

# Do Deficits Cause Inflation?

## A High Frequency Narrative Approach

NBER Impulse & Propagation Mechanisms

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Jonathon Hazell (London School of Economics, CEPR)    Stephan Hobler (London School of Economics)

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This paper: high frequency narrative approach for causal effect of deficits on inflation

- Narrative measure of shock: deficit news event [Friedman & Schwarz '67; Romer & Romer '89]
- High frequency response: inflation expectations from asset prices [Gurkaynak et al '05]

Advantage: causal effect of single episode specific shocks



# A High Frequency Narrative Approach: 2021 Georgia Senate Runoffs



# A High Frequency Narrative Approach

Narrative identification of event: 2021 Georgia Senate Election Runoffs

- November 2020: Democrats win presidency + 48 senators
  - January 5th 2021: runoff election for 2 senators from Georgia
  - If Democrats win both: majority in senate + fiscal stimulus, small difference for non-fiscal
- Democrat victory = news about deficits

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Narrative measure of shock: deficit news from Georgia

- New hand collected data: time-stamped information from 20 investment banks
  - $P(\text{Democrat victory}) \approx 50\%$ ,  $\mathbb{E}[\text{Stimulus}] = \$900 \text{ billion}$ , 70% transfers, deficit financed
- Deficit news of \$450 bn = 2.1% of GDP
- Reports: main consequence of Democrat victory was fiscal stimulus

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High frequency response: inflation expectation from intraday swap prices

- Main identification strategy: single event study around election
- Advantage: excludes lower frequency omitted variables
- Result: expected price level increase of 0.38% over 2 years [persistent effect on inflation]
- Robustness: Capitol Hill Riots

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High frequency response: inflation **expectation** from intraday swap prices

Narrative + high frequency: '21 deficits caused **intermediate share** of '21-'22 inflation ( $\approx 30\%$ )

- Assumes  $\Delta \text{inflation expectations} / \Delta \text{deficits} \approx \Delta \mathbb{E}[\text{inflation}] / \Delta \text{deficits}$

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Loose monetary policy important: short term nominal rates **unchanged** after runoff

# Standard Models and Inflation After the Runoff

*Can **standard models** match inflation dynamics around runoff?*

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Simple Heterogeneous Agent New Keynesian (HANK) model

- Calibrate to **pre 2020 data**
- **Reduced form** deficit shock → **structural shocks** to interest rates + spending + transfers
- From **narrative** + **high frequency** info



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**Bottom line:** standard model matches size + dynamics of inflation response around runoff

- Loose monetary policy important

# Data

## Intraday risk neutral inflation expectations

- 1, 2, 5 and 10 year inflation expectations from swaps (= contract on future inflation)
- Inflation risk premium is stable over this period [Cieslak & Pflueger '23, Cleveland Fed]

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## New hand collected narrative data from investment banks

- Source: investment banks + similar, 20 sources [e.g. Goldman Sachs, Bloomberg, Moody's]
  - Reports around events, distributed to market participants, time stamped, narrative detail
- Proxy for markets' beliefs

# Reports as a Proxy for Market Beliefs

The diagram illustrates an email report from Goldman Sachs. It features three orange arrows pointing to specific parts of the email: 'Email distribution' points to the header information, 'Time stamp' points to the date and time, and 'Narrative information' points to the main body text.

**Email distribution**

**Time stamp**

**Narrative information**

**GS Rates Research**  
Global Rates Trader: Softer data drive yields lower  
To: jhazell@mit.edu,  
Reply-To: gs-portal-emails@gs.com

**Goldman Sachs | Economics Research**

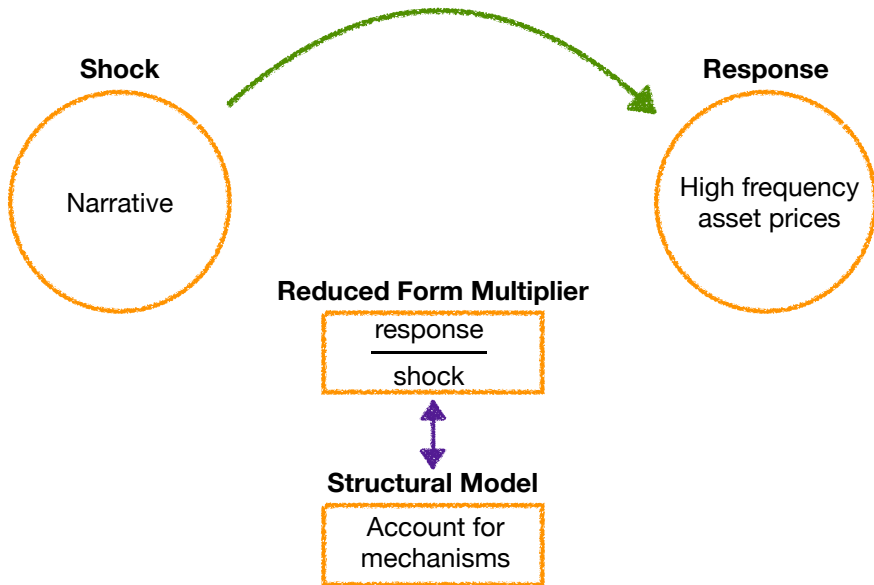
[Print](#) | [Read](#)

**Global Rates Trader: Softer data drive yields lower**

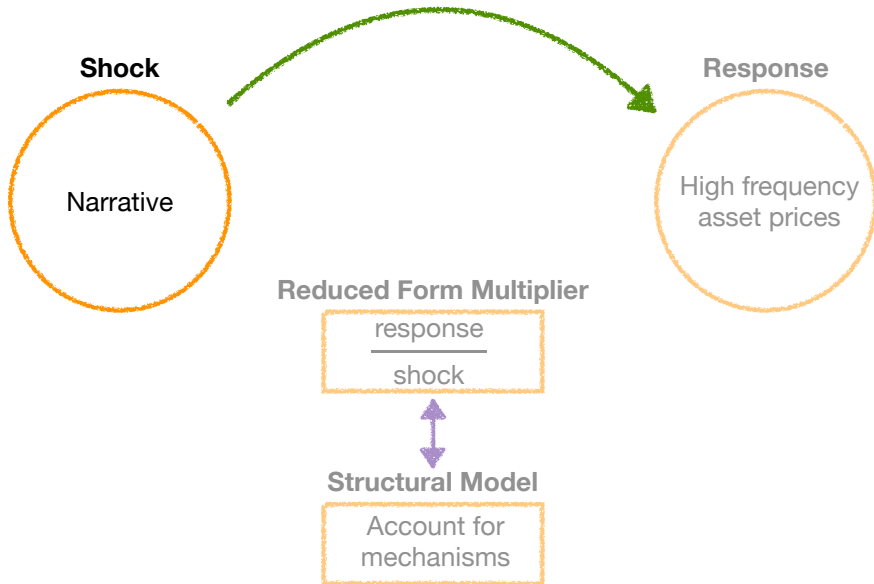
17 November 2023 | 3:58PM EST

In this week's *Trader*, we discuss recent behavior of US yields and the outlook for the rate volatility. A stretch of

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Mar '20: CARES Act \$2.2 trillion  $\approx$  10.3% of GDP

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Nov '20 Election

Jan 5 '21 Georgia Runoff



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Democrat legislation:

- Mar '21: American Rescue Plan, \$1.8 trillion,  $\approx 8.4\%$  of GDP
- Aug '22: approx. deficit-neutral Inflation Reduction Act

Nov '20 Election

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Jan 5 '21 Georgia Runoff

Jan 6 '21 Capitol Hill Riots

Jan 7 '21 Democrats Declared Victors

March '21 American Rescue Plan

Aug '22 Inflation Reduction Act

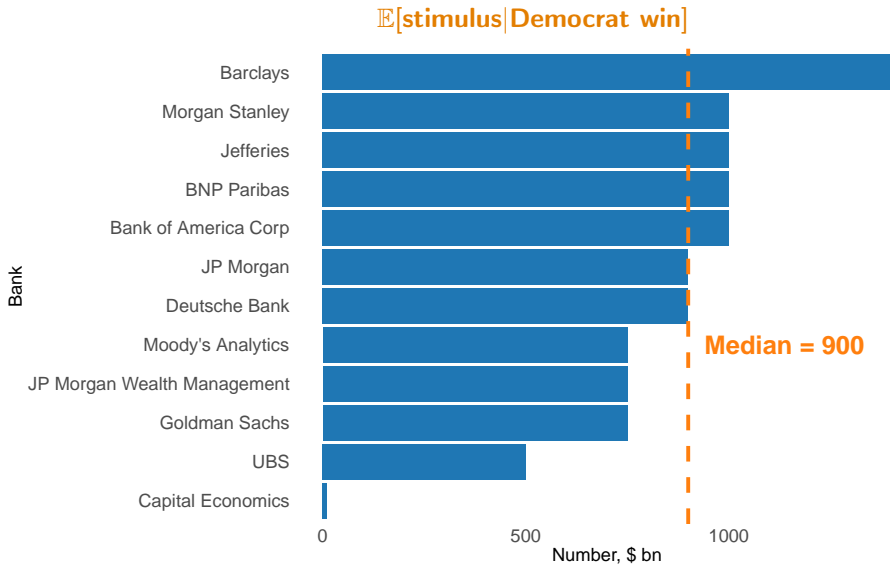
# Narrative Measure of Shock to News About Deficits

*What was the shock to expected fiscal deficits due to Georgia runoff?*

- **Challenge:** need **counterfactual** beliefs if **either** Democrats or Republicans were to win
- Search hand collected data from 20 investment banks, one week window around election

Needed:  $\mathbb{E}[\text{stimulus} | \text{Democrat win}]$ ,  $P(\text{Democrat win})$ ,  $\mathbb{E}[\text{stimulus} | \text{Divided govt.}]$

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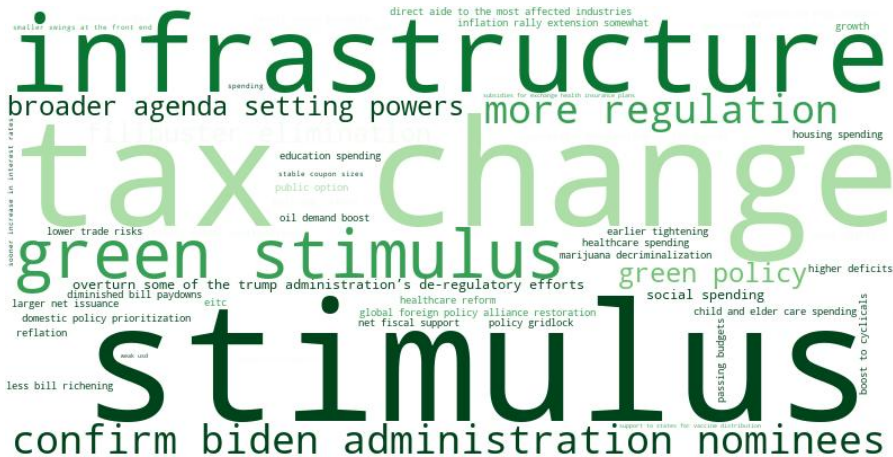
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Additional policy: delayed + tax financed infrastructure [quantitatively unimportant cf. Ramey '21]

