Measuring the Effects of the Global Tax Reform - Evidence from High-frequency Data

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Global tax reform

- Over 140 countries agreed on a *fundamental* global corporate tax reform in 2021, effective in 2023
- Customer location-based taxation of profits (Pillar 1)
- Minimum tax rate 15% (Pillar 2)

This is big!

Janet Yellen:

"Today is an historic day for economic diplomacy" (July 1, 2021)

Larry Summers:

"This agreement is arguably the most significant international economic pact of the 21st century so far." (October 30, 2021)

Global tax reform

Goal of the reform

- Align taxation with actual activity (= tax in markets)
- Curb aggressive corporate tax avoidance

- Make tax system fit for digital world
- Redistribute tax revenue & end tax competition

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This paper uses market perceptions to answer

- ▷ What are the costs for companies (shareholder value)?
- ▷ Which countries are worse/better off after reform?

Outline & main findings

Main Findings

1. Immediate negative share price reactions for affected MNCs
2. USD 26-65bn total shareholder value loss, persistent decreases in firm value
3. Higher sovereign debt CDS spreads for tax-favorable countries

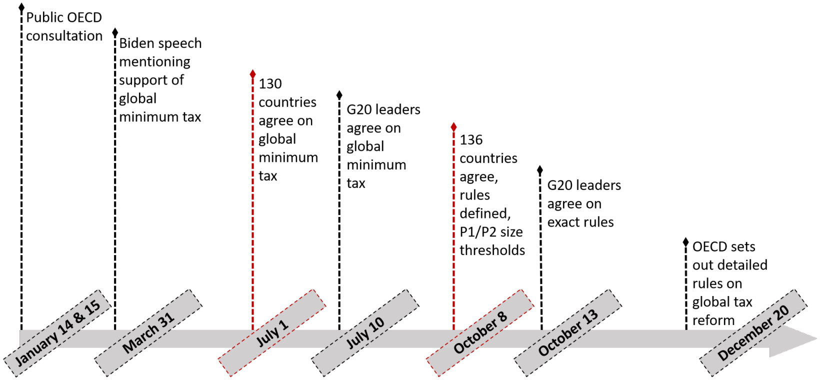
Contribution

1. First evidence on (expected) effects of historic tax reform
2. Novel approach to infer effects on countries' public finances (OECD CbCR data + market reactions)

Two empirical challenges

1. **Isolate tax reform effect on asset prices**
   - Exploit rapid agreement by 130+ countries as surprise
   - High-frequency trading data around events
2. **Proxies for ex-ante exposure to reform**
   - Companies: international tax planning
   - Countries: attracting MNCs' tax bases & operations

Key global tax reform dates in 2021

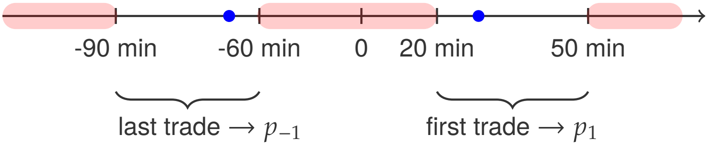


- ▷ Time-stamped events of the release of information
- ▷ These events received significant news media attention

  ⟹ evidence from google trends data

Identification

- We compute price changes around the tax events:



  - Results are robust to using alternative windows

- Identifying assumption:

$$\Delta p = log\ (p_1) - log\ (p_{-1})$$

driven by the tax event

Ex-ante exposure to the reform

	Companies	Countries
Reform target:	Low intl. taxes	High MNC tax bases
Measure:	• Foreign income • Low taxed foreign income • Tax rate differential	• MNC Revenue / market size • MNC pre-tax profitability

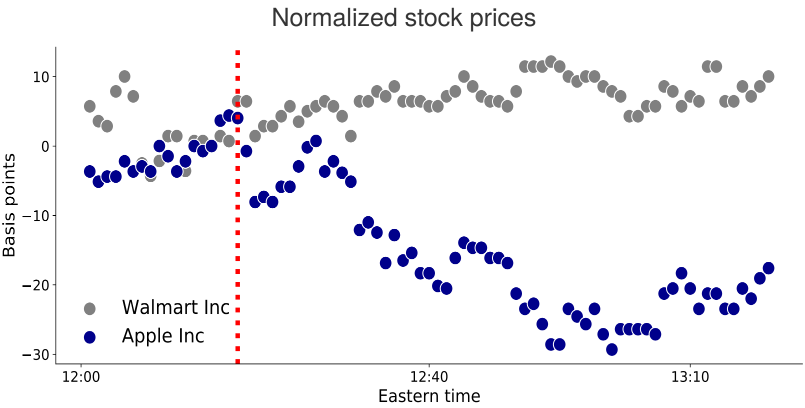
Effect on companies

Wall Street Journal:

