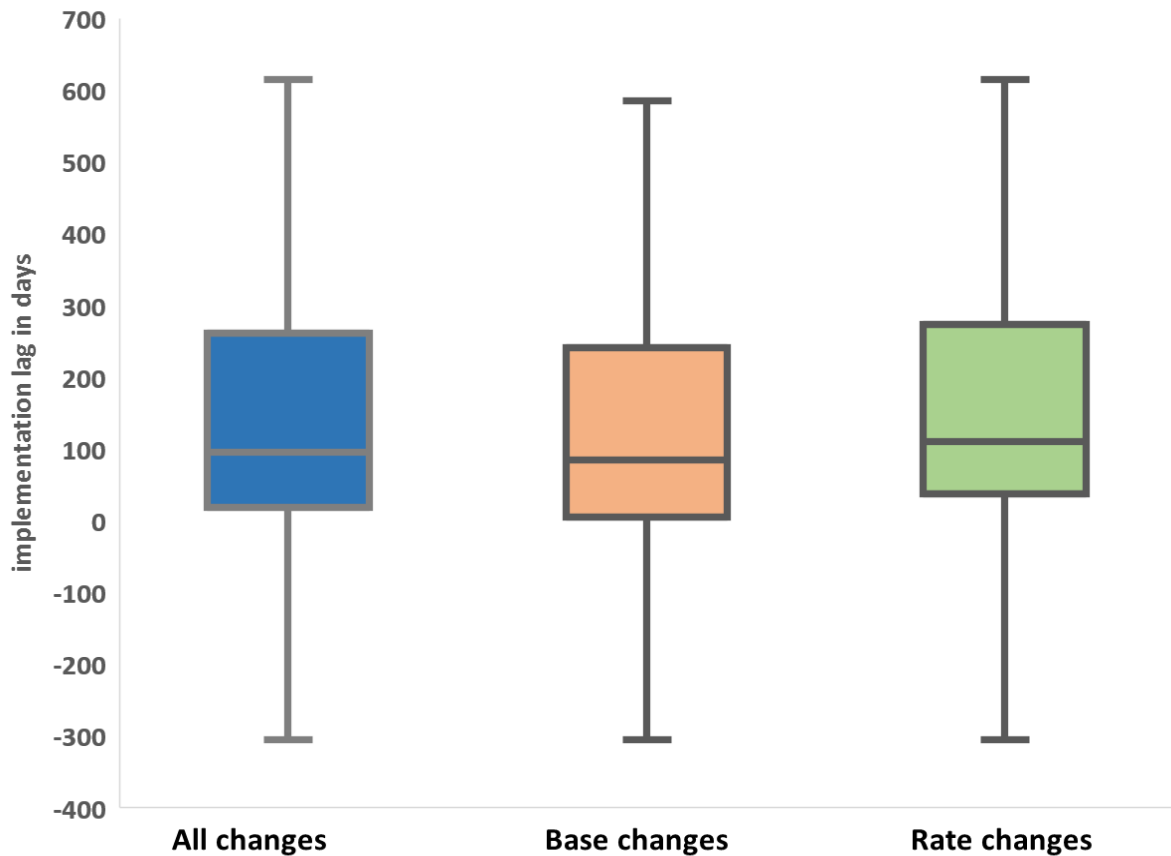


Most changes are tax base narrowing

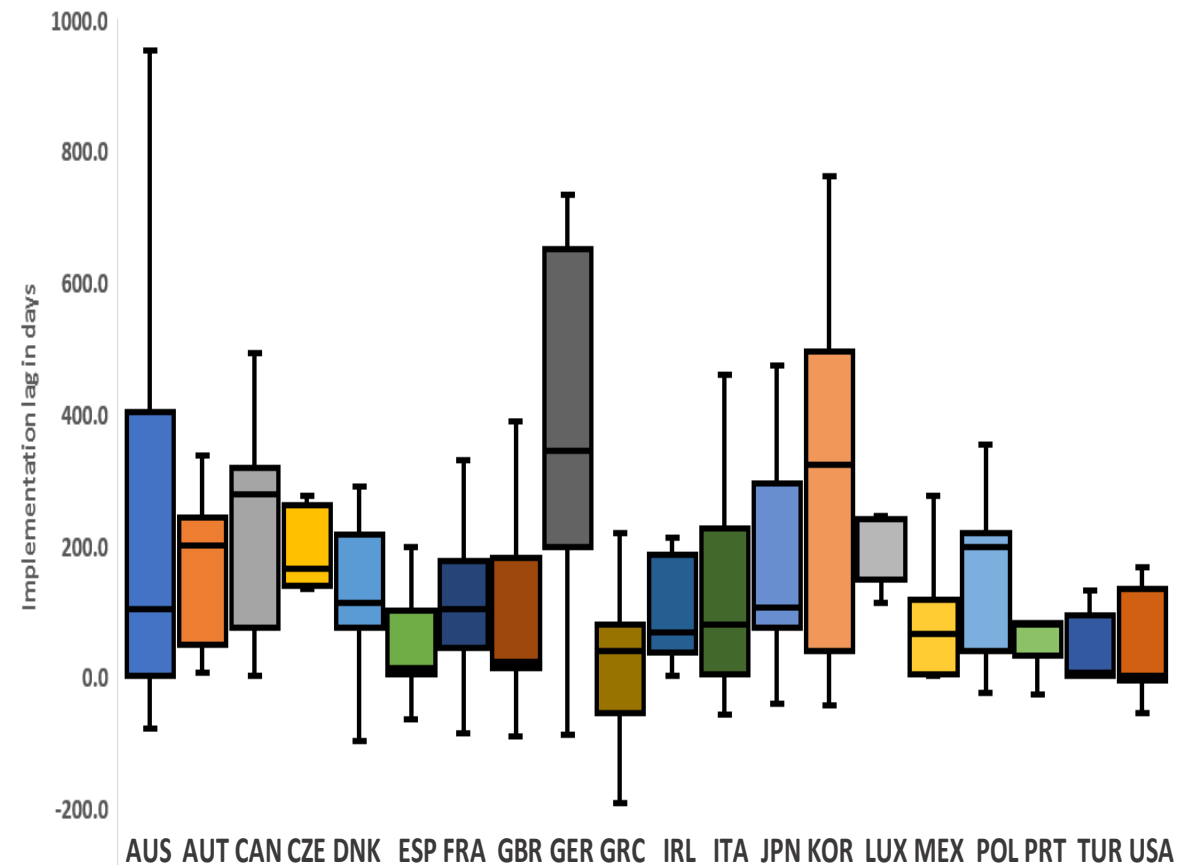


...and Implemented With Sizable Lags

Median implementation lag 3 months...



...but significant variation



Impact of CIT changes Estimated Using the Local Projection Model (Jorda, 2005)

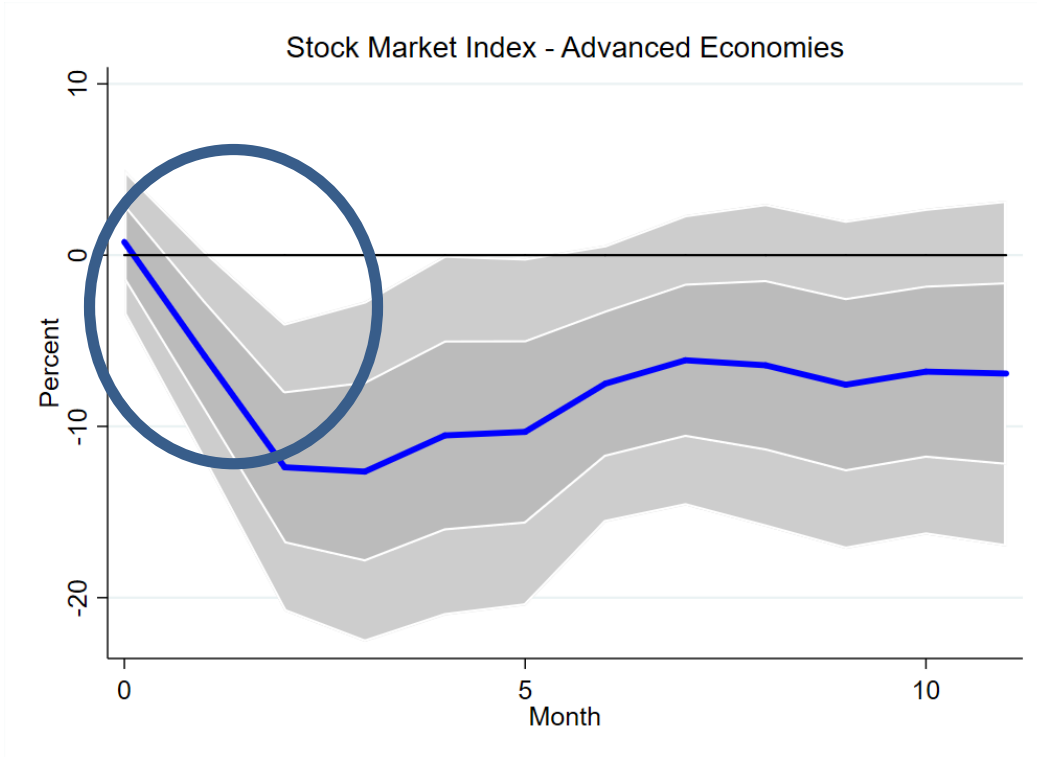
Baseline:

$$z_{t+h} = \alpha_h + \mu_h(L)y_{t-1} + \beta_h SH_t + \xi_t + \chi + e_t$$

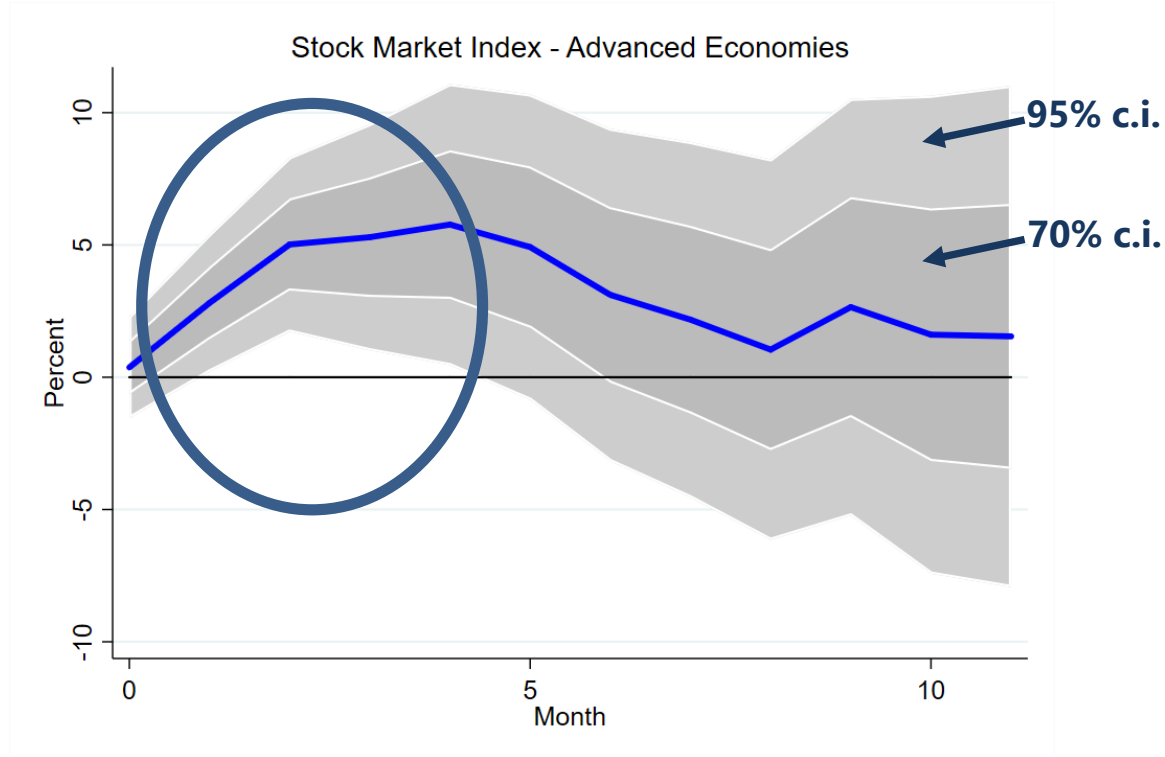
- Unbalanced sample of OECD countries from early 80's; **monthly** data
- z_{t+h} is the stock market index
- y_{t-1} is a vector of control variables (macroeconomic, lagged shocks)
- Time (ξ_t) and country (χ) fixed effects (common shocks, unobserved country-specific heterogeneity)
- SH_t is the tax policy announcement shock (90-days implementation lag)
- Driscoll and Kraay (1998) standard errors clustered by country and time

CIT Rate Changes Affect AE's Financial Markets...