# Main Outcome of Democrat Victory is Stimulus

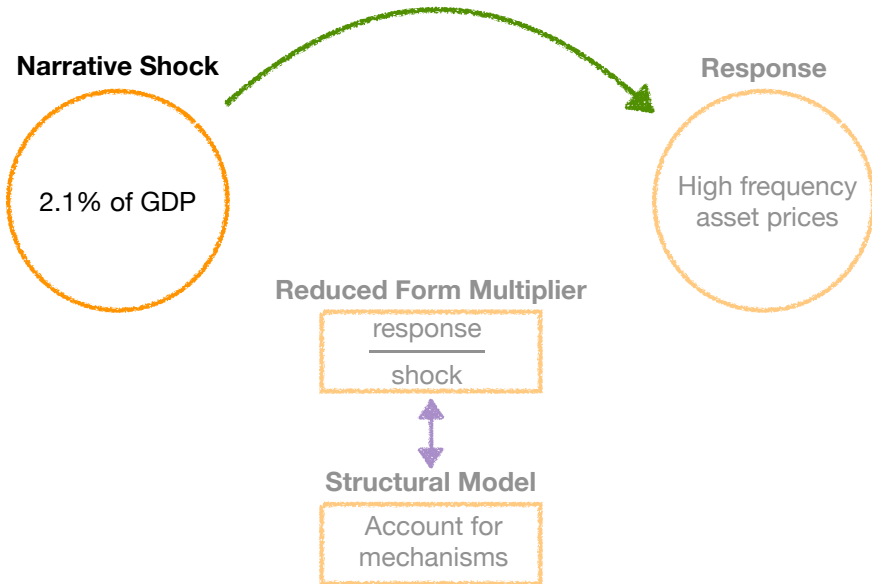
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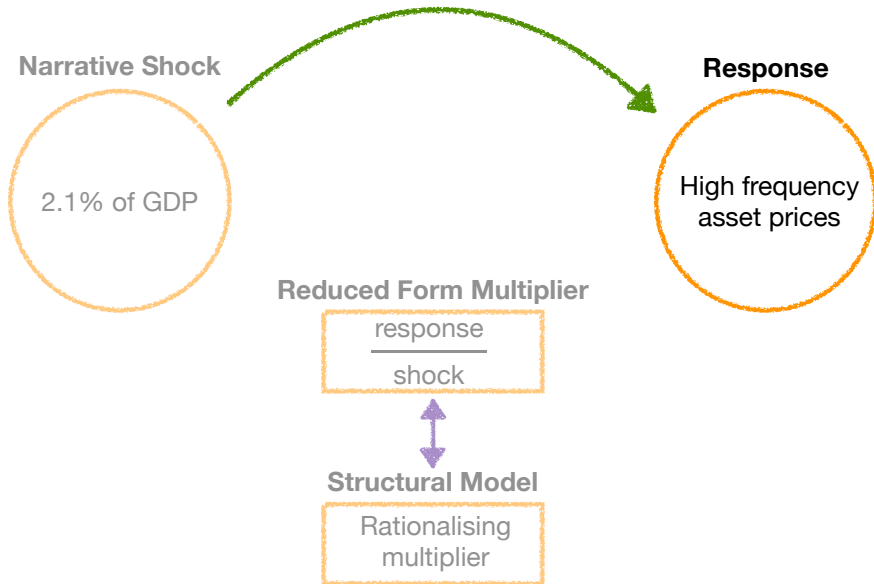
Darker = more likely, Larger = mentioned by more investment banks

ChatGPT + Human—read reports, summarize outcomes of Democrat victory [▶ ChatGPT Version](#)

# High Frequency Narrative Approach



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- Single event study: around Georgia shock, asset price  $y_t$  follows process [MacKinlay '97]

$$y_t = \begin{cases} \varepsilon_t & \text{if } t < T \\ \varepsilon_t + \alpha_t & \text{if } t > T \end{cases}$$

$\alpha_t$  is causal effect of election,  $\varepsilon_t$  is "typical" movement [e.g. liquidity shock]



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- **Identification assumption**: distribution of  $\varepsilon_t$  did not change just before vs. just after  $T$   
→ No other "atypical" shocks just after Senate election  
... But typical shocks "allowed"

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Capturing full effect: window from beginning of January 5th to end of January 7th

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  - Goldman Sachs: “*democratic senate control looks likely*” — January 6th, 2:01 AM [▶ Details](#)
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**Potential confounding event:** January 6th Capitol Hill Riots

- Robustness: end event window at 2PM on January 6th + other robustness to come
- Bloomberg daily “round up”: **no other significant events** [▶ Details](#)

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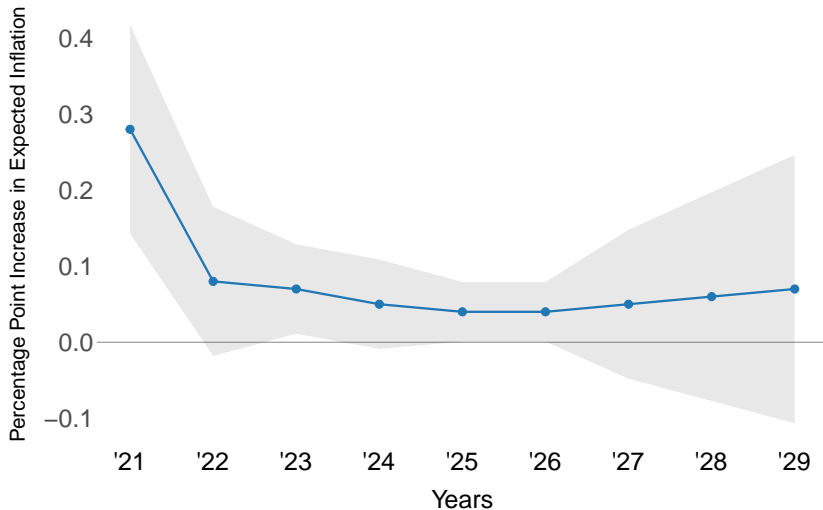


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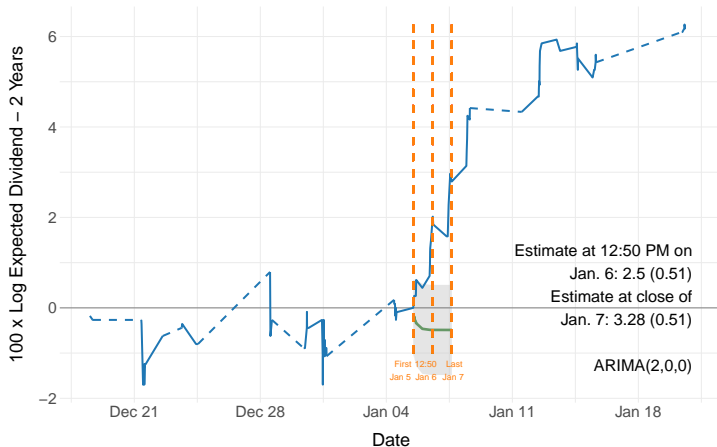


NB: effect of election on inflation relative to counterfactual of no news

## Dynamics: Causal Effect of Georgia Shock on Inflation Expectations



# Dividend Futures + Investment Banks: Positive Growth (“Demand Shock”)

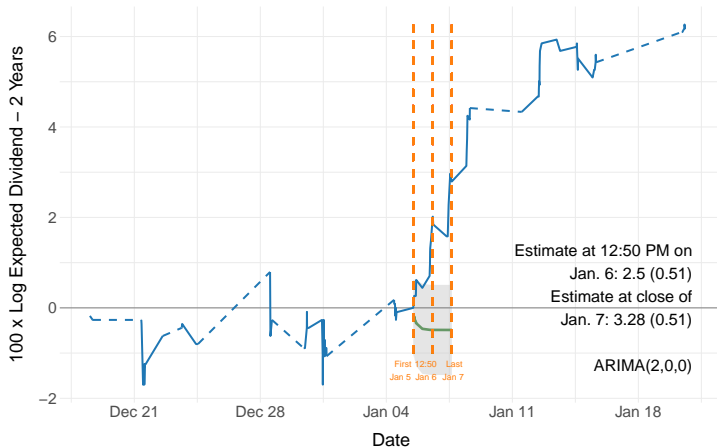


2 year nominal dividend future  $\approx$  forecast of 2 year nominal dividends

[Details](#)

[Additional Results](#)

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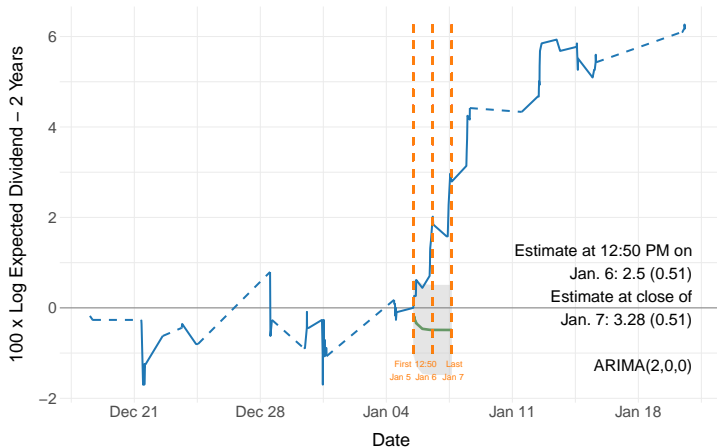
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→ Increase in '22 real GDP of  $\approx$  1.9% [Gormsen & Koijen '20]

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After runoff: median investment bank raises '22 output forecast by 1.8%

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4. Narrative evidence from news: Capitol Hill Riots not important for asset prices [▸ Details](#)
5. Credit default swaps did not respond [▸ Details](#)



# Causal Effect of Georgia Shock: Identification Strategies

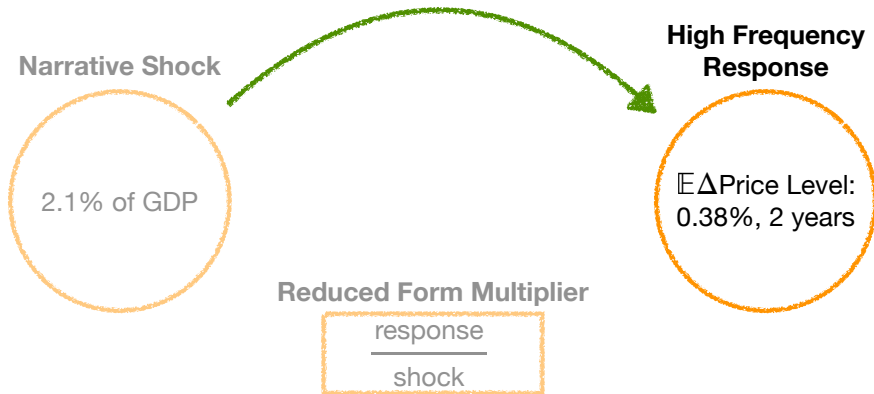
## 1. Single event study

- Drawback: relies on a single, high-powered observation

## 2. In paper:

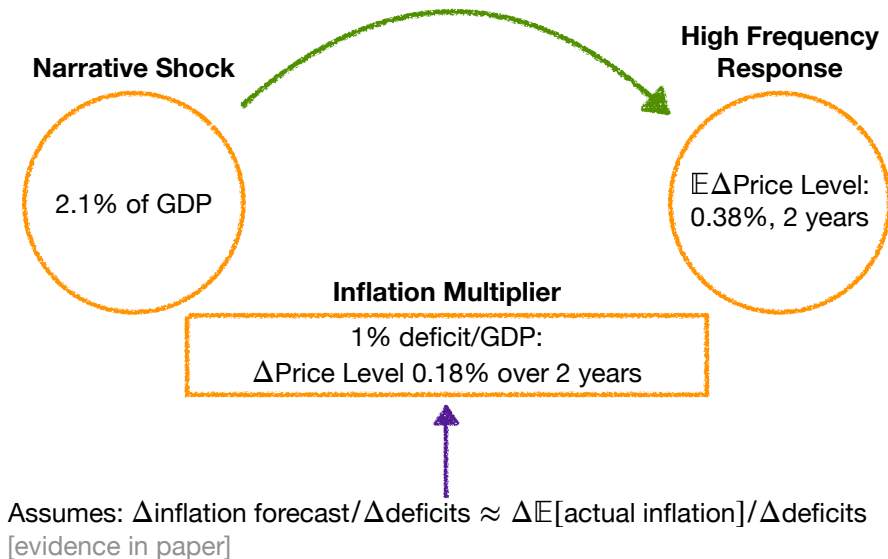
- Daily regression specification using beliefs about Democrat victory from betting markets
- Quantitatively similar estimates

# High Frequency Narrative Approach



# Narrative + High Frequency: Effect of '21 Deficits on Inflation

## Back of the Envelope: Combining Narrative + High Frequency



### **Inflation Multiplier**

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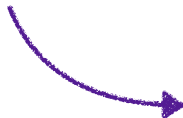
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# Back of the Envelope: Combining Narrative + High Frequency

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'21 Deficits + '20 CARES Act  
explains 50% of '21-22 inflation

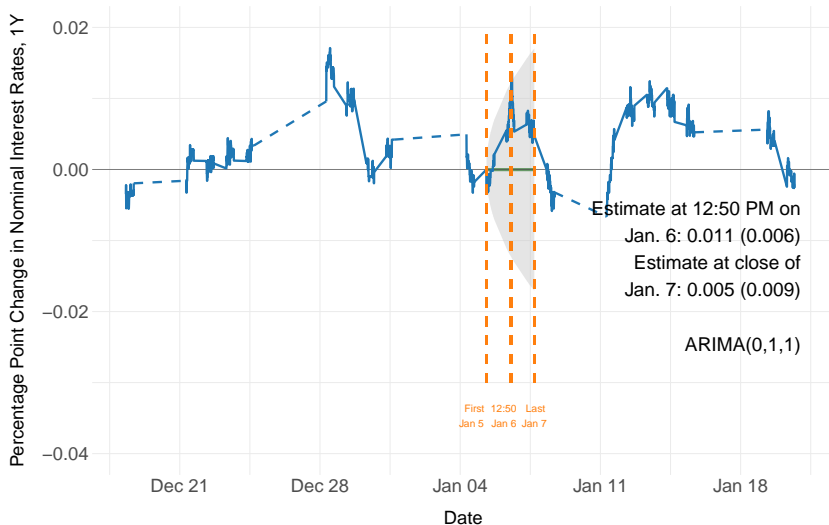
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# Loose Monetary Policy Important: Short Term Rates Unchanged