"Corporate Taxes Poised to Rise After 136-Country Deal"

(October 8, 2021)

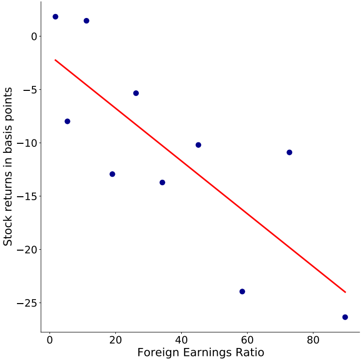
Company results: Apple and Walmart stocks on July 1



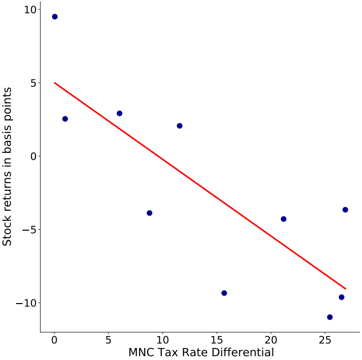
- Apple disclosed in the 10-K that the reform is a risk to its business
- Walmart did not discuss the reform proposals as a risk in its 10-K

Company results: Immediate stock price responses

Foreign Earnings Ratio



MNC Tax Rate Differential



- Magnitude: 10bp for 1 SD higher exposure
- Results driven by firms with foreign earnings *taxed at low rates* (10-K tax footnote)
- Results likely driven by use of tax haven entities (Orbis ownership data)

Company results: Discontinuity analysis for Pillar 1

EUR 10 billion size threshold used in RDD.

Panel A	2021 October 8
	(2)
RD Estimate	-32.66
	[-1.91]
Observations	1,444
Observations in BW	167
Polynomial Order	1
Covariates	No
Sample	Foreign Earnings

→ RDD Full Tests

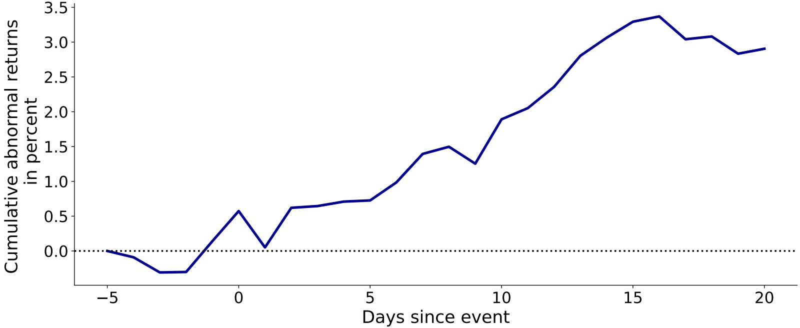
Company results: Measuring the reform's full effect

- **Problem:** Anticipation of reform
- **Solution:** Adjust price responses with changes in the perceived probability :

$$V_i = \frac{\Delta p_{i,t}}{\Delta \pi_t} \times M_{i,t-1},$$

  - $\Delta p_{i,t}$ is the high-frequency stock price change
  - $M_{i,t-1}$ is the market capitalization for company i
  - $\Delta \pi_t$ is investors' perceived change in the probability that the reform will happen after learning about the event at time t.
- Use options data to compute $\Delta \pi_t \implies$ immediate total shareholder value loss ranges from \$26 billion to \$65 billion (Table **3**)

Company results: Long-run effects



- Daily returns of 32bp for 1 SD higher exposure
- 3% Long-Short returns in the next 20 days
- No run-up in the days immediately before the tax events