CIT rate increase



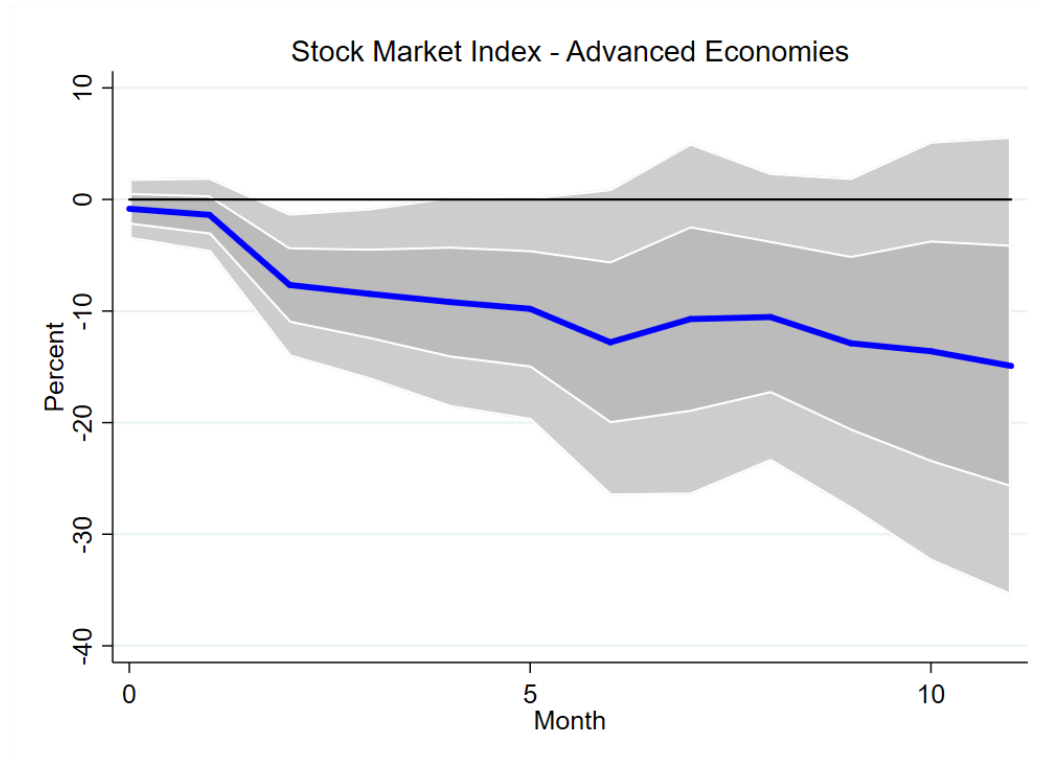
CIT rate decrease



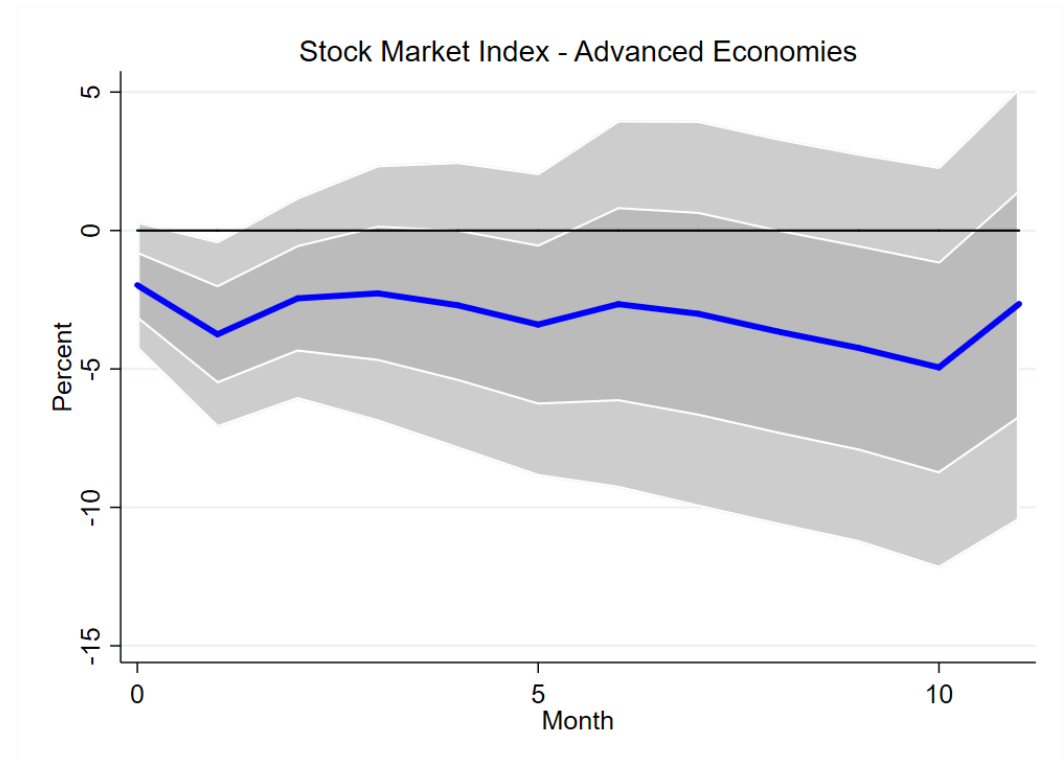
✓ Results are robust to [additional controls](#)

... but CIT Base Changes, Less So

CIT base expansion



CIT base reduction



Controlling for the Business Cycle

- Expand the baseline specification to allow for differential effects during expansions and recessions

$$z_{t+h} = F [\alpha_{Ah} + \mu_{Ah}(L)y_{t-1} + \beta_{Ah}SH_t] + (1 - F)[\alpha_{Bh} + \mu_{Bh}(L)y_{t-1} + \beta_{Bh}SH_t] + \xi_t + \chi + e_t$$

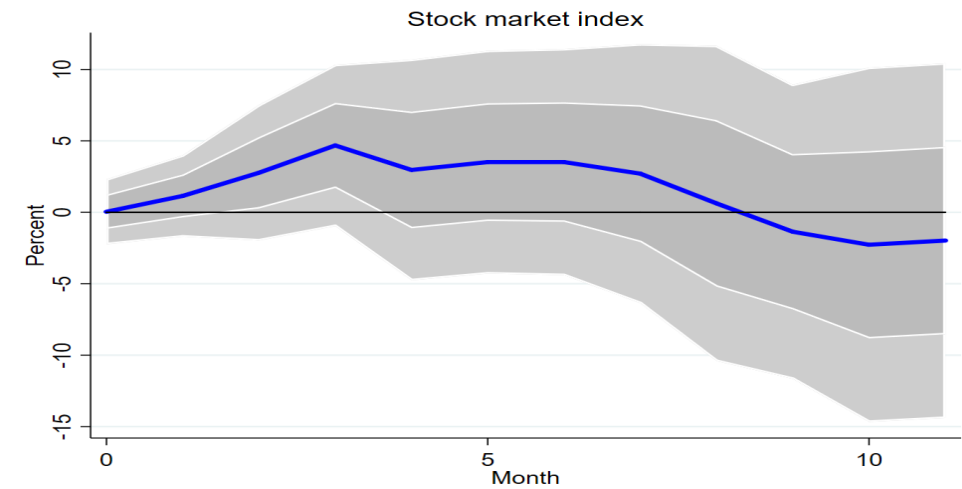
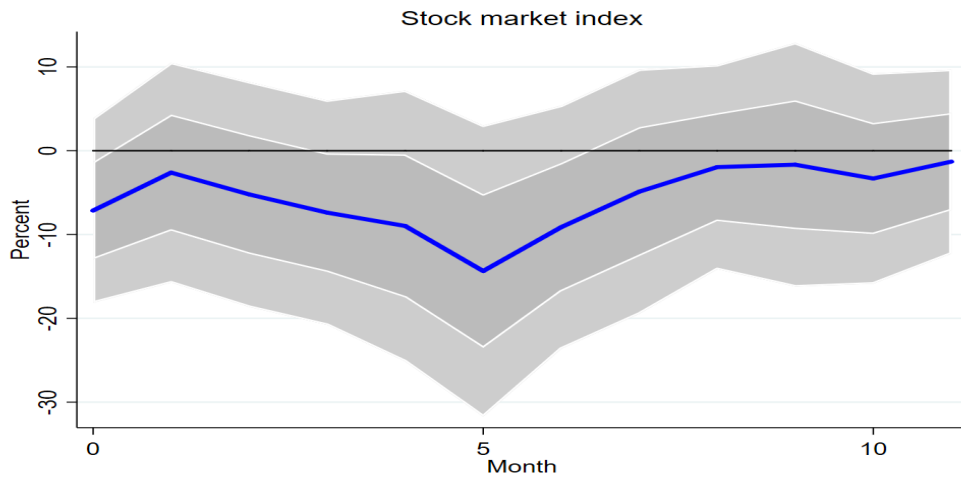
- $\beta_{\bullet h}$ gives the response of z_{t+h} under two different states of the economy
- $F(\bullet)$ is a smooth transition function (Auerbach and Gorodnichencko 2012)
- Robust to dummy approach for identification of recessions
- Same controls as in the baseline

CIT Rate Changes Have Different Effects in Expansions and Recessions (cont.)