But long term rates rise [cf. Mian, Straub & Sufi 2024]

► Long Term Rates + Robustness

► Fed Funds

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**Simple + standard** Heterogeneous Agent New Keynesian (HANK) model:

- New Keynesian Phillips Curve
- Fraction  $\mu$  of **hand to mouth** households
- Fraction  $1 - \mu$  of **overlapping generation** households with mortality risk [Blanchard '85]

→ Departure from **Ricardian equivalence** + approximates HANK [one asset HANK in paper]

# Can Standard Models Match Inflation Dynamics Around Runoff?

Post-Pandemic inflation + '21 deficits = **powerful test** of standard model

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In model: evaluate **inflation response** after “**deficit shock**” from runoff

- **In paper:** similar exercise for Fiscal Theory of the Price Level model

# A Simple Heterogeneous Agent Model

## Environment:

- Fraction  $\mu$  **hand to mouth**: consume after tax income  $C_{H,t} = W_t N_{H,t} - T_{H,t}$
- Fraction  $1 - \mu$  of OLG households with survival probability  $\phi$

$$\max_{\{C_i, A_i\}} \mathbb{E}_t \sum_{j=0}^{+\infty} (\beta\phi)^j \left[ \frac{C_{i,t+j}^{1-\frac{1}{\sigma}} - 1}{1 - \frac{1}{\sigma}} - \frac{N_{i,t+j}^{1+\frac{1}{\phi}}}{1 + \frac{1}{\phi}} \right] \quad \text{s.t.} \quad C_{i,t} + A_{i,t} = \frac{1}{\phi} \frac{1 + i_{t-1}}{\Pi_t} A_{i,t-1} + W_t N_{i,t} - T_{i,t} + Z_{i,t}$$

- Market clearing:  $Y_t = C_t + G_t$
- Sticky wages Phillips Curve:  $\pi_t = \kappa \left( y_t - \frac{\varphi}{\varphi + \sigma} \frac{C_{SS}}{Y_{SS}} g_t \right) + \beta \mathbb{E}_t \pi_{t+1}$

**Policy:** government sets  $\{i_t, T_t, T_t^H, G_t\}_{t=0}^{\infty}$  s.t. budget constraint

# Calibration and Modelling '21 Deficit Shock

Standard calibration to pre 2020 data: [► Calibration Details](#)

- Calibrate consumption block to target intertemporal MPC [Fagereng et al '21; Auclert et al '23]
- Flat but positively sloped Phillips Curve [Hazell et al '22]

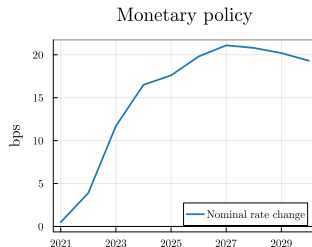
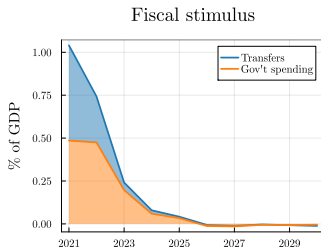
Main exercise: evaluating inflation response implied by model to “deficit bundle” from Georgia

Measuring policy variables  $\{i_t, T_t, T_t^H, G_t\}_{t=0}^{\infty}$  around Georgia runoff

- Deficit size + composition (i.e. G vs. T) from narrative reports
- Timing of spending from realized American Rescue Plan
- Debt repayment from long term interest rates + Congressional Budget Office debt forecast
- Nominal interest rate response around runoff

Assume economy in steady state after 10 years

# Model Quantitatively Matches Size + Persistence of Inflation Response



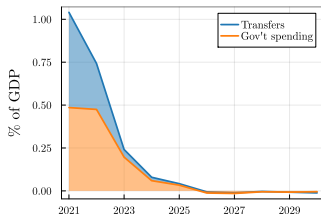
Shock to transfers + spending around runoff

Response of interest rates around runoff  
→ Endogenous monetary response to fiscal

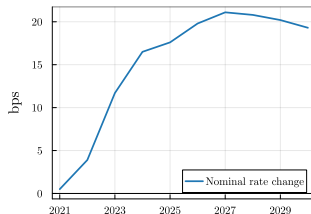


# Model Quantitatively Matches Size + Persistence of Inflation Response

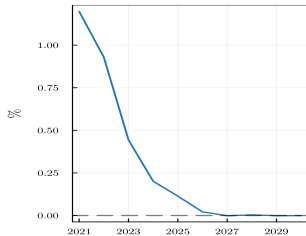
Fiscal stimulus



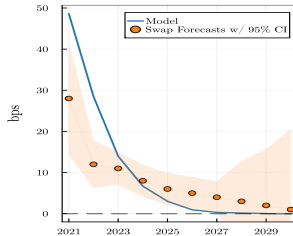
Monetary policy



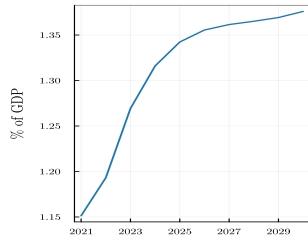
Output



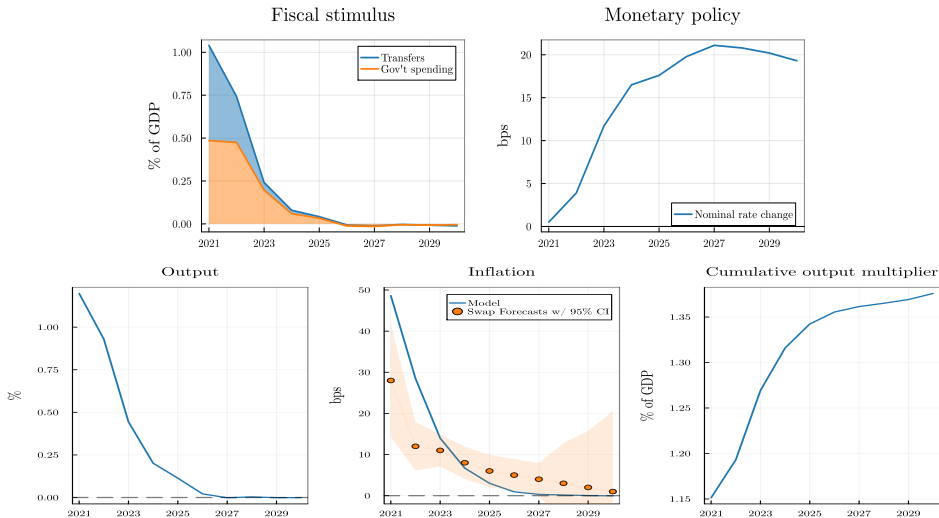
Inflation



Cumulative output multiplier



# Model Quantitatively Matches Size + Persistence of Inflation Response



**In paper:** key mechanism for inflation response is loose monetary policy

# Conclusion

# Conclusion

This paper: **high frequency narrative approach** for causal effect of deficits on inflation

- **Narrative measure of shock**: deficit news from key event
- **High frequency response**: inflation expectations from asset prices

Bottom line:

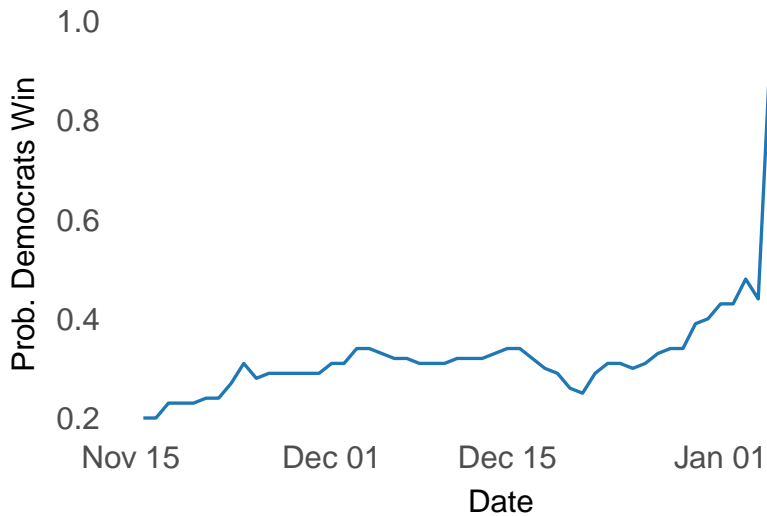
- Dec '20 + Mar '21 stimulus explains **intermediate share** of '21-'22 inflation

→ Deficits **important** for inflation **but not only cause**

**High frequency narrative approach** estimates causal effect of **single episode specific** shocks

- In principle applicable to other influential episodes

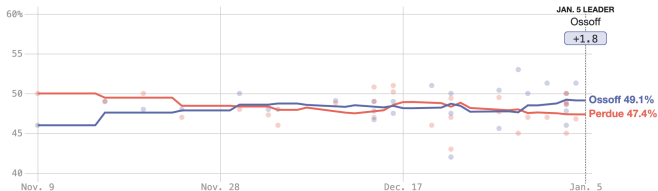
# Appendix



# Polling Data

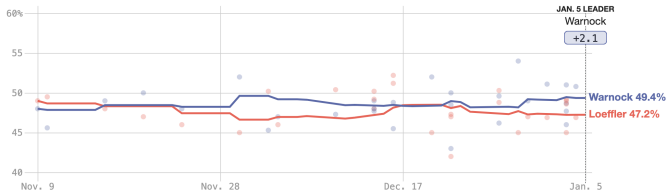
## Georgia's regular Senate election

Republican Sen. David Perdue is running for reelection against Democrat Jon Ossoff in a regularly scheduled election.

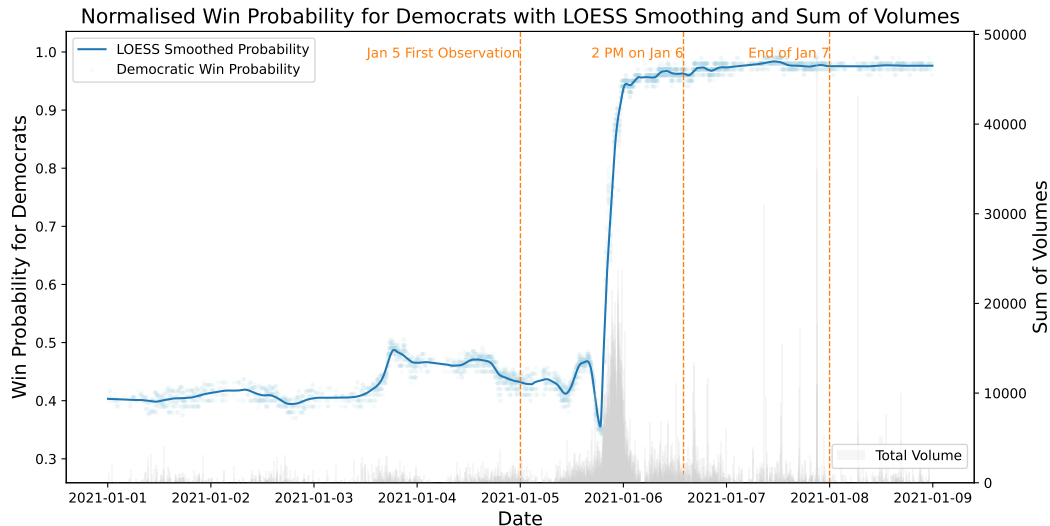


## Georgia's special Senate election

Republican Sen. Kelly Loeffler faces Democrat Raphael Warnock in a special election. Loeffler was appointed to fill former Sen. Johnny Isakson's seat after he resigned.

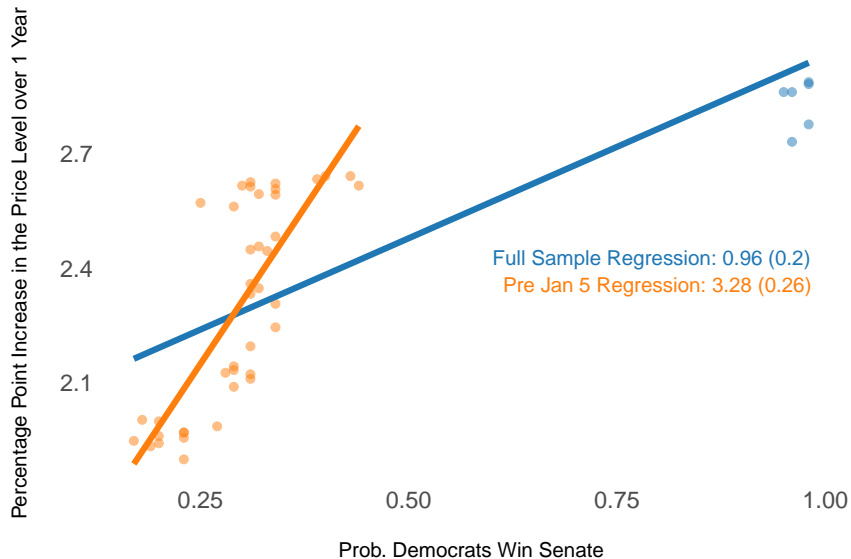


# High Frequency Betting Data [Return](#)

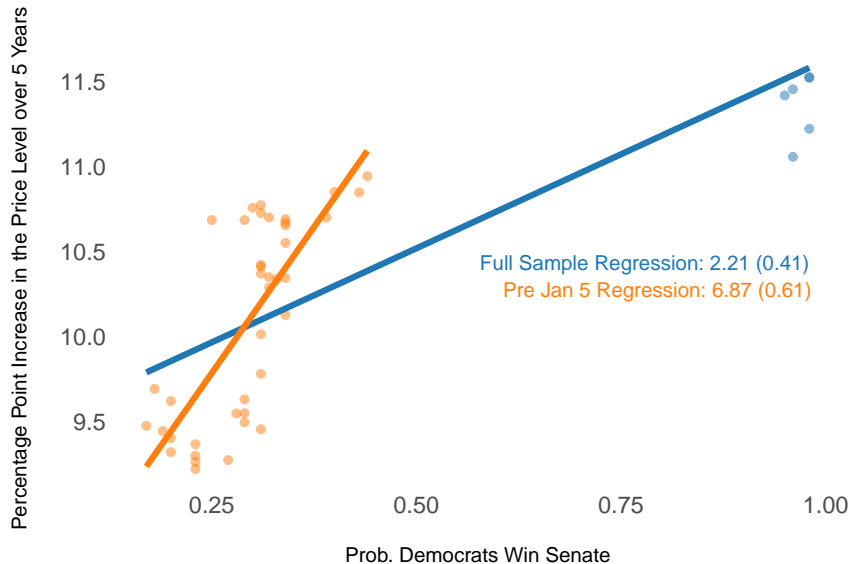




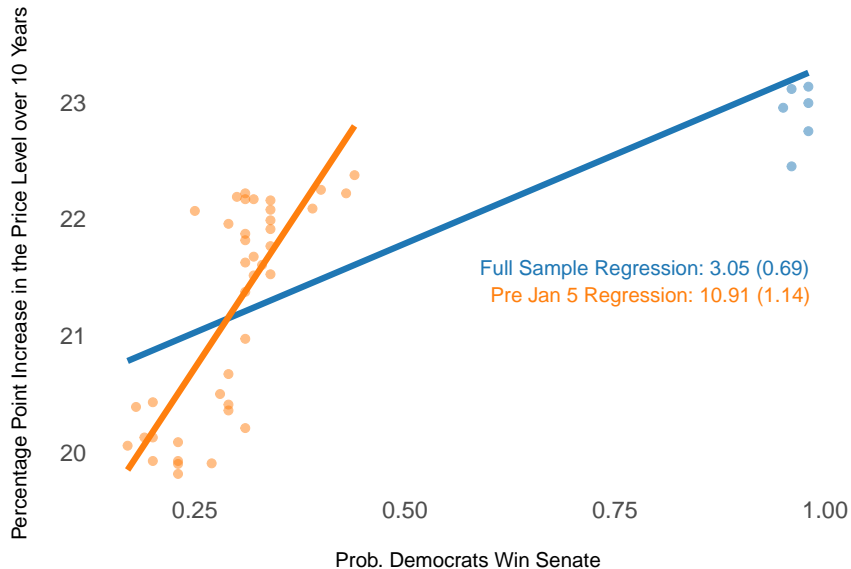
## Swaps IV - 1 Year



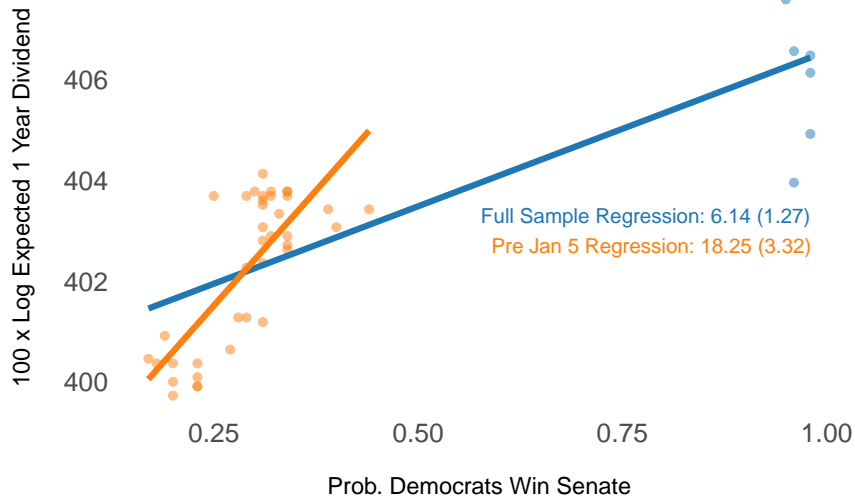
## Swaps IV - 5 Years



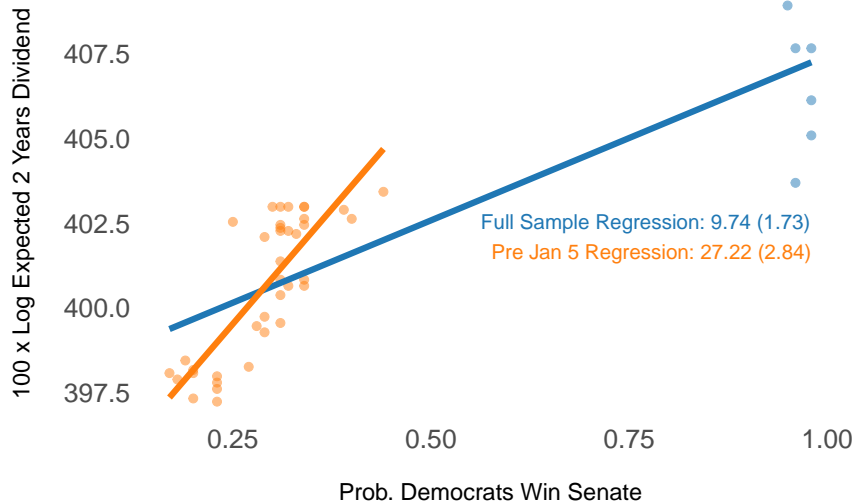
## Swaps IV - 10 Years



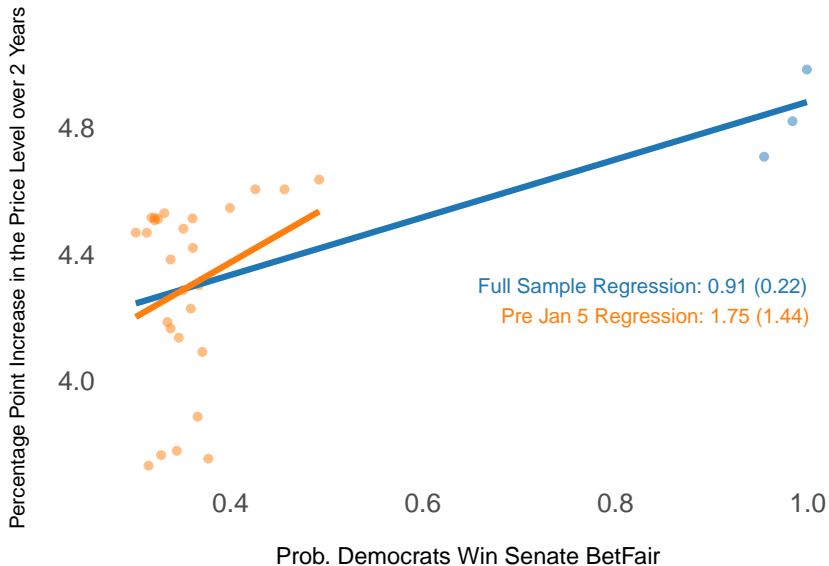
## Dividends IV - 1 Year



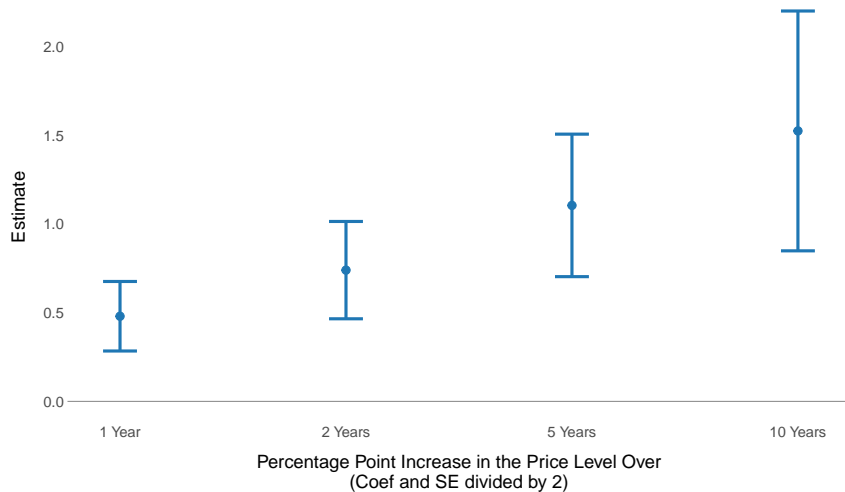
## Dividends IV - 2 Years



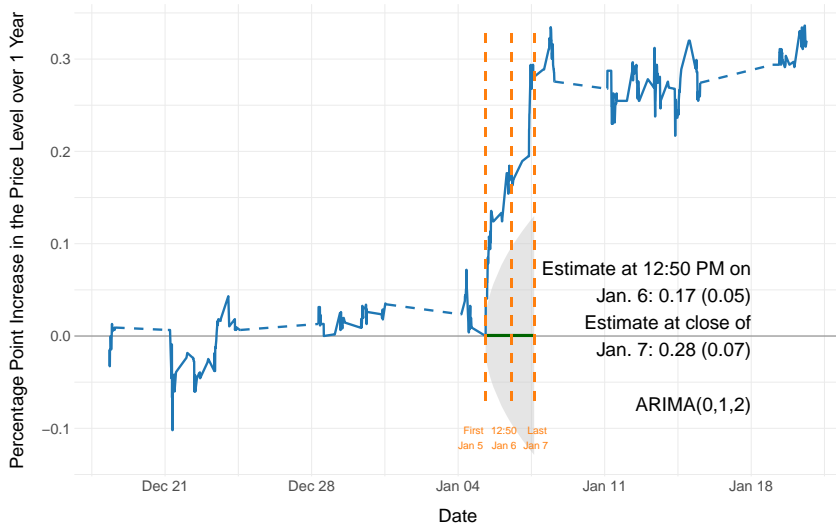
## Betfair Regular IV - 2 Years



# Coefplot IV Full Model Swaps

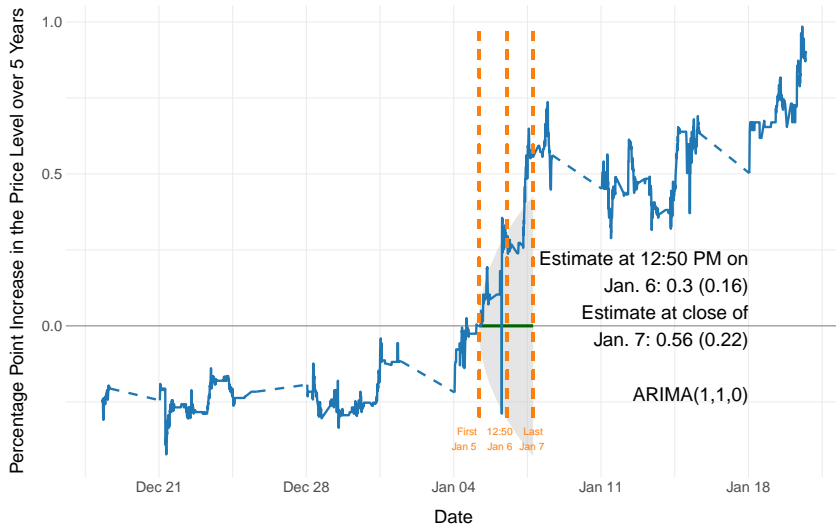


# Swaps Single Event Study - 1 year

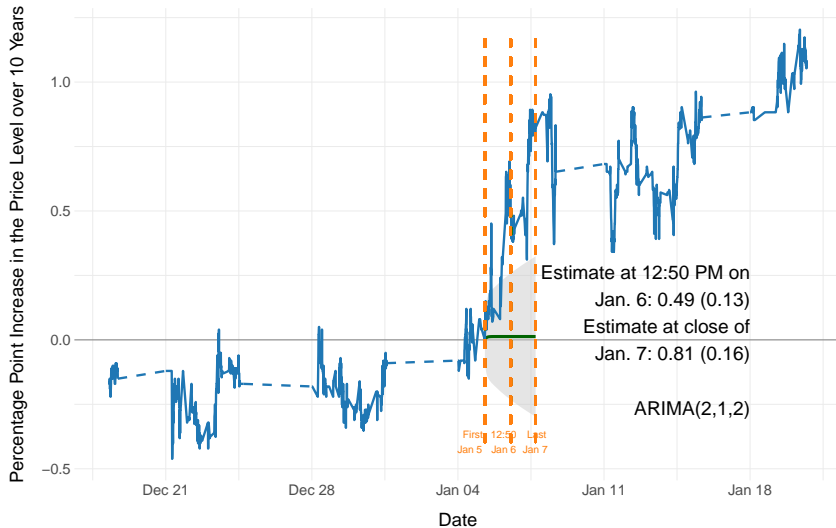




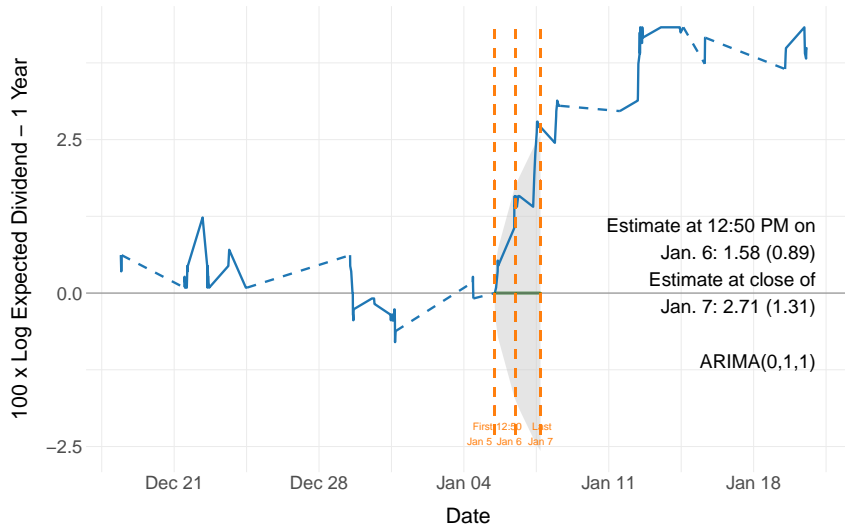
# Swaps Single Event Study - 5 Years



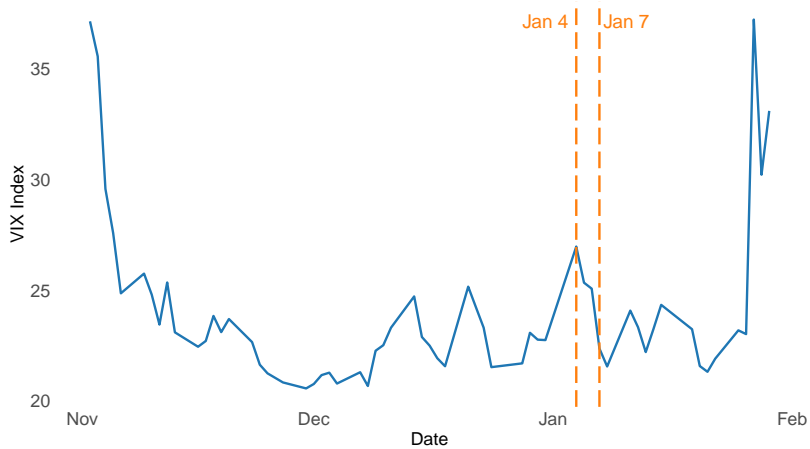
# Swaps Single Event Study - 10 Years



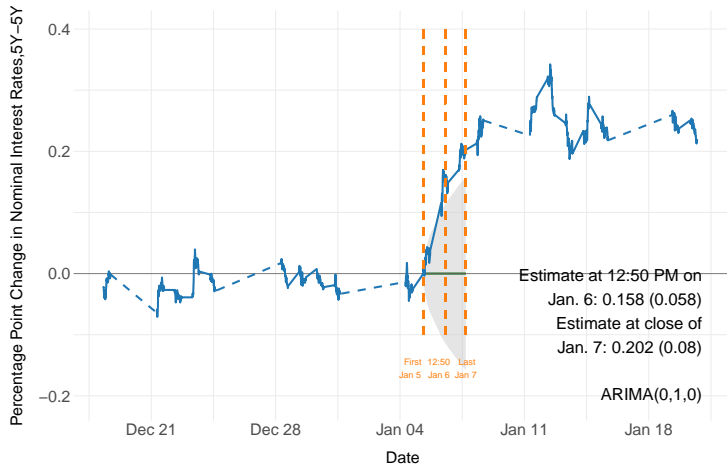
# Dividends Single Event Study - 1 Year

[Return](#)

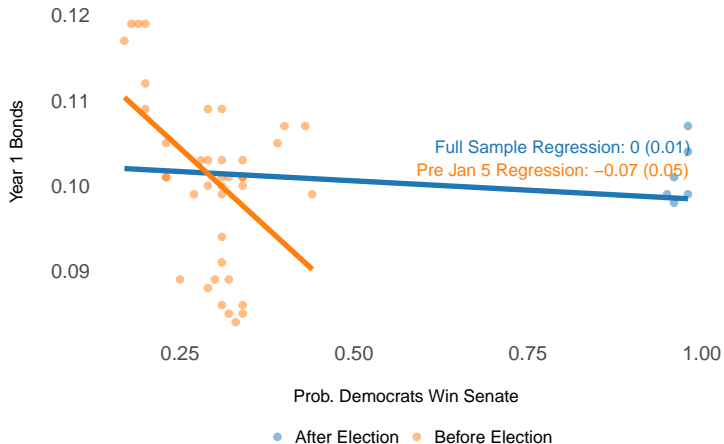
# VIX daily

[Return](#)

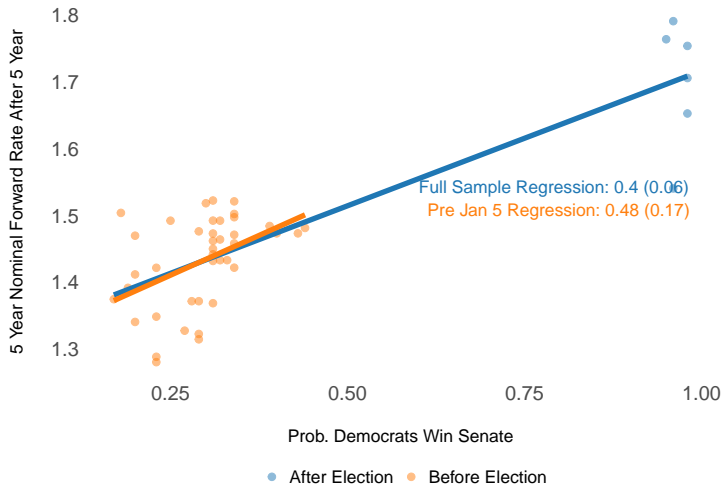
# Long Term Interest Rates Event Study

[Return](#)

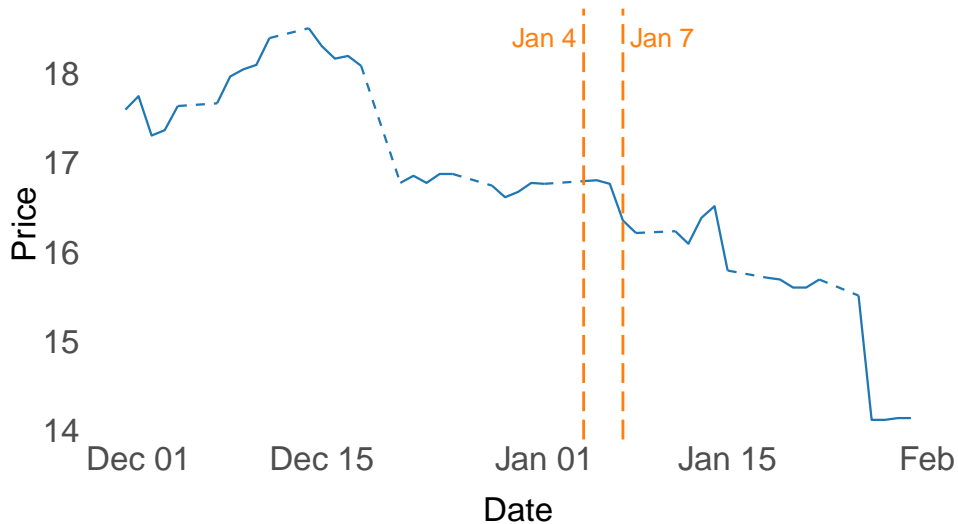
# Regression: Causal Effect of Georgia Shock on Short Term Rates



# Regression: Causal Effect of Georgia Shock on Long Term Rates



# Credit Default Swaps

[Return](#)



Figures/Main Figures Bigger Fonts/Surprise\_Hourly.pdf

# Event Study: Percentage point increase in the price level from inflation swaps

[► Return](#)

*Panel A: Percentage point increase over 1 year*

	Jan 7, non Stationary	Jan 6, non Stationary	Difference	Jan 7, Stationary	Drop missing
	(1)	(2)	(3)	(4)	(5)
Jump in Expectations	0.28 (0.07)	0.18 (0.05)	0.28 (0.03)	0.28 (0.03)	0.28 (0.12)