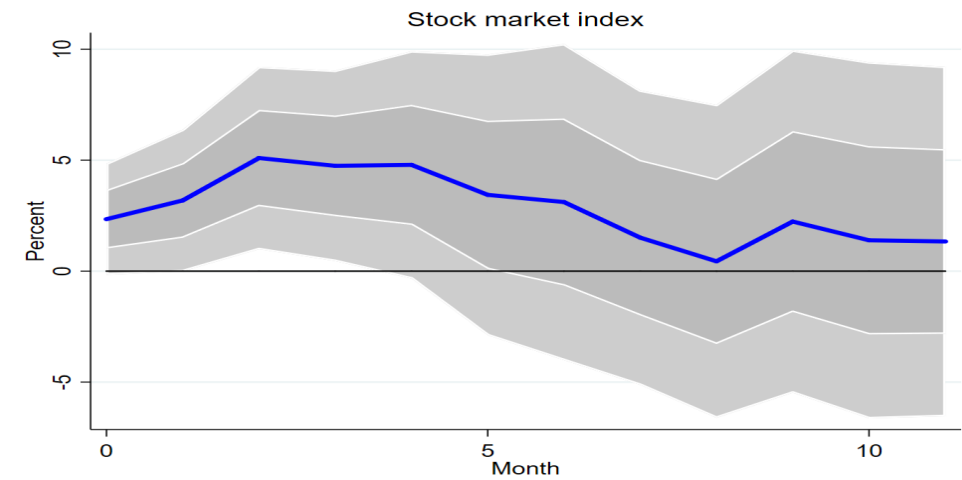
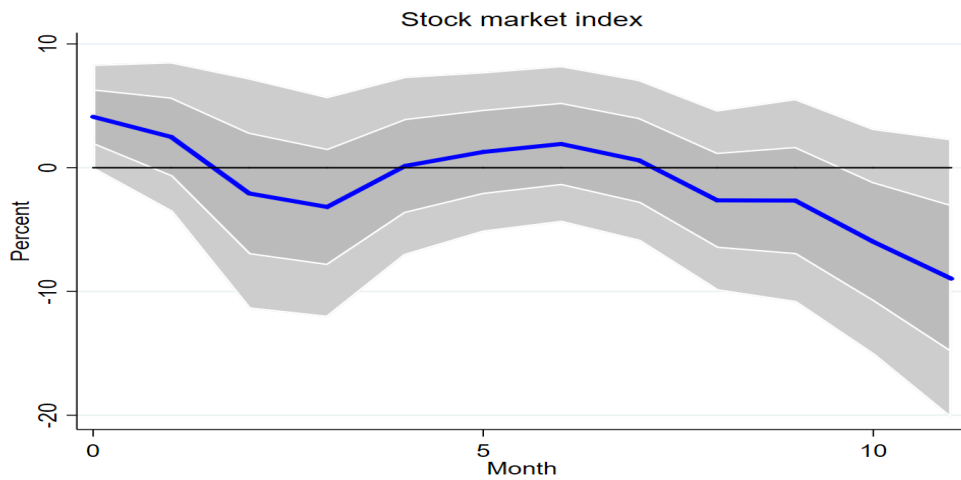
CIT rate increase

CIT rate decrease

Recession



Expansion

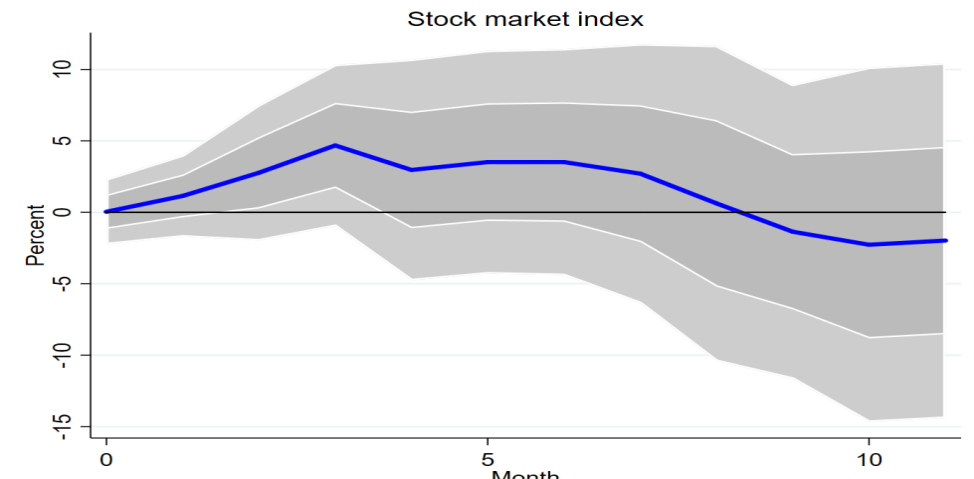
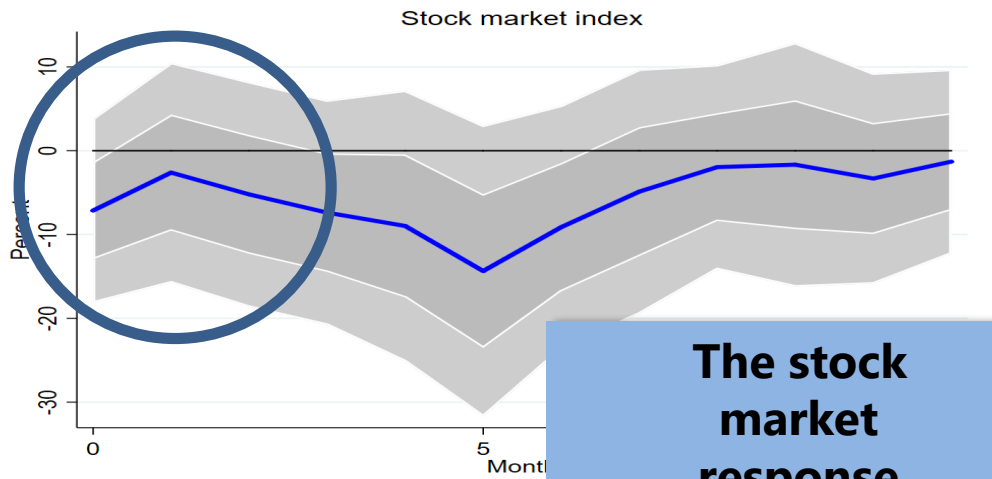


CIT Rate Changes Have Different Effects in Expansions and Recessions (cont.)

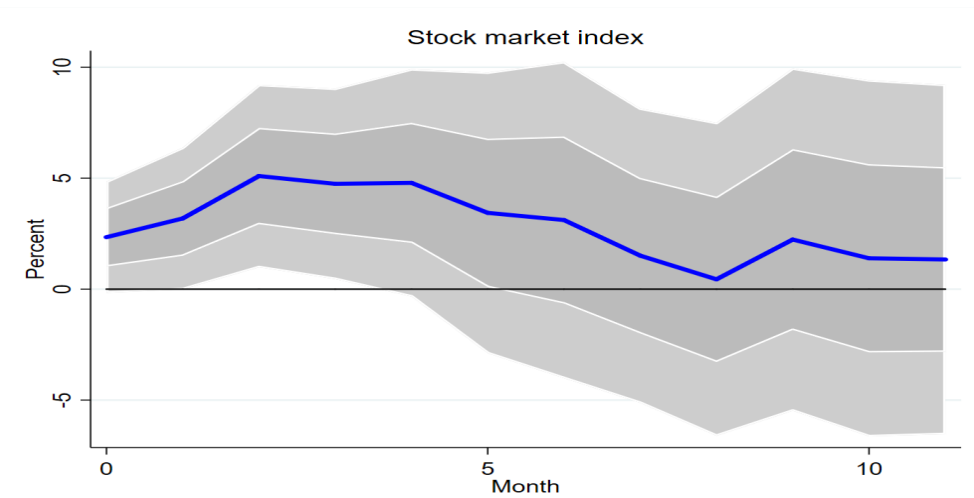
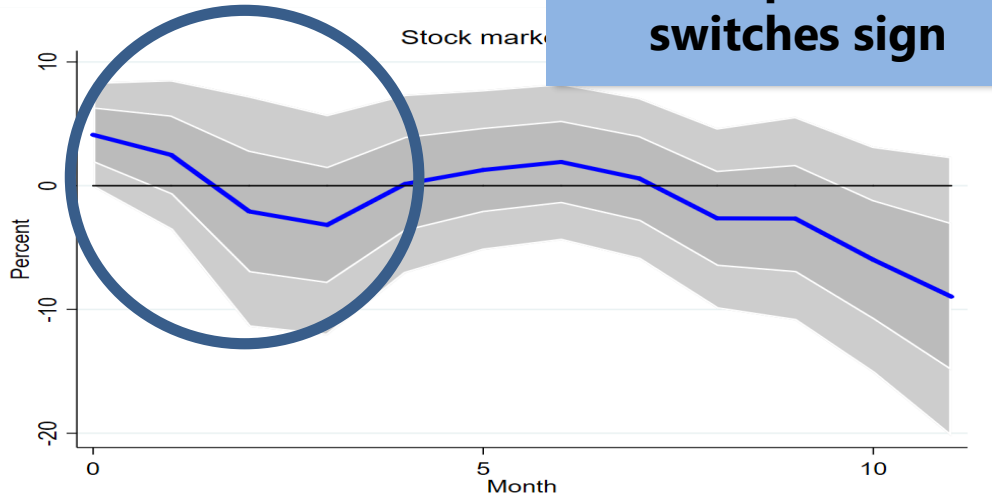
CIT rate increase

CIT rate decrease

Recession



Expansion



The stock market response switches sign

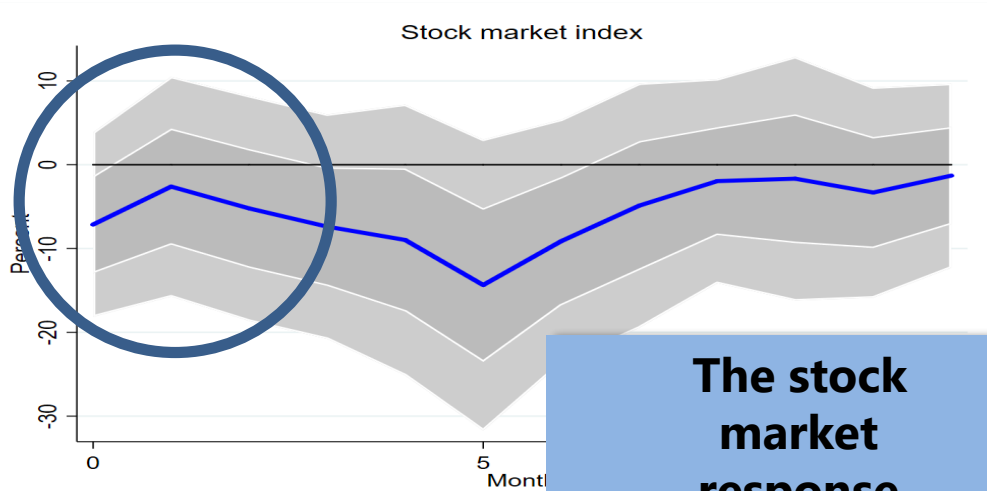


CIT Rate Changes Have Different Effects in Expansions and Recessions (cont.)