Observations	231	231	231	232	231

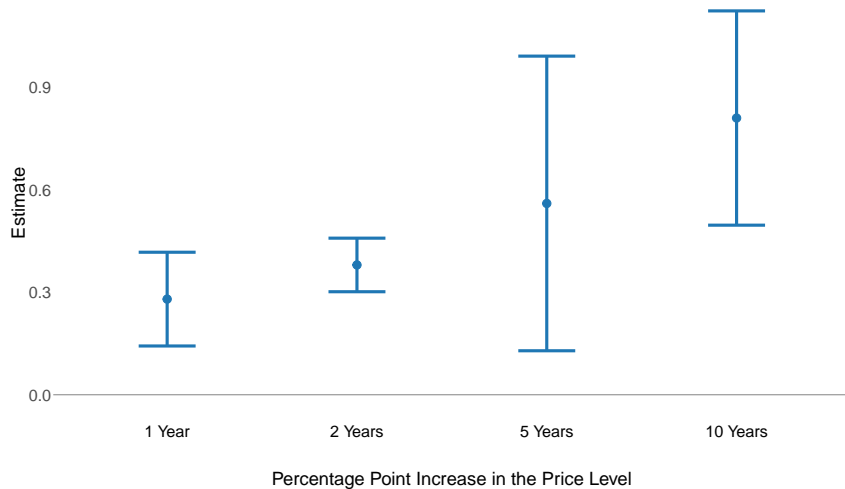
*Panel B: Percentage point increase over 2 year*

Jump in Expectations	0.38 (0.05)	0.18 (0.04)	0.37 (0.04)	0.45 (0.05)	0.38 (0.09)
Observations	659	659	659	660	659

# Event Study: Percentage point increase in the price level from inflation swaps

<i>Panel C: Percentage point increase over 5 year</i>					
Jump in Expectations	0.58 (0.22)	0.29 (0.16)	0.58 (0.08)	0.76 (0.08)	0.58 (0.23)
Observations	1048	1048	1048	1049	1048
<i>Panel D: Percentage point increase over 10 year</i>					
Jump in Expectations	0.77 (0.18)	0.44 (0.14)	0.74 (0.12)	0.99 (0.11)	0.75 (0.49)
Observations	647	647	647	648	647

# Event Study: Causal Effect of Georgia Shock on Price Level



# Regression: Causal Effect of Democrat Victory on Swaps

<i>Overall Outcome: Percentage point increase in the price level from inflation swaps</i>				
<i>Panel A: Percentage point increase in the price level over 1 year</i>				
	Full Sample	Before Jan 5	Outliers Dropped	Diff
	(1)	(2)	(3)	(4)
Democrats Win Probability	0.87 (0.09)	3.42 (0.40)	0.95 (0.14)	0.08 (0.04)
Observations	40	35	35	38
<i>Panel B: Percentage point increase in the price level over 2 years</i>				
Democrats Win Probability	1.39 (0.14)	5.40 (0.59)	1.50 (0.22)	0.23 (0.07)
Observations	41	36	36	40

# Regression: Causal Effect of Democrat Victory on Swaps

*Panel C: Percentage point increase in the price level over 5 years*

Democrats Win Probability	2.12 (0.22)	8.24 (0.91)	2.33 (0.33)	0.33 (0.10)
Observations	41	36	36	40

*Panel D: Percentage point increase in the price level over 10 years*

Democrats Win Probability	2.84 (0.34)	12.30 (1.60)	3.16 (0.51)	0.64 (0.19)
Observations	41	36	36	40