CIT rate increase

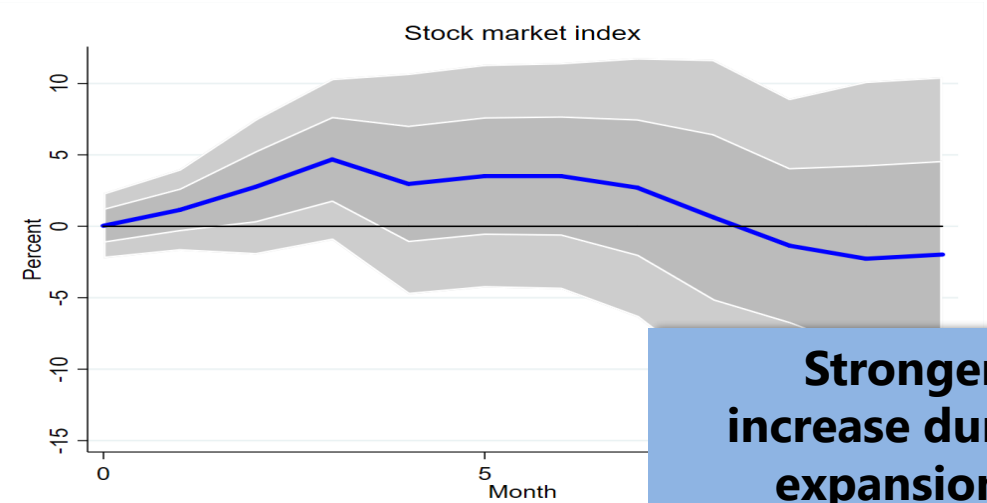
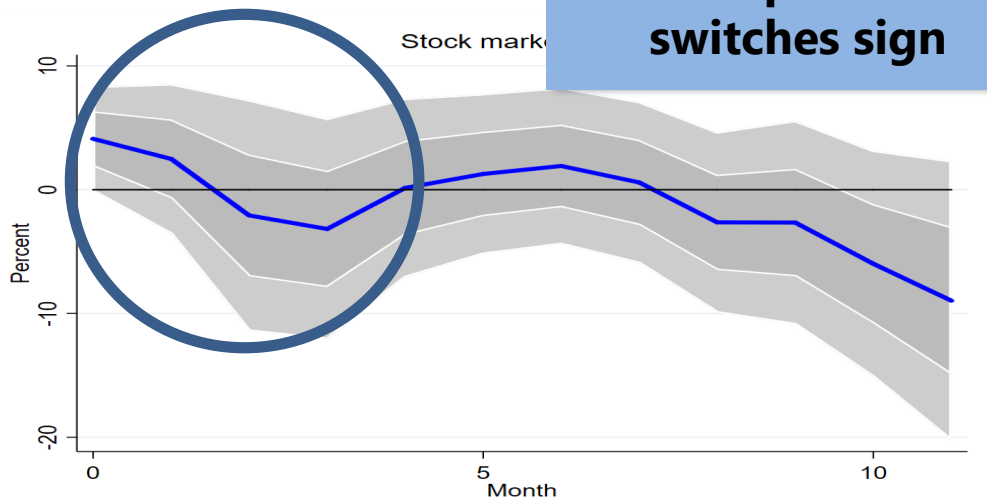
CIT rate decrease

Recession

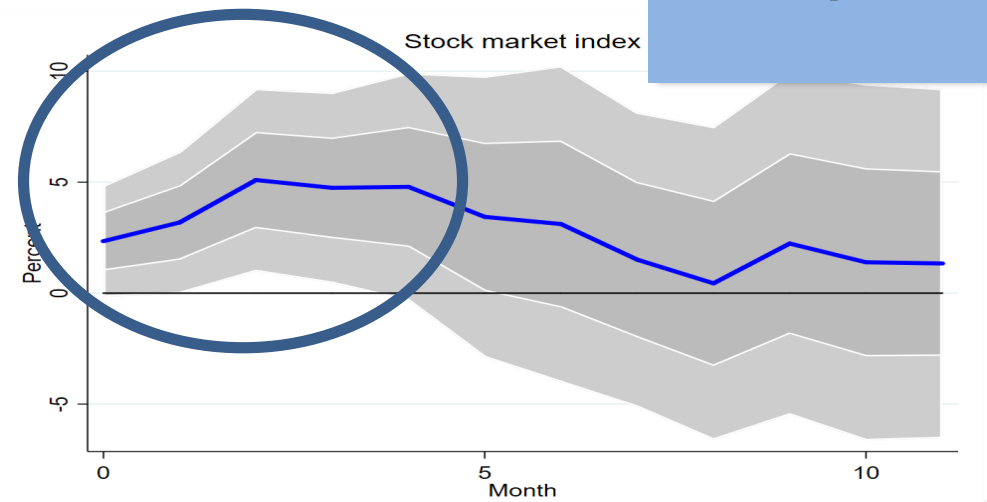


The stock market response switches sign

Expansion



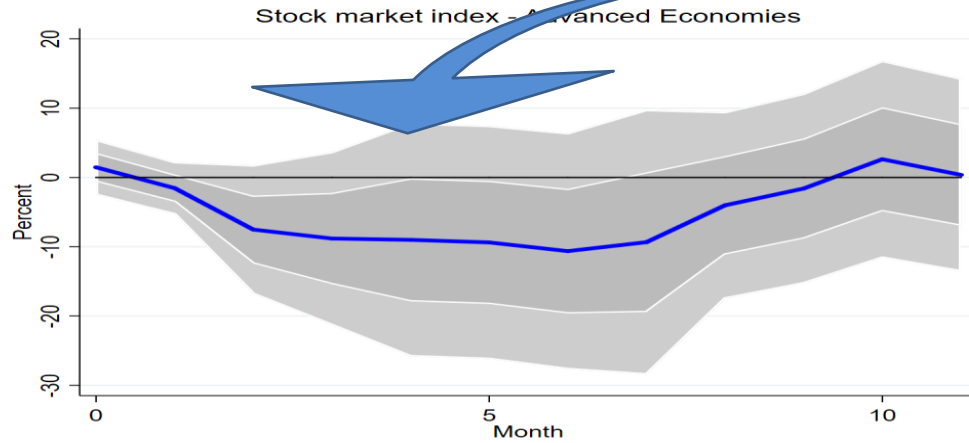
Stronger increase during expansions



The Effects of CIT Base Changes are Less Pronounced

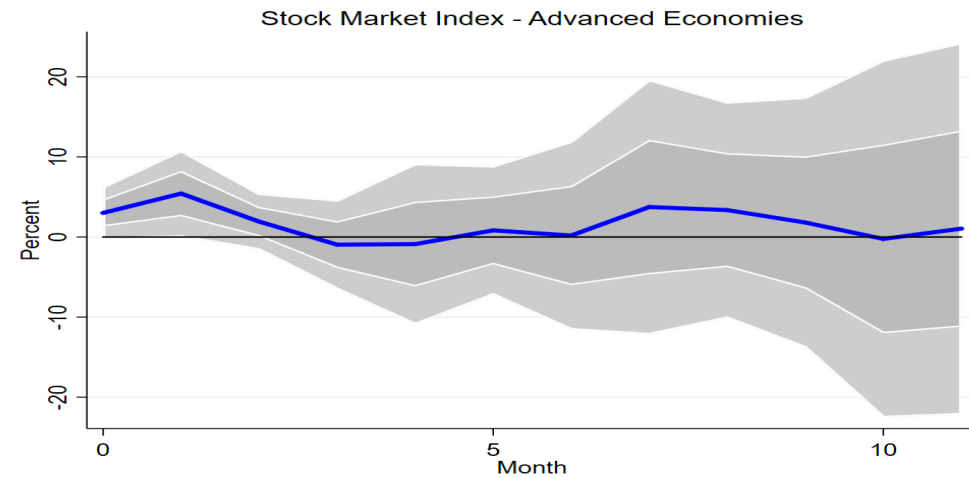
CIT base expansion

Recession



- Some evidence that CIT base expansions have a more dampening effect on financial markets during recessions