# Event Study: Nominal Interest Rates

Panel A: Percentage point increase over 1 year					
	Jan 7, non Stationary	Jan 6, non Stationary	Difference	Jan 7, Stationary	Drop missing
	(1)	(2)	(3)	(4)	(5)
Jump in Interest Rate	0.005 (0.009)	0.014 (0.006)	0.0047 (0.0051)	0.005 (0.005)	0.005 (0.015)
Observations	570	570	570	571	570
Panel B: Percentage point increase over 5 years, after 5 years					
Jump in Interest Rate	0.202 (0.08)	0.161 (0.059)	0.2024 (0.0213)	0.202 (0.025)	0.202 (0.106)
Observations	570	570	570	571	570

# Event Study: Dividends

*Overall Outcome: Increase in  $100 \times \text{Log}(\text{Expected S\&P 500 dividends})$*

<i>Panel A: 2021 dividends</i>					
	Jan 7, non Stationary	Jan 6, non Stationary	Difference	Jan 7, Stationary	Drop missing
	(1)	(2)	(3)	(4)	(5)
Jump in Expectations	2.74 (1.63)	1.09 (1.27)	2.79 (0.31)	2.79 (0.54)	2.89 (1.55)
Observations	77	77	77	78	77
<i>Panel B: 2022 dividends</i>					
Jump in Expectations	3.32 (0.51)	1.23 (0.51)	2.88 (0.52)	3.32 (0.51)	3.49 (0.51)
Observations	76	76	75	76	76



## IV Controls

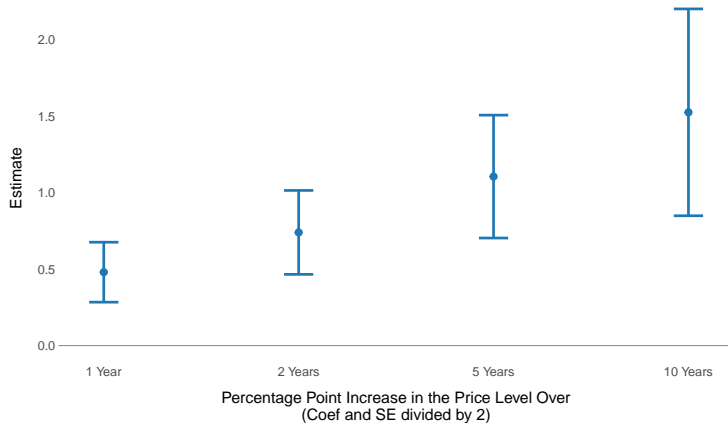
[▶ Return](#)

Controls	1 Year	2 Years	5 Years	10 Years
1. No Control	3.93 (0.70)	5.78 (1.17)	10.31 (1.81)	16.41 (3.12)
Observations	29	30	30	30
2. 10-year Bonds	2.12 (0.84)	2.77 (1.39)	6.30 (1.60)	10.97 (2.91)
Observations	29	30	30	30
3. Surprise Index	0.90 (0.63)	1.38 (1.20)	5.90 (1.83)	11.84 (3.50)
Observations	23	23	23	23
4. Oil Price	-0.05 (1.29)	-0.003 (1.87)	4.39 (1.59)	9.13 (3.36)
Observations	29	30	30	30

# Regression Specification: IV + Controls

5. S&P 500	1.1 (1.03)	1.03 (1.71)	5.34 (1.89)	10.46 (3.67)
Observations	28	29	29	29
<hr/>				
6. Vaccine Dummy	3.77 (0.66)	5.51 (1.11)	9.96 (1.7)	15.9 (2.95)
Observations	29	30	30	30
<hr/>				
7. COVID Effect	3.96 (0.74)	5.76 (1.22)	10.39 (1.97)	16.5 (3.45)
Observations	29	30	30	30

# Regression: Causal Effect of Georgia Shock on Inflation Expectations



# Real Dividends

*Overall Outcome: Increase in the real dividends*

*Panel A: 1-year real dividends*

	Jan 7, non Stationary	Jan 6, non Stationary	Difference	Jan 7, Stationary	Drop missing
	(1)	(2)	(3)	(4)	(5)
Jump in Expectations	2.46	0.91	2.51	2.51	2.61

*Panel B: 2-years real dividends*

Jump in Expectations	2.94	1.05	2.51	2.87	3.11
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# Expected Stimulus After Elections

[▶ Return](#)

Date	Bank	Number, \$(billion)	Exact Phrasing
06.01.2021	Goldman Sachs	750	"With control of the Senate by a narrow margin, Democrats are likely to pass further fiscal stimulus in Q1 that we expect to total about \$750bn."
06.01.2021	BNP Paribas	1000	"We expect the unified Democratic government to enact significantly more near-term spending – upwards of \$1trn, split between Covid-19 and non-Covid related fiscal support – than under our previous assumption of a GOP-led Senate and divided government."
06.01.2021	Jefferies	1000	"Jefferies LLC economists ... see Democratic victories in both seats spurring an additional \$1 trillion of stimulus in the next few months."
06.01.2021	Capital Economics	0	"We are not going to be factoring in any further fiscal stimulus into our forecasts yet."
07.01.2021	JP Morgan Wealth Management	750	"We are assuming another support bill of around \$750 billion will be passed sometime between February and early April."
07.01.2021	JP Morgan	900	"Our best guess ... is a spending package of around \$900 billion passed in the next few months."
07.01.2021	Deutsche Bank	900	"In the first quarter, we anticipate passage of a bill of approximately \$900bn."

# Expected Stimulus Dem Win Before Elections

Date	Bank	Election Results	Number, \$(billion)	Expectation Phrase	Exact Phrasing
04.01.2021	Goldman Sachs	before	600	"we would expect"	"If Democrats manage to win both of the Senate seats in play in Georgia, they would win 50 seats, which would allow Vice President-elect Harris to cast the tie-breaking vote. This would lead to greater fiscal stimulus— <b>we would expect around \$600bn more on top of the recently enacted \$900bn</b> —but would also likely mean tax increases to finance additional spending."
05.01.2021	Barclays	before	2000	"the size of the package could possibly be"	"If the Democrats control the Senate, a larger stimulus package could be more likely, with a sizable portion dedicated to state and local governments. With the focus in Q1 likely to be on the virus, <b>the size of the package could possibly be \$2trn</b> , and Democrats might expand it to include significant spending for infrastructure, clean energy initiatives, etc. if the political climate is advantageous."
05.01.2021	Bloomberg	before	700	"we think"	"In the event of a Democratic sweep in Georgia, we think additional near-term pandemic relief and <b>accompanying stimulus could stretch into the \$600 billion to \$800 billion range.</b> "

# Expected Stimulus Rep Win Before Elections

[▶ Return](#)

Date	Bank	Number, \$(billion)	Expectation Phrase	Exact Phrasing
31.12.2020	Deutsche Bank	0	"do not see"	"As such, unless the Senate switches to Democratic control on the results of the Georgia election, <b>we do not see much scope for further stimulus.</b> "
04.01.2021	Goldman Sachs	0	"we would not expect"	"If Senate Republicans hold one or both of these Georgia seats, this will leave them with a narrow majority and probably will not have substantially different implications for legislation than in the last Congress when they held 53 seats ... In that environment, <b>we would not expect much further fiscal stimulus.</b> President Trump recently proposed \$2000/person stimulus payments, but these are unlikely to move forward under a Republican controlled Senate, we believe, as it would cost around \$450bn, Republican leaders and many Republican senators don't support it, and there is likely to be less momentum behind it once individuals start receiving the smaller payments that Congress recently passed."
05.01.2021	Moody's Analytics	0	"not penciling"	"Our baseline forecast does not assume that Democrats will pick up both Georgia seats, which would be necessary for that party to retake the Senate from Republicans. As a result, <b>Moody's Analytics is not penciling in a sixth piece of federal pandemic legislation following the \$900 billion economic relief package that was enacted over the holidays,</b> nor do we expect President-elect Biden to get his tax and spending policy proposals from the campaign through Congress."

# Probability of Dem Win Before Elections

[▶ Return](#)

Date	Bank	Prob Democratic Government	Exact Phrasing
04.01.2021	Deutsche Bank	0.5	"The web now has sites suggesting odds are only 52% in favour of the Republicans maintaining control of the Senate - <b>so a bit of a toss-up</b> . Same story on the individual races with the Ossoff â Perdue now essentially 50/50 while Warnock- Loeffler is 60/40 in the Democratic candidates favour. All this well within the poll margin of errors, to say the least."
05.01.2021	Barclays	0.5	"Polling in both Georgia Senate run-off elections is well within the margin of error, and we <b>consider them both toss-ups</b> ."
05.01.2021	Goldman Sachs	0.5	"Polls show Democratic candidates with a very <b>slim advantage</b> and early voting appears to have moved slightly in the Democratic direction (vs early voting in November) ... <b>race remains a toss-up</b> with a slight Republican lean ... Prediction markets appear to take the same view and imply nearly even odds that Democrats win both seats"
05.01.2021	Moody's Analytics	<0.5	"Our baseline forecast <b>does not assume that Democrats will pick up both Georgia seats</b> , which would be necessary for that party to retake the Senate from Republicans."



Date	Bank	Initial Number	Transfers	Government Spending	Other Spending
05.01.2021 (before, case of Dem. win)	Bloomberg	\$850bn	UI: - \$250bn - 29.4%  stimulus checks: - \$350bn - 41.2%  <b>Total: \$600bn</b> <b>Total Share: 70.6%</b>	state and local fiscal aid: - \$250bn - 29.4%  <b>Total: \$250bn</b> <b>Total Share: 29.4%</b>	
06.01.2021 (after)	Goldman Sachs	\$750bn	UI: - \$150bn - 20%  stimulus checks: - \$300bn - 40%  <b>Total: \$450bn</b> <b>Total Share: 60%</b>	state and local fiscal aid: - \$200bn - 26.7%  <b>Total: \$200bn</b> <b>Total Share: 26.7%</b>	other: - \$100bn - 13.3%  <b>Total: \$100bn</b> <b>Total Share: 13.3%</b>

Date	Bank	Fiscal Package	Exact Phrasing
30.12.2020	Financial Times	Deficit Financed	"The Treasury department plans to sharply shift its bond sales towards debt maturing well into the future as the government seeks to fund vast spending programmes."
06.01.2021	DWS North America	Deficit Financed	<b>"More fiscal support will likely require huge Treasury issuance to fund it,</b> which is already pushing yields higher, and could increase borrowing costs for companies."
06.01.2021	Bloomberg	At least some deficit financing implied	"While stimulus will be the primary focus, high-earners and corporations could be tasked with helping to pay for it ... tax hikes may be limited and possibly delayed until the economy is on stronger footing."
06.01.2021	BNP Paribas	Deficit Financed	"In order to finance our increased 2021 fiscal deficit projection of USD2.5trn+, we expect US Treasury issuance to remain at elevated levels (averaging USD370bn/month) throughout 2021."
08.01.2021	HSBC	Deficit Financed	"The benchmark 10-year Treasury yield has moved above 1.0 per cent for the first time since March 2020. <b>This has been driven by expectations that the Senate elections in Georgia will pave the way for even greater fiscal stimulus, which will ultimately have to be financed by more bond issuance.</b> "

# Infrastructure Discussion Before Elections

Date	Bank	Infrastructure Number	Exact Phrasing
30.12.2020	Moody's Analytics	<b>Rep. win:</b> sizeable infras- tructure is pos- sible once the pandemic winds down	"A divided government will prevent additional fiscal stimulus from being passed next year. However, <b>there are reasonable odds that once the pandemic winds down, Biden will be able to get Congress to agree to a sizable infrastructure package, though likely not in 2021.</b> "
31.12.2020	Deutsche Bank	<b>Dem win:</b> possible infras- tructure package	"However, if Democrats take both seats, another large fiscal stimulus package would be likely, possibly including some of the more structural priorities of the new Administration such as infrastructure."
04.01.2021	Goldman Sachs	<b>Dem win:</b> meaningful infras- tructure package;  <b>Rep win:</b> some infrastruc- ture package	"Infrastructure, for example, continues to be an area where some bipartisan support appears possible...Democratic control of the Senate would increase the odds of a meaningful infrastructure package becoming law, though this is more of an indirect effect as such legislation would still require bipartisan support to pass."
05.01.2021	Rabobank	<b>Dem win:</b> more expansive fiscal policy;  <b>Rep win:</b> 0	<b>"Biden's ambitious plans to boost the economy through expansive fiscal policy will be shot down in the Senate if the Republicans keep a majority. ... So we can forget about all those plans to spend on education, public R&amp;D, green infrastructure, health care, unemployment benefits and social programs. The same is true for tax hikes for corporations and high income and high wealth individuals.</b> <b>If the Democrats win both run-off elections in Georgia this would open the door to a large fiscal stimulus package and more expansive fiscal policy in the coming years. Part of this will likely be financed by higher taxes somewhere down the road."</b>

# Infrastructure Number After Elections

Date	Bank	Infrastructure, \$(billion)	Type	Exact Phrasing
06.01.2021	Cornerstone Research	1000	infrastructure	"Infrastruct. Larger deal <b>(\$1 trillion) via budget recon</b> ; surface infrastr + schools/housing"
06.01.2021	BNP Paribas	600	infrastructure and industrial policy	"We also see a strengthened likelihood of a bipartisan passage of President-elect Biden's <b>infrastructure and industrial policy plans (≈USD600bn) roughly evenly spread across 2021 and 2022.</b> "
06.01.2021	Capital Economics	0	infrastructure	"Biden's major legislative priorities, including a large Green New Deal-style infrastructure package partly funded by higher taxes on high-income individuals and corporations are still unlikely to become a reality, so we are not minded to change our (above-consensus) forecasts for 2021 or 2022."
07.01.2021	Deutsche Bank	1000	infrastructure	"While at this point the size and scope of these policies are highly uncertain, we have in mind an <b>infrastructure package of about \$1tn and tax reform raising revenues of about half that much.</b> "
10.01.2021	Moody's Analytics	1150	net fiscal support	"We also expect an additional \$1.15 trillion in net fiscal support to be signed into law later this year with government spending and tax increases in the spirit of the "Build Back Better" policy agenda that Biden proposed during the campaign."
11.01.2021	Saxo	3500	green infrastructure	"With Harris to break the 50/50 potential Tie in the Senate, about \$7 trillion in Green Infrastructure that Biden and Harris campaigned on has risen several magnitudes in not just probability but scope ... We are not saying the full \$7 trillion will come into fruition, it could actually be more – but even if it's "only" \$3.5 trillion the ripples are huge."

# Infrastructure Financing

Date	Bank	Infrastructure	Exact Phrasing
06.01.2021	Morgan Stanley	Partially by taxes	"US public policy strategist Michael Zezas ... sees ... a lighter touch on taxes, used as a partial offset to infrastructure and/or healthcare spending initiatives later in 2021."
06.01.2021	Capital Economics	Partly funded by higher taxes on high-income individuals and corporations (but unlikely)	"But Biden's major legislative priorities, including a large Green New Deal-style infrastructure package partly funded by higher taxes on high-income individuals and corporations are still unlikely to become a reality, so we are not minded to change our (above-consensus) forecasts for 2021 or 2022."
07.01.2021	Deutsche Bank	Half by tax	"While at this point the size and scope of these policies are highly uncertain, we have in mind an infrastructure package of about \$1tn and tax reform raising revenues of about half that much."
08.01.2021	UBS	Partially financed by taxes	"Our Dem sweep scenario also assumed that there would be a multi-year fiscal package that included infrastructure spending along with other measures. We had penciled in an annual flow rate of about \$275bn, but not starting until the second half of 2021. In addition, we had assumed that there would be a set of tax increases, including higher business taxes, that would be used to partially pay for the extra spending."
10.01.2021	Moody's Analytics	Financed by taxes	"We also expect an additional \$1.15 trillion in net fiscal support to be signed into law later this year with government spending and tax increases in the spirit of the "Build Back Better" policy agenda that Biden proposed during the campaign."

# Types of Tax Change for Infrastructure Financing

Date	Bank	Taxes
10.01.2021	Moody's Analytics	Capital gains taxes: - Increase to 0.28
11.01.2021	Goldman Sachs	Personal tax: - no net increase in personal taxes - increase in marginal rate on top earners: 0.396  Capital gains taxes: - increase to 0.28 - \$160bn  Corporate tax: - increase to 0.25 - \$400bn  Social Security Tax and Payroll Tax: - no change  Deductions and restorations: - increase to 0.28 - \$225bn - itemized deductions

# Barclays Policy Outcomes

Date	Bank	Outcome	Probability	Exact Phrasing
06.01.2021	Barclays	aggressive progressive policy agenda	unlikely	We believe ... the probability of an 'aggressive progressive policy agenda' is unlikely even if the Democrats win both seats in Georgia ... [w]e generally agree with Maneesh that near-term corporate tax hikes are unlikely given policy priorities during the pandemic.
06.01.2021	Barclays	stimulus	likely	the outcome of the two Georgia elections, which are likely to give control of Congress to Democrats, will raise expectations for further COVID-related fiscal support and, potentially, spending on infrastructure
06.01.2021	Barclays	infrastructure	moderately likely	the outcome of the two Georgia elections, which are likely to give control of Congress to Democrats, will raise expectations for further COVID-related fiscal support and, potentially, spending on infrastructure
07.01.2021	Barclays	lower trade risks	likely	With a Democratic Congress, we expect the Biden administration likely will pursue additional stimulus, revert to a more active regulatory agenda, and lower trade risks.
07.01.2021	Barclays	tax change	moderately unlikely	While infrastructure remains a distinct possibility, we assign a lower probability to significant tax changes or a public option.
07.01.2021	Barclays	public option	moderately unlikely	While infrastructure remains a distinct possibility, we assign a lower probability to significant tax changes or a public option.
08.01.2021	Barclays	confirm Biden administration nominees	likely	With full control of Congress, we expect Democrats are more likely to confirm all of the Biden administration's nominees
08.01.2021	Barclays	broadier agenda setting powers	likely	With full control of Congress, we expect Democrats are more likely to confirm all of the Biden administration's nominees, control the Congressional policy agenda with the power to call hearings

# Conditional Forecast Real GDP

Source	Date	Real GDP Increase	Real GDP Phrasing
Barclays	14.01.2021	2.3% increase after 2 years	"With Democratic control of Congress, we expect another virus- related relief package of about \$1.4trn. Should the vaccine rollout proceed in line with our expectations, additional fiscal support could lead to a positive output gap later this year, though rising participation should help limit inflationary pressures...[w]e now expect Q4/Q4 real GDP growth of 7.0% in 2021 (up 3.2pp) and 1.5% in 2022 (down 0.9pp). On a calendar-year basis, these revisions boost real GDP growth to 6.3% y/y in 2021 and 3.9% y/y in 2022."
Bloomberg	06.01.2021	2.3% increase after 2 years	"In the event of a Democratic sweep in Georgia, we think additional near-term pandemic relief and accompanying stimulus could stretch into the \$600 billion to \$800 billion range. The high end could be sufficient to lift growth by roughly 1.7 percentage points in 2021, to 5.2% year-over-year, with a faster pace continuing into 2022 (above 3%), compared to our current baseline of 2.4%."
BNP Paribas	06.01.2021	1.4% increase over 2 years	"Both Democratic candidates are projected to win their Georgia run-off races...[w]e revise our annual average 2021 and 2022 GDP forecasts up by 0.5pp and 0.9pp, respectively, with growth expected to register 4.2% and 4.1%."
Deutsche Bank	07.01.2021	2% increase over 2 years	"The first priority of the Biden administration and Democratic Congress is likely to be another tranche of Covid-related fiscal support. In the first quarter, we anticipate passage of a bill of approximately \$900bn that is built around further stimulus checks, funds for state and local governments, and enhancements to unemployment benefits, among other provisions. In response, we have lifted our growth forecast for 2021 by about 2 percentage points to 6.3% (Q4/Q4) and reduced our year-end forecast for the unemployment rate to 4.3% from 5% previously."



# Changing of Probability of Dem Senate Majority (Barclays)

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Date	Source of Probabil-ity	Probability of Demo-cratic Majority	Exact Phrasing
06.11.2020	Barclays	< 0.5	"With a split Congress highly likely, prospects for another large fiscal package seem remote, putting pressure on the Fed to boost monetary policy support. Although many votes remain to be counted, <b>the likelihood of a divided government outcome is high.</b> "
04.12.2020	Prediction Markets	0.2	"On November 3 (or shortly thereafter), we thought that we would have all the answers, but with the Senate's fate still in limbo, the muni market faces a lot of uncertainty. <b>Prediction markets assign a nearly 80% probability of Republicans winning at least one of the Georgia Senate seats in the January run-off.</b> "
11.12.2020	Barclays	unlikely (< 0.5)	"Looking ahead, as discussed in our 2021 municipal outlook, <b>although it appears somewhat unlikely, if Democrats win both Senate seats in Georgia</b> , Treasuries and tax-exempt yields might sell off sooner and to a larger degree."
18.12.2020	Prediction Markets	0.35	"Regardless, the main focus of muni investors going into 2021 will be on the Georgia Senate elections, with a possibility of a large stimulus bill, with a sizable portion dedicated to municipalities, implemented <b>if Democrats win both races (although prediction markets assign less than a 35% probability to this outcome).</b> "
05.01.2021	Barclays	0.5	"Polling in both Georgia Senate run-off elections is well within the margin of error, and <b>we consider them both toss-ups.</b> '

Date	News	Summary	US
5th Jan	European stocks fluctuated with U.S. equity futures as traders weighed concerns about the impact of rising coronavirus cases and braced for key U.S. runoff elections.	European stocks fluctuated with U.S. equity futures as traders weighed concerns about the impact of rising coronavirus cases and braced for key U.S. runoff elections. Energy firms and retailers led the Stoxx 600 Index as the U.K. went back into lockdown in an attempt to prevent hospitals being overwhelmed.	✓
5th Jan	The New York Stock Exchange said it will no longer delist China's three biggest state-owned telecommunications companies	The New York Stock Exchange said it will no longer delist China's three biggest state-owned telecommunications companies, backtracking on a plan that had threatened to escalate tensions between the world's largest economies. NYSE's U-turn came with scant explanation just four days after the exchange said it would remove the shares to comply with a U.S. executive order barring investments in businesses owned or controlled by the Chinese military.	✓
5th Jan	The U.S. Food and Drug Administration delivered a clear rebuke to health officials:... [D]on't mess with our guidelines.	The U.S. Food and Drug Administration delivered a clear rebuke to health officials attempting to alter the timing and dosage of Covid-19 vaccines: Don't mess with our guidelines. The agency, in a statement late yesterday, urged that vaccines be given according to how the FDA has authorized them after a key U.S. official proposed cutting dosage levels for Moderna Inc.'s shot as a way to immunize more people.	✓
5th Jan	Qatar's ruler landed in Saudi Arabia today	Qatar's ruler landed in Saudi Arabia today to a warm embrace from host Crown Prince Mohammed bin Salman, hours after their nations re-established travel ties and eased a regional dispute. Qatari Emir Sheikh Tamim bin Hamad Al Thani is attending the Gulf Cooperation Council summit for the first time since a 2017 row that cut trade, travel, and diplomatic ties with Saudi Arabia, the U.A.E., Bahrain, and Egypt. Saudi Arabia reopened its air, land, and sea borders with Qatar on Monday, a leap toward easing the crisis that had complicated U.S. efforts to isolate Iran amid heightened tensions.	

Parameter	Description	Value	Target
$\mu$	Share of hand-to-mouth	0.275	1 & 2 year intertemporal MPC
$\phi$	OLG survival rate	0.68	
$\sigma$	Intertemporal elasticity of substitution	1	Standard
$\varphi$	Frisch elasticity	1	Standard
$\beta$	Discount factor	0.99	Standard
<i>Nominal rigidities</i>			
$\kappa$	NKPC slope	0.055	Hazell et al. (2022)
<i>Steady State Fiscal</i>			
$B_{ss}/Y_{ss}$	Steady state Debt-to-GDP	0.8	Standard
$\tau_y$	Marginal tax rate	0.27	Provided by CBO (2019)
$G_{ss}/Y_{ss}$	Gov't spending-to-GDP	0.2	Standard
<i>Fiscal Rule</i>			
$\tau_B$	Response of surpluses to debt	0.189	Persistence of debt, CBO (2021)
$H$	Period where debt repayment starts	3	Provided by CBO (2021)
$\bar{B}/Y_{ss}$	Steady state Debt-to-GDP after shocks	80.6%	9 year ahead 1 year interest rate

Start on election morning, January 6th, to include **preannouncement drift**

Reasons:

- Democrats' best poll released after close of markets on January 5th
  - Betting markets move towards Democrats during election day
  - Markets also moved towards Democrats during election day
- Pre-announcement drift larger in tenors where "smart money" is active
  - Consistent with informed speculation in advance of election outcome
  - Hedge funds disproportionately operate in shorter tenors (Bahaj et al 2023)
  - Preannouncement drift only visible in these tenors
  - Hedge funds buy exit polls around high stakes political events (e.g. Brexit)

## Dividend Futures (1/2)

Nominal  $n$  year ahead dividend growth from dividend futures:

- The  $n$  year dividend future is

$$F_t^n = \frac{E_t D_{t+n}}{1 + \theta_t^n}$$

$E_t D_{t+n}$  is expected dividend,  $\theta_t^n$  is  $n$  year dividend risk premium

- Identification assumption:  $\theta_t^n$  unaffected by deficit shock
  - $\theta_t^n$  varies little at short horizons [Gormsen et al '21]

→ Then  $\Delta \log F_t^n$  is  $n$  period dividend growth

Real  $n$  year ahead GDP growth:

- Adjust for inflation using swaps
- Convert dividend growth to GDP growth using

$$\Delta \log \text{GDP}_t = b \Delta \log \text{dividend}_t$$

- $b = 0.76$  [Gormsen & Koijen '20]

Sources of bias?