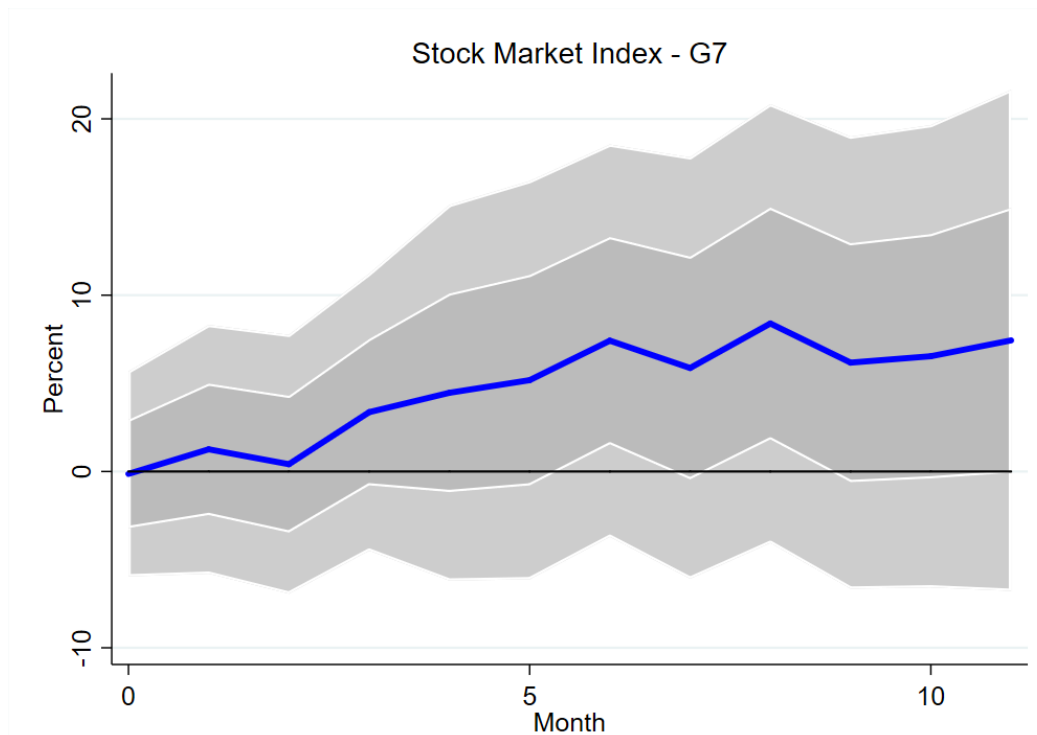
Expansion



But There is Heterogeneity in the Sample

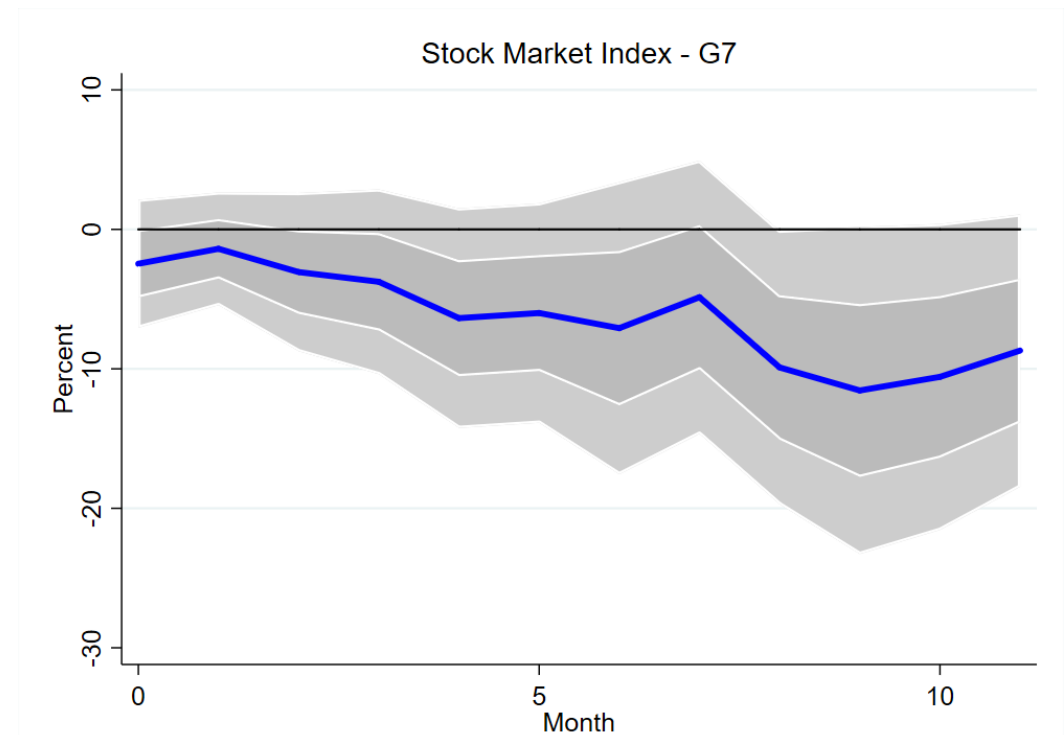
CIT base decrease

*Capital gains, Loss carry forward
and Thin capitalization rules*



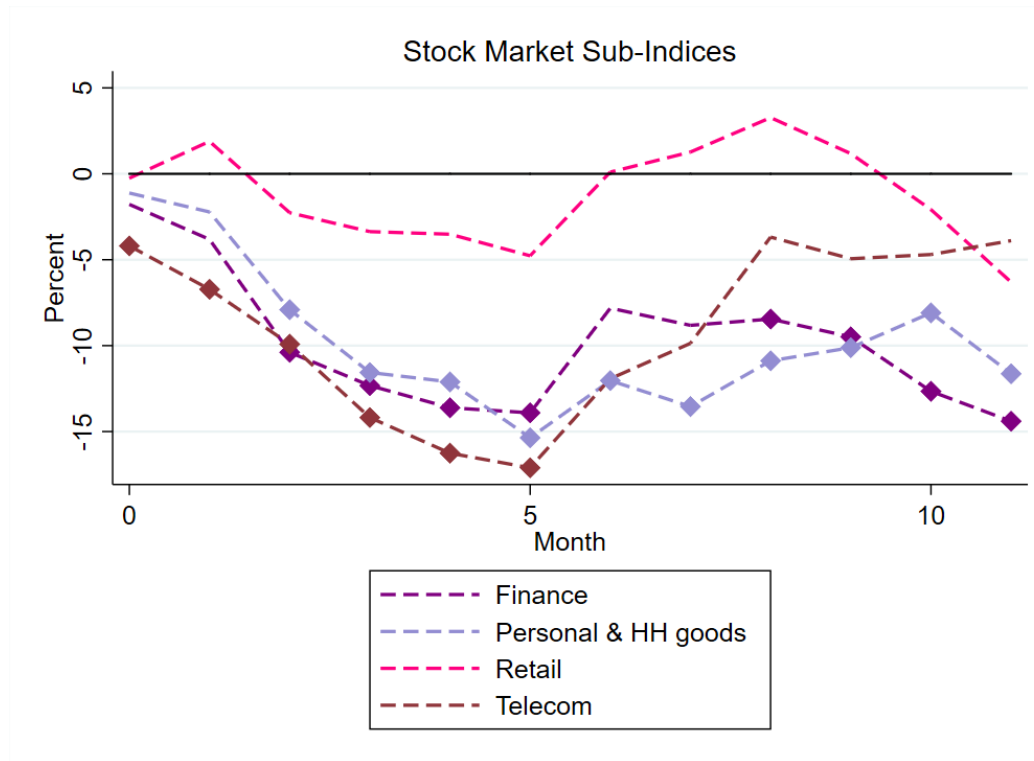
CIT base increase

*R&D and Investment
Promotion*

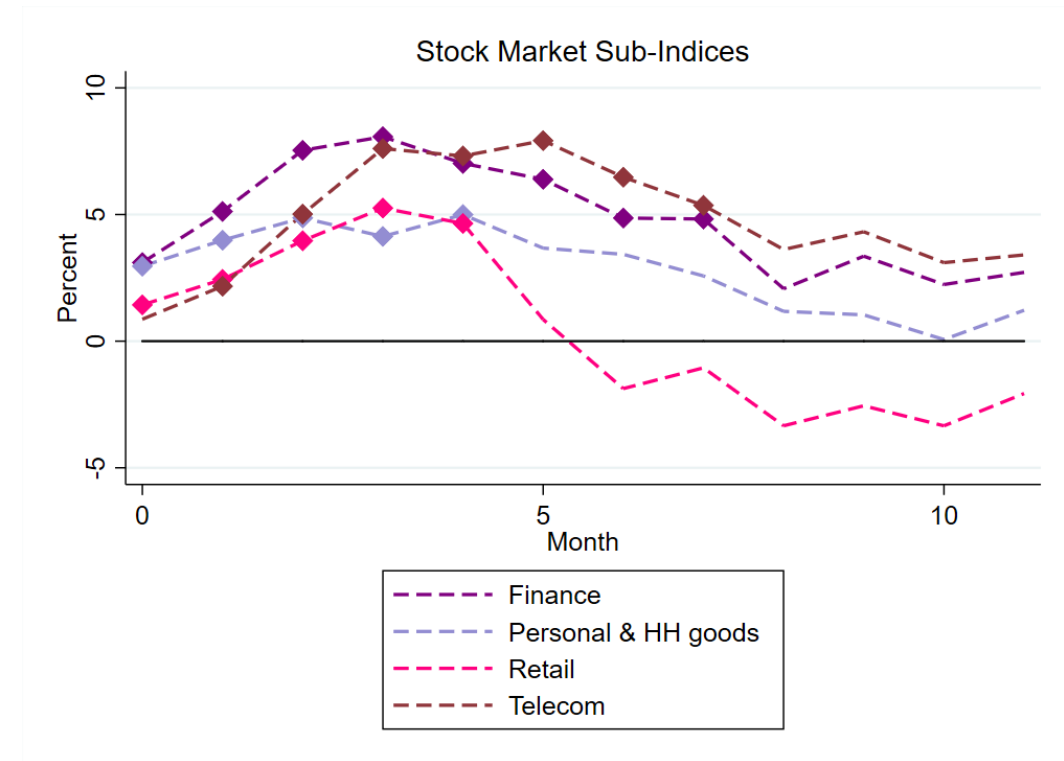


Sectoral Responses Support Evidence Based on Aggregate Stock Market Indexes

CIT rate increase



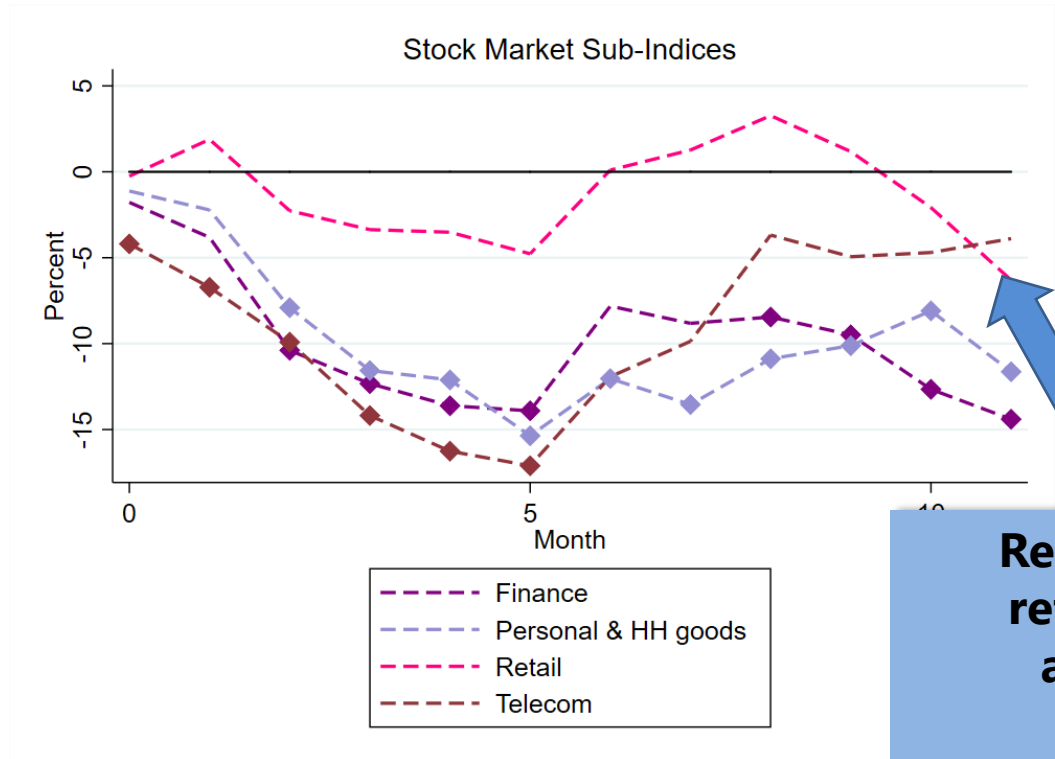
CIT rate decrease



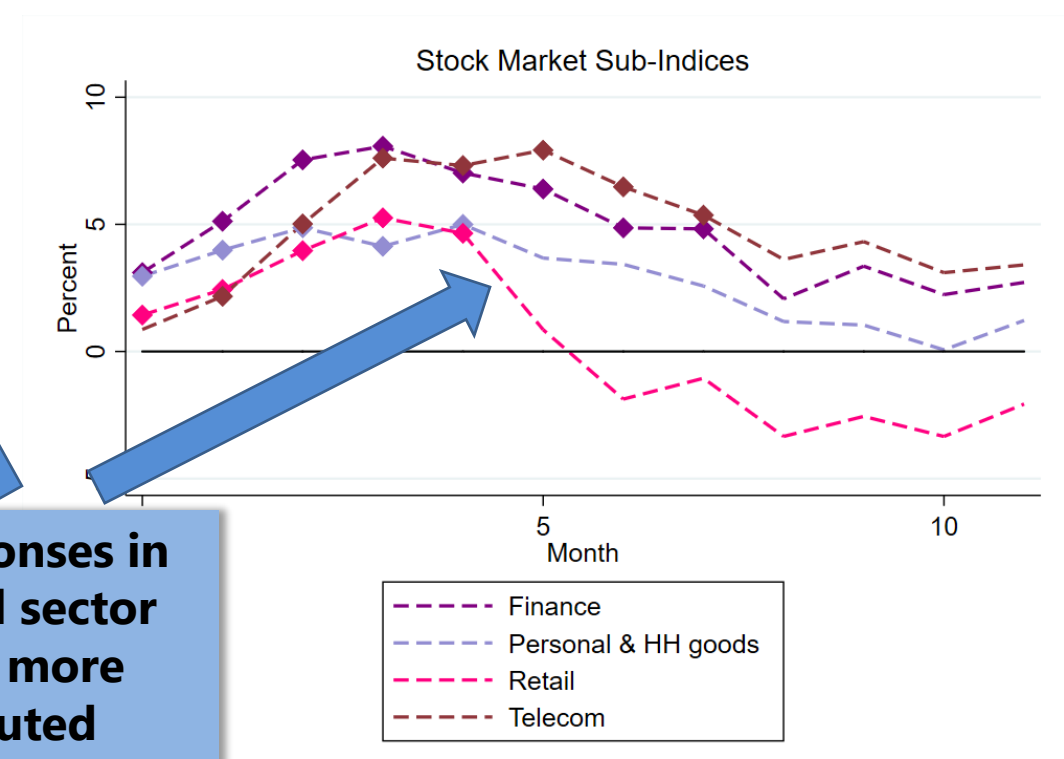
➤ Dashed-diamond lines indicate significance at the 68 percent level

Sectoral Responses Support Evidence Based on Aggregate Stock Market Indexes (cont.)

CIT rate increase



CIT rate decrease



Responses in retail sector are more muted

✓ Dashed-diamond lines indicate significance at the 68 percent level

Next Steps

- Account for market expectations (Consensus forecasts)
- Examine behavior of excess return (stock market index minus S-T interest rate)
- Assess the size of CIT shocks
- Introduce daily observations

Conclusions

- Analyzed how financial markets react to major CIT changes using new IMF database (TPRD)
- AE's financial markets show a negative correlation with CIT rate changes, but CIT base changes less so
- Cyclical conditions appear to magnify the impact of rate changes
- The response of sectoral stock indices to CIT rate changes does not suggest idiosyncratic effects.

Thank you

Appendix: Definition of Stock Market Index

○ **Economist Intelligence Unit**

➤ A reference stock market index is chosen for each country (see table).

○ **Thomson Reuters**

➤ In each country, this index is constructed by aggregating the prices of individual stocks (e.g. 999 in the US), possibly traded on different markets.

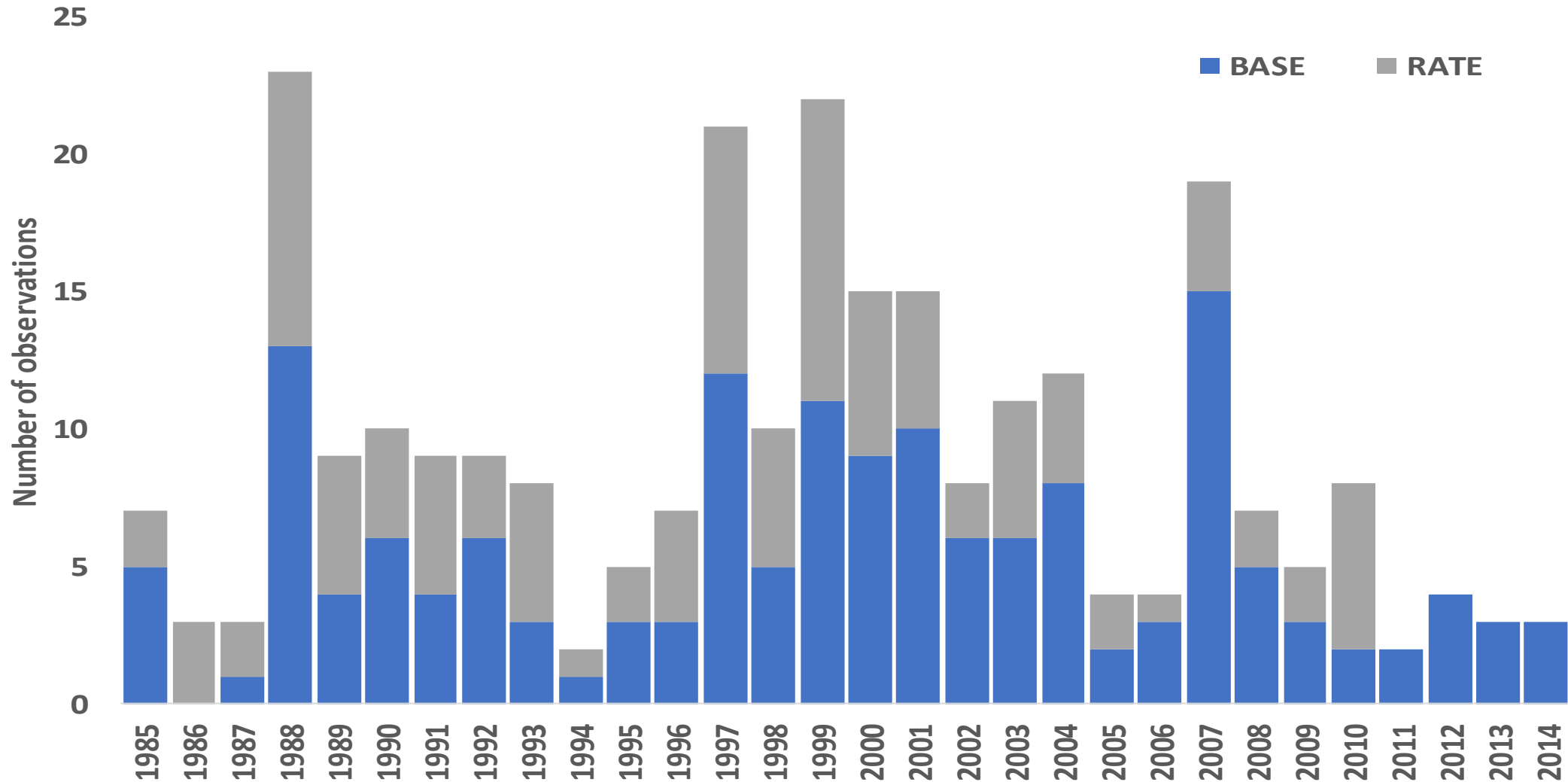
Economist Intelligence Unit: Stock Market Indexes

1. Australia – Australia: Stock Price Index: All Ordinaries (Wall Street Journal)
2. Austria – ATX (Financial Times)
3. Belgium – Belgium: Brussels Bel 20 Index (Banque Nationale de Belgique)
4. Canada – Composite stock market index (Toronto Stock Exchange)
5. Switzerland - Share Price: Swiss Performance Index (SIX Swiss Exchange)
6. Chile – Composite stock market index (Financial Times)
7. Czech Republic – Composite stock market index (Monthly Review of Emerging Stock Markets; Quarterly Review)
8. Germany – DAX stock market index (Gruppe Deutsche Borse)
9. Denmark – Composite stock market index: OMXC (Danmarks NationalBank)
10. Estonia –
11. Spain – General share price index (Banco de España)
12. Finland – Composite stock market index (Bank of Finland)
13. France - CAC 40 stock market index (NYSE Euronext)
14. UK – FTSE-100 index (Wall Street Journal)
15. Greece – Greece: Stock Price Index: Athens, SE (Financial Times)
16. Hungary – Bux stock market index (Financial Times)
17. Ireland – Composite stock market index (Irish Stock Exchange)
18. Iceland –
19. Israel – Composite stock market index (Tel Aviv Stock Exchange; Monthly Main Indicators)
20. Italy – ISA MIB Storico Share Price Index (OECD, Main Economic Indicators)
21. Japan – Nikkei Stock Average: Tokyo Stock Exchange series of 225 issues (Nikkei)
22. Korea – Composite stock market index (KOPSI) (Korea Stock Exchange)
23. Latvia –
24. Luxembourg –
25. Mexico – Composite stock market index (Composite stock market index)
26. Netherlands – Amsterdam Exchange Index (Financial Times)
27. Norway – Oslo stock exchange share price index (Financial Times)
28. New Zealand – NZSX 50 (New Zealand Stock Exchange). Note: NZSE40 (NSA, 7/1/86=1000) prior to 2003
29. Poland – Composite stock market index (WIG20 (EOP, Apr-16-94=1000) / Warsaw Stock Exchange)
30. Portugal – PSI 20 (Financial Times)
31. Slovakia –
32. Slovenia – Composite stock market index (Ljubljana Stock Exchange)
33. Sweden – Stockholm All-Share Index (SAX) (Financial Times)
34. Turkey – ISE national 100 composite stock market index (Istanbul Stock Exchange)
35. USA – S&P 500 (Standard & Pours)

Appendix: Regression Specification

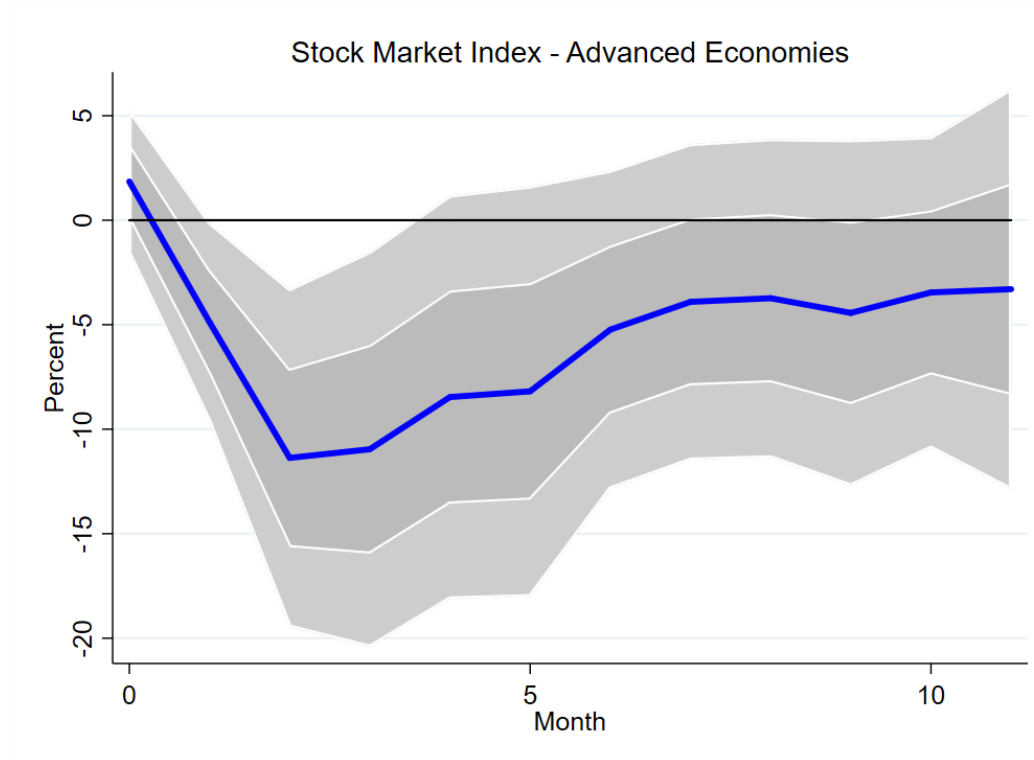
- Control variables in baseline specification:
 - Monetary policy stance (ST interest rates; LT interest rates)
 - Inflation
 - Industrial production
 - CIT base and rate changes (depending on the identified shock) (4-6 lags)
 - PIT base and rate changes (4-6 lags)
- Robust to additional controls:
 - US Federal fund rate
 - CIT statutory rate
 - Oil price
 - Alternative measure of stock market index