- Market likely expected higher dividend taxes
- Suggests real GDP growth even higher than baseline

Liquidity: >>25 transactions per day during event window

Restricting to 2019-2023:  $\beta = 0.6$  (0.3)

→ Expectations **under-react** to shocks

- Caveat: only 4 years of data

In Coibion-Gorodnichenko framework w/ noisy information:

$$\frac{d\mathbb{E}[\text{actual inflation}]}{d\text{deficit shock}} = 1.6 \times \frac{d[\text{inflation forecast}]}{d\text{deficit shock}}$$

→ Response of expectations is **lower bound** for response of actual inflation

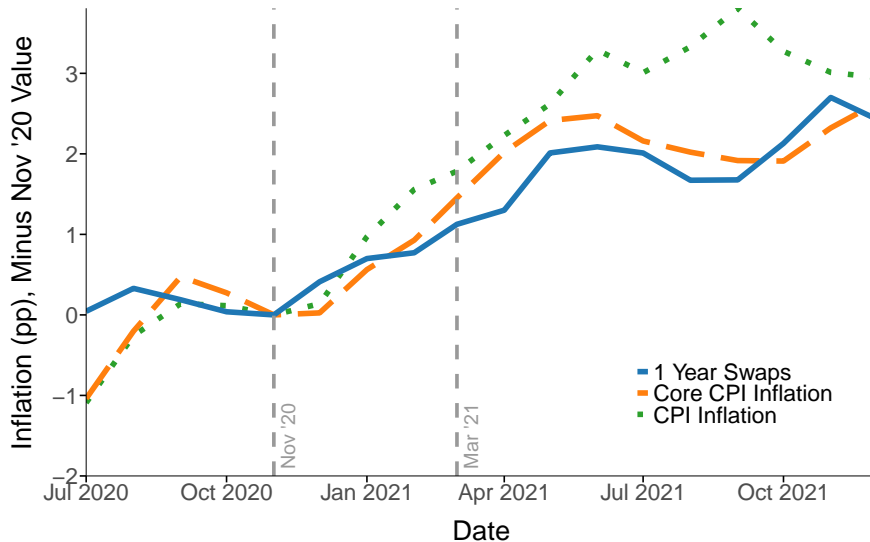
# Forecast Accuracy

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	CPI Inflation	CPI Core Inflation	$\Delta$ CPI Inflation	$\Delta$ CPI Core Inflation
	(1)	(2)	(3)	(4)
Year 1 Swaps	1.237 (0.524)	1.034 (0.284)		
$\Delta$ Year 1 Swaps			1.168 (0.547)	0.828 (0.334)
Observations	51	51	39	39
$R^2$	0.426	0.653	0.336	0.521

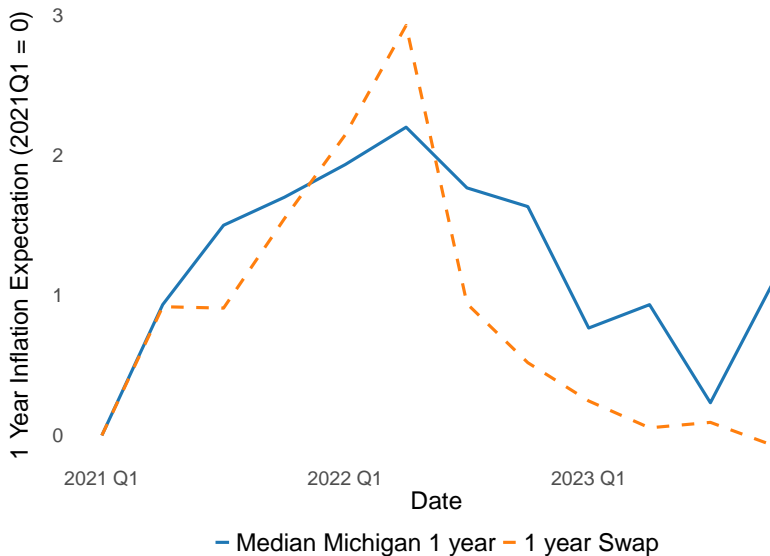


# Swaps Predict Inflation Changes Around '21 Deficits



- Graph: swaps and realized inflation for same horizon
- Swaps predict actual inflation changes well around '21 deficits

# 1 Year Quarterly Inflation Expectation [Return](#)




# Narrative: Capitol Hill Riots and asset prices [▶ Return](#)

 **Emily McCormick** · Reporter  
Updated January 7, 2021 · 10 min read

In this article:

<b>^GSPC</b> +1.03% ☆	<b>4HAQ.DE</b> +0.32% ☆	<b>YM=F</b> -0.11% ☆	<b>^DJI</b> +0.34% ☆	<b>CCERX</b> +1.15% ☆	<b>SPY</b> +0.99% ☆
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U.S. stocks gained Thursday as traders shook off Wednesday's unrest in Washington and looked ahead to the policy implications of the incoming presidential administration and Congress. Optimism over more stimulus under a unified Democratic government stoked a risk-on mood.

 **BUSINESS.** Markets Tech Media Calculators Videos

## Here's why Wall Street mostly ignored the chaos in Washington

By  Anneken Tappe and  David Goldman, CNBC Business  
© 2 minute read · Published 6:46 PM EST, Wed January 6, 2021

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Markets

## Everything Rally Defies Washington Mayhem After Deadly Clash

- U.S. stock futures have climbed, despite chaos in U.S. Capitol
- Low rates, stimulus and vaccines buoy markets, Nguyen says

Opinion **US economy**

## Why investors shrugged off the Capitol riots

A Democratic sweep and hopes for fiscal stimulus drove the market instead

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BREAKING

**Not Even A Riot At The Capitol Can Keep Stocks Down As Dow, S&P 500 And NASDAQ Hit Record Highs—Again**

Sarah Hansen · Former Staff

Forbes

BREAKING

**As Trump Supporters Storm Capitol, Dow Rallies 400 Points To Close At All-Time High**

Jonathan Porciani · Former Staff

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Jan 6, 2021, 04:25pm EST

MONEYWATCH >

**Wall Street's reaction to Washington mayhem? All-time highs**

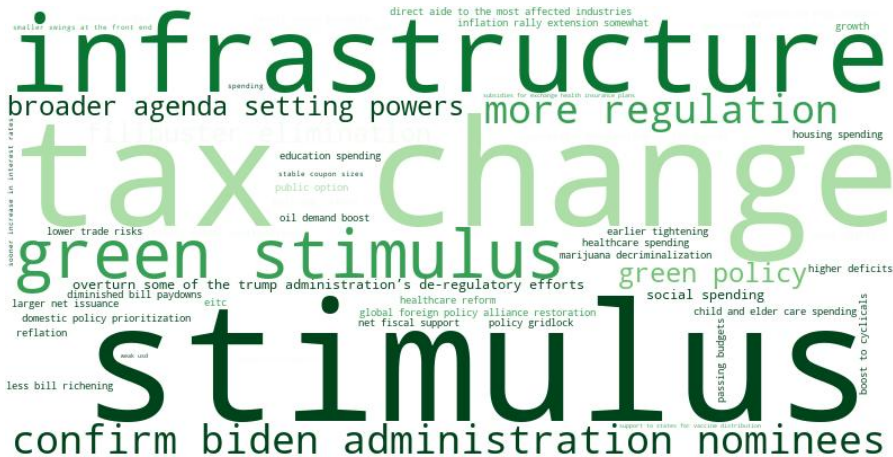


By  Stephan Gaudet  
January 6, 2021 · 6:21 PM EST · MoneyWatch

[f](#) [X](#) [v](#)

*“The markets appear to be putting zero probability on the U.S. becoming a banana republic ... [o]n Jan. 6, as a mob stormed the Capitol, the S&P 500 merely trimmed its gains.”*  
— Bloomberg Economics, January 19th '21

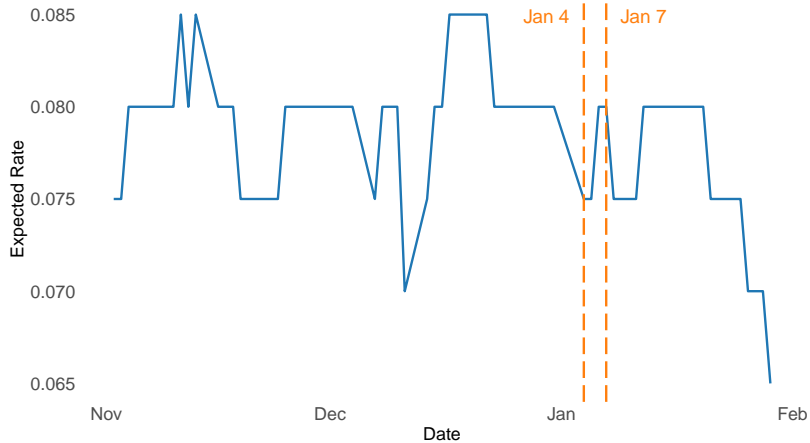
## Main Outcome of Democrat Victory is Stimulus



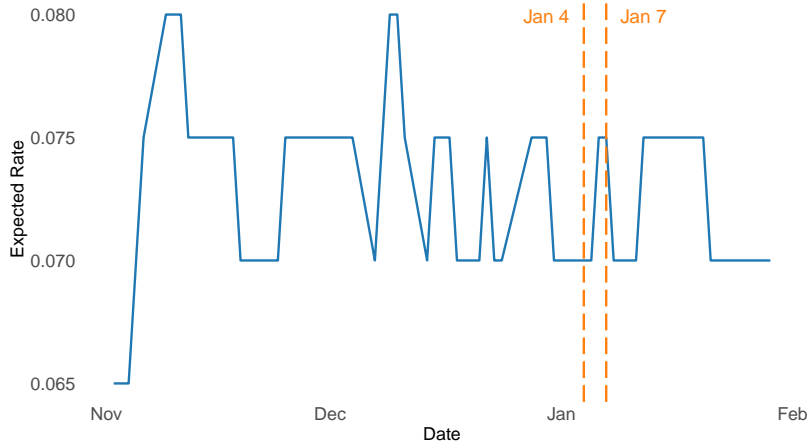
Darker = more likely, Larger = mentioned by more investment banks

**Human**—read reports and summarize main outcomes of Democrat victory [▶ GPT Version](#)

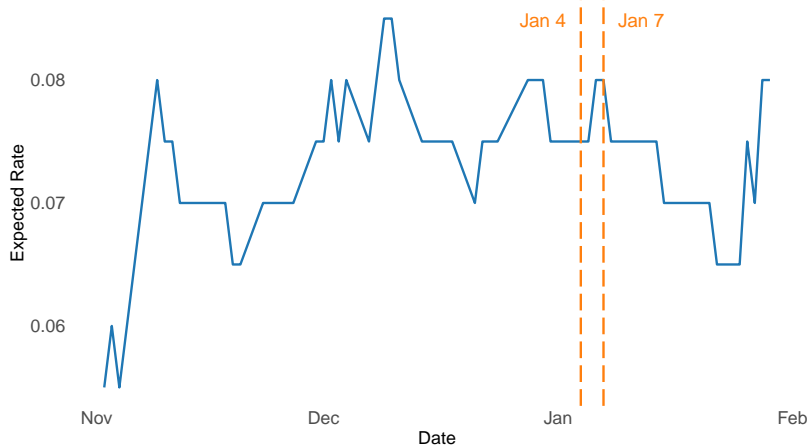
# Federal Funds Futures: 3-month forward

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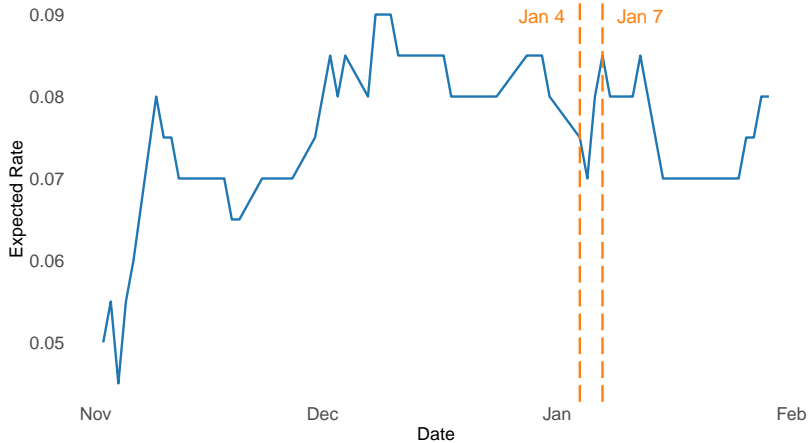
# Federal Funds Futures: 6-month forward

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# Federal Funds Futures: 9-month forward

[▶ Return](#)

# Federal Funds Futures: 12-month forward

[Return](#)



# Oil Futures

▸ Return