Appendix: Distribution of CIT Changes Over Time

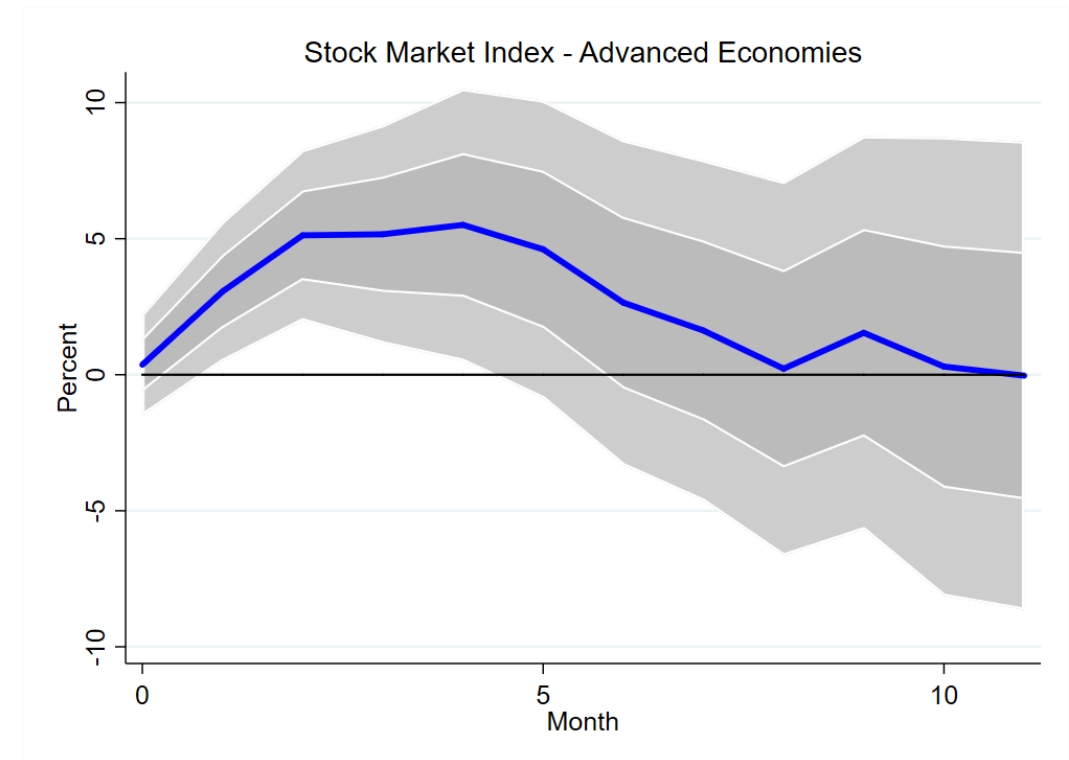


Appendix: Robustness to Additional Controls

CIT rate increase



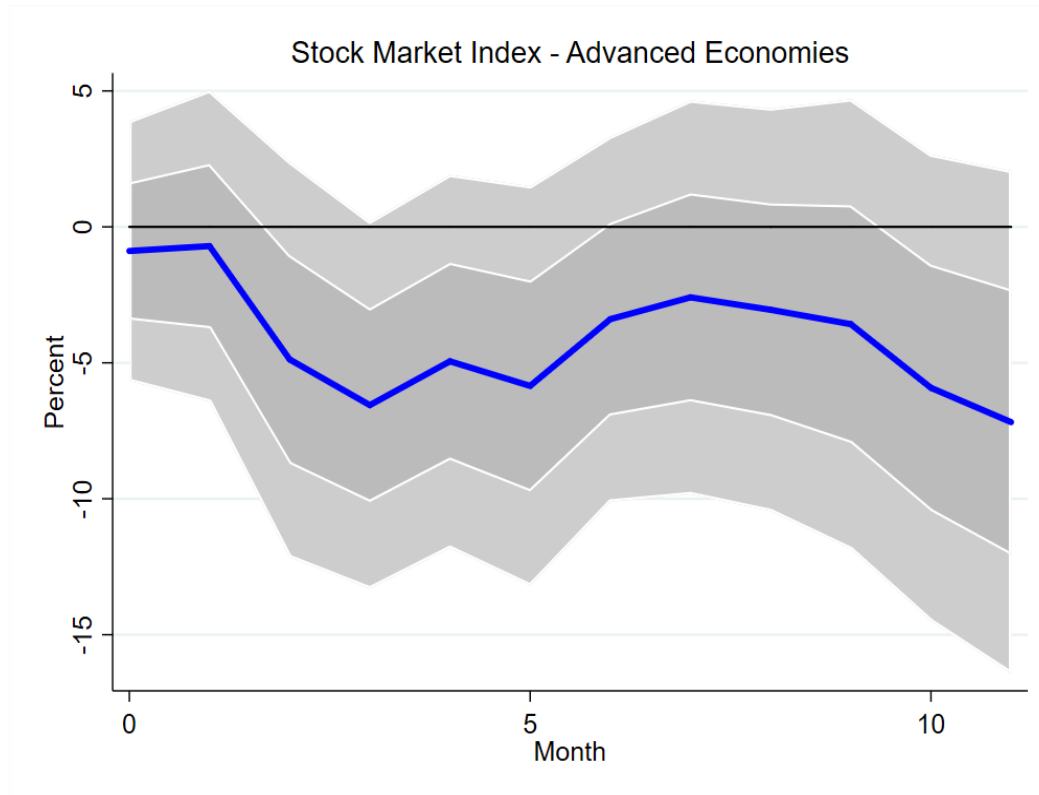
CIT rate decrease



➤ Controlling for US federal fund rate, oil prices and initial CIT statutory rate does not alter results

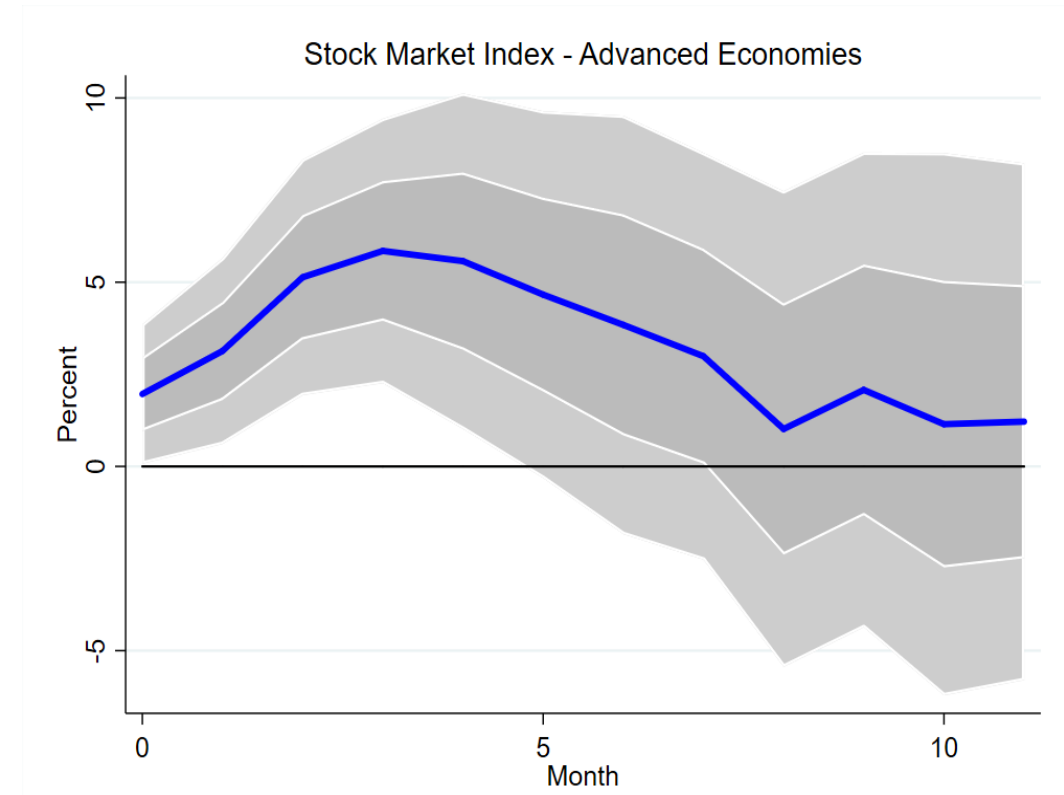
Appendix: CIT Rate Changes Using Thomson Reuters Stock Market Index

CIT rate increase



➤ Smaller magnitude, same direction

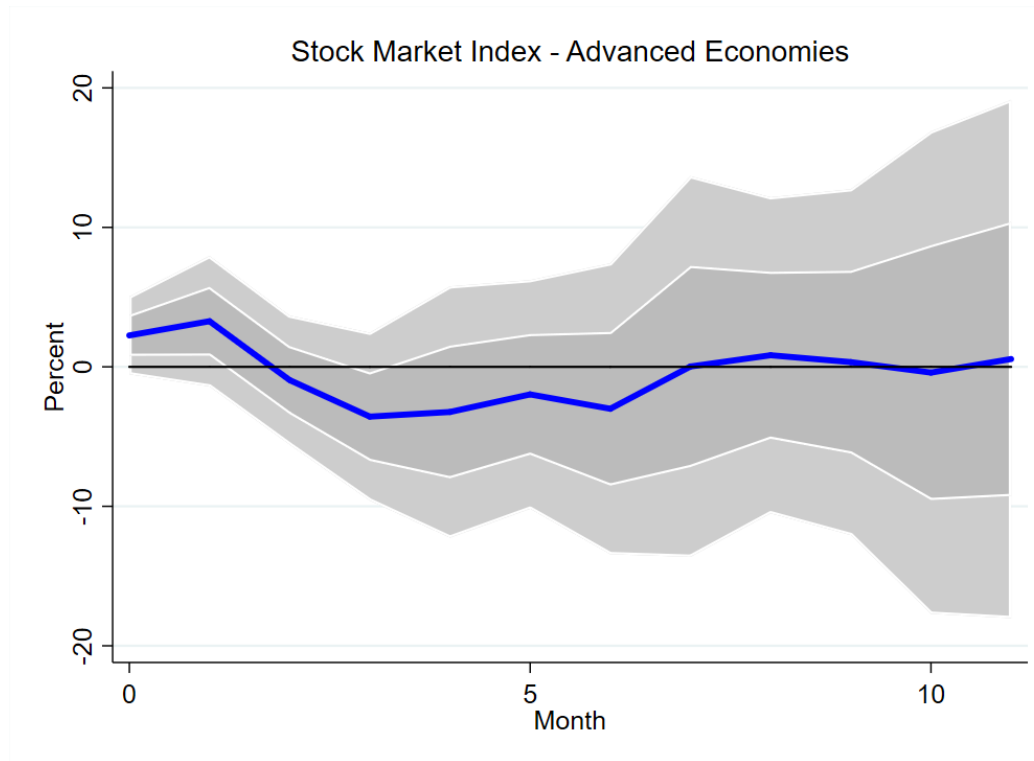
CIT rate decrease



➤ Consistently close to 5 percent peak response

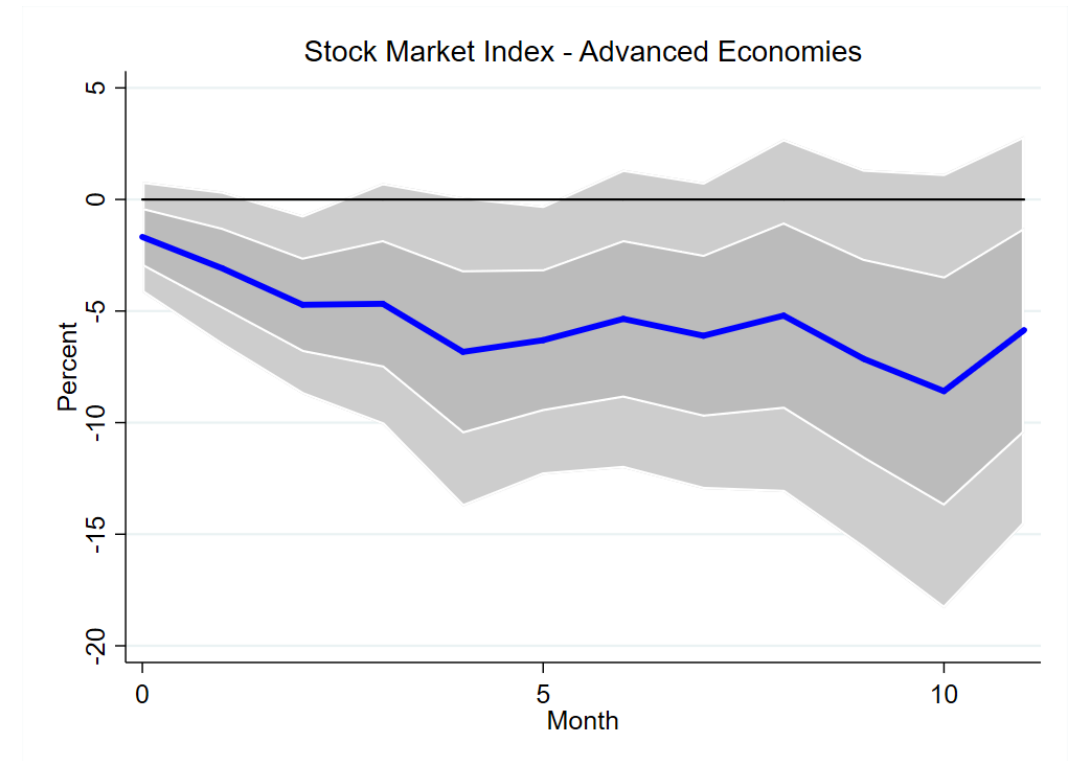
Appendix: CIT Base Changes Using Thomson Reuters Stock Market Index

CIT base expansion



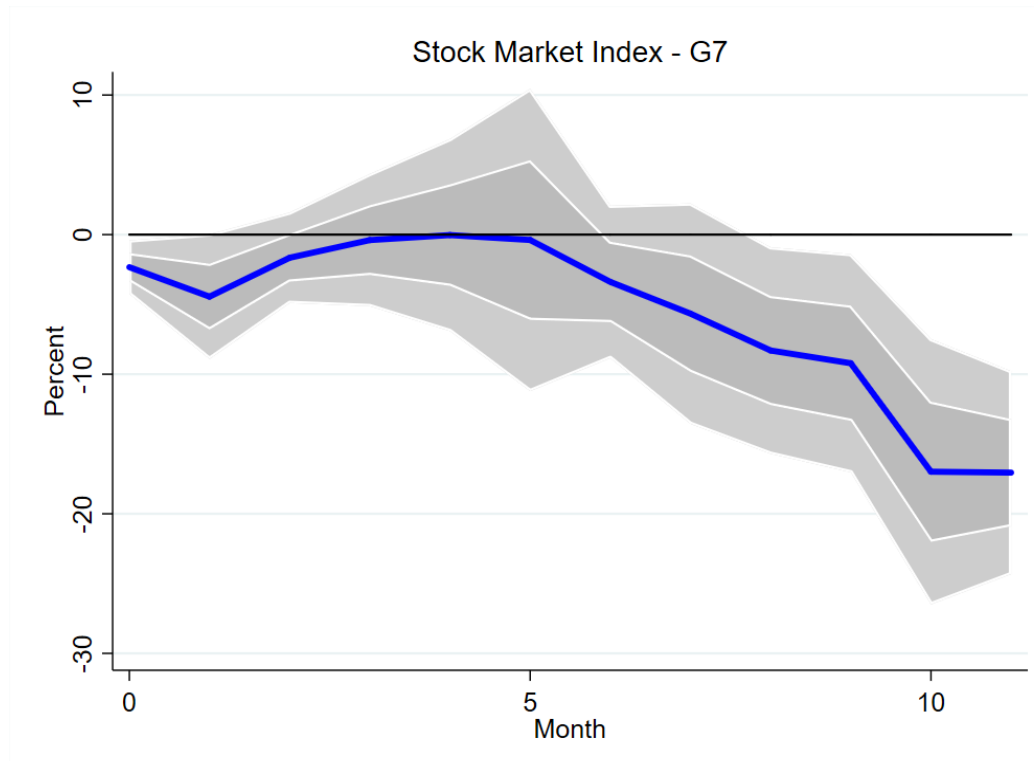
➤ No major differences are observed

CIT base reduction



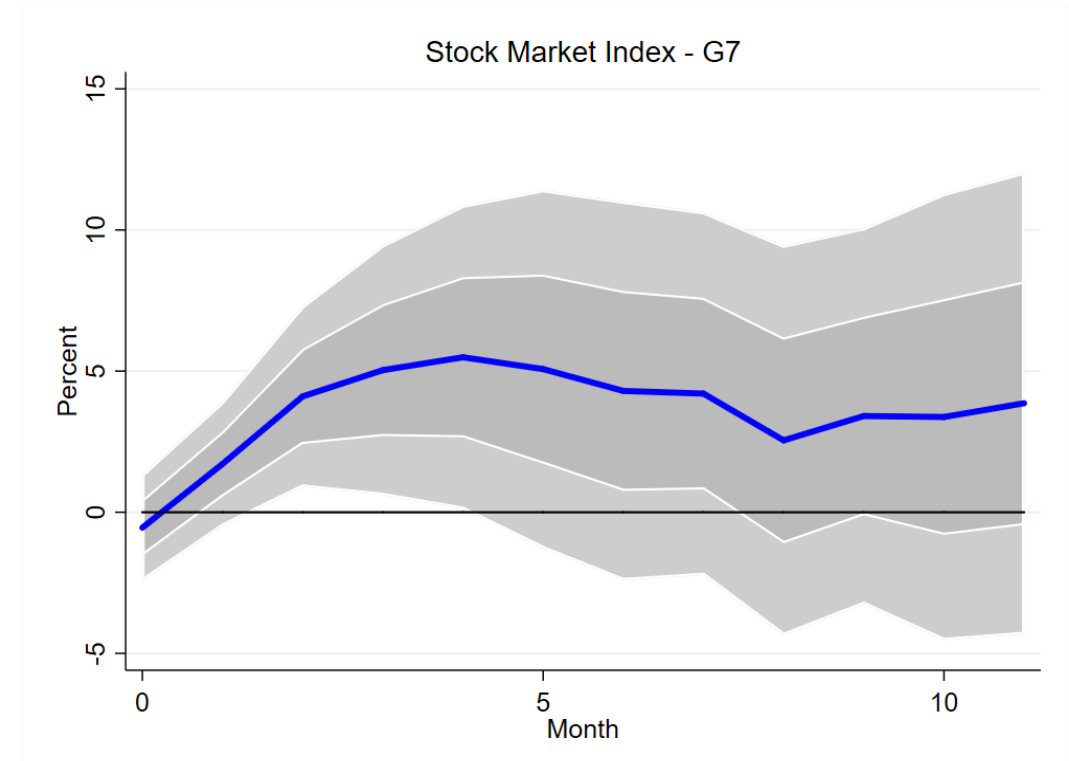
Appendix: CIT Rate Changes in G7 Countries

CIT rate increase



- Peak decline large and statistically significant after 10 months

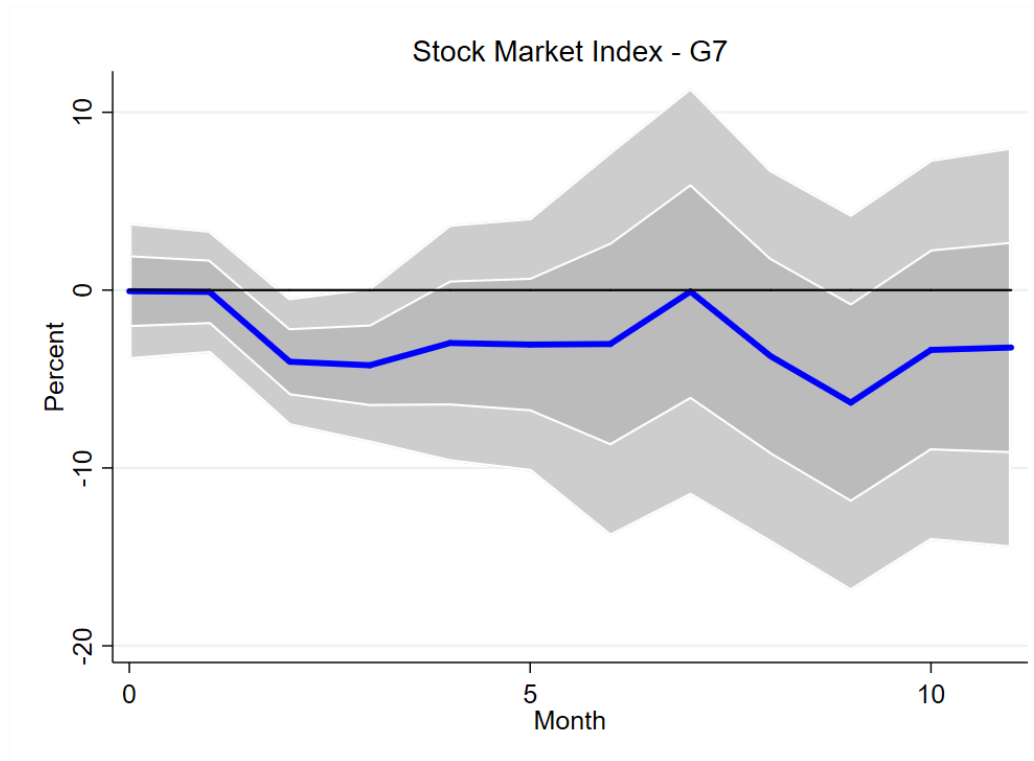
CIT rate decrease



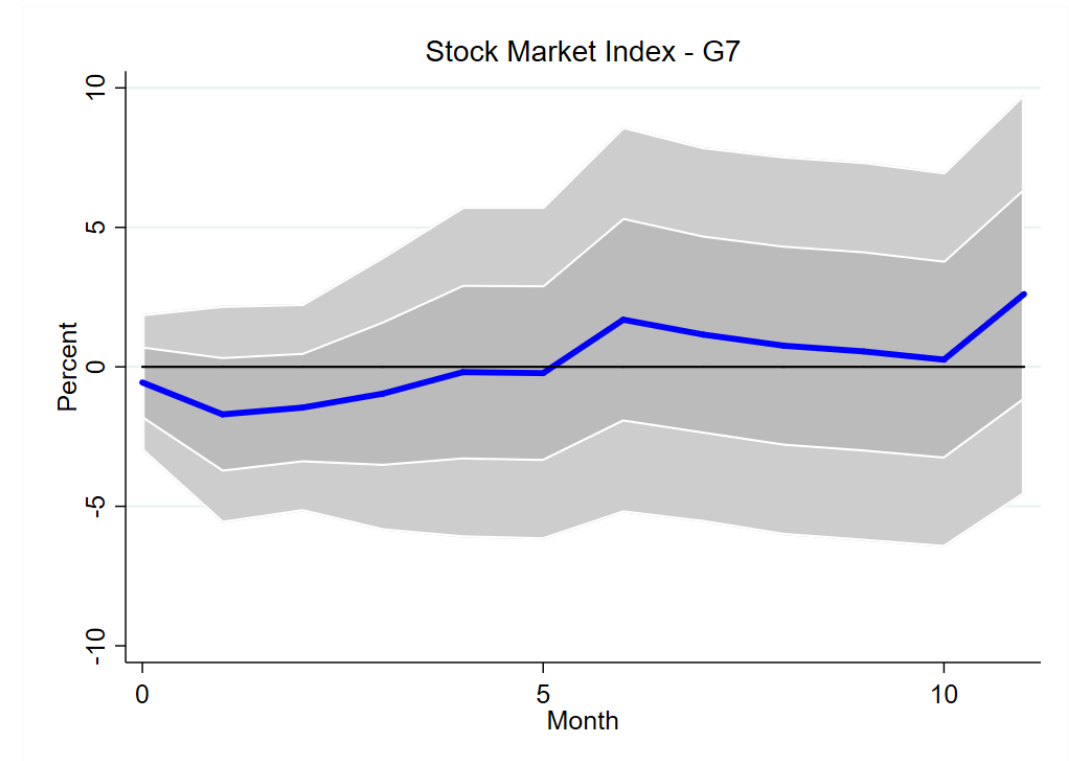
- Results for CIT rate decreases consistent across samples and choice of endogenous variable

Appendix: CIT Base Changes in G7 Countries

CIT base expansion



CIT base reduction



➤ The response becomes insignificant