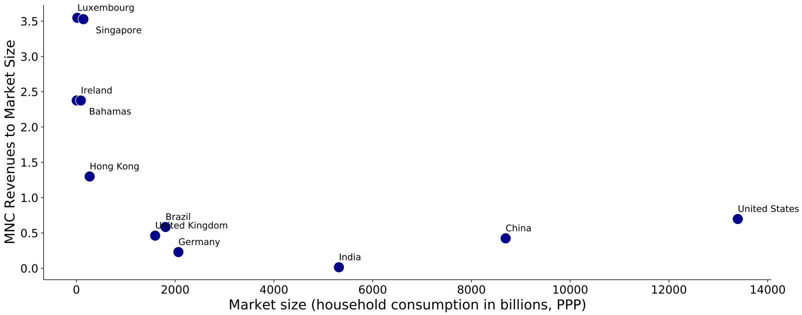
Effect on countries

OECD:

*"Under Pillar 1, taxing rights on more than **USD 125 billion** of profit expected to be **reallocated** to market jurisdictions each year"*

*"Under Pillar 2, the global minimum tax (15%) expected to generate around **USD 150 billion in new tax revenues** globally"*

Country exposure to reform: *MNC Revenues to Market Size*



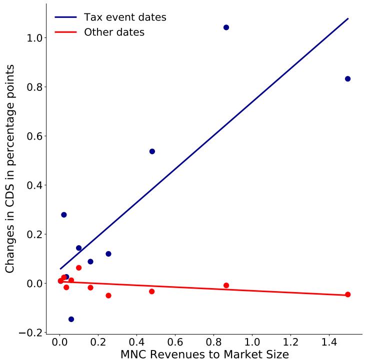
- MNC's reported revenues by country from OECD CbCR data

  (Joshi, 2020; De Simone & Olbert, 2021)

- Market size (household consumption) from Worldbank

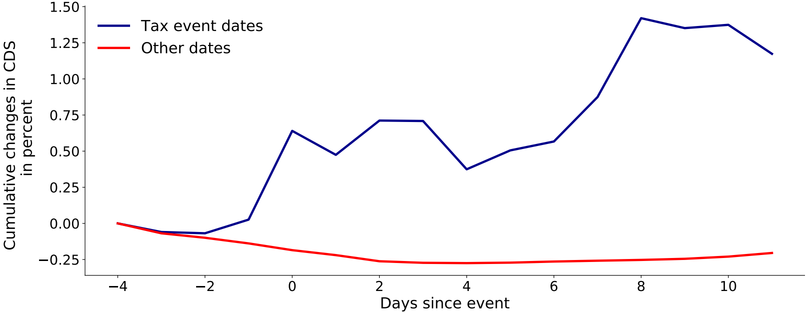
Country results: Daily CDS spread changes

MNC Revenues to Market Size



- Magnitude suggests: 28bp for 1 SD higher exposure (19% for sample mean, 58% for Hong Kong)
- Similar results for *MNC Taxable Income Margin*
- Results driven by small tax-favorable jurisdictions

Country results: Long-run effects



- The CDS spread drifts upward until $t = 8$ (blue line)
- No pre-announcement drift
- Placebo: non-tax-event dates CDS spread ≈ 0 (red line)

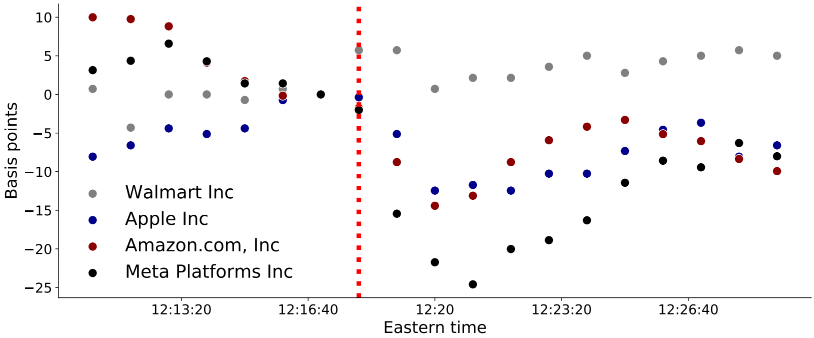
Conclusion

- A historic global tax reform coming in 2023!
- First evidence on micro and macro *negative* effects on
  - market values of targeted companies
  - public finances of small tax-favorable countries
- Important policy implications, regulators currently …
  - debating about the benefits & costs (U.S. perspective → WSJ as of June 7, 2022)
  - discussing specific rules for implementation
  - considering domestic policy changes to counteract the impact on their tax revenues.
- Future research: Real effects
  - Corporate responses (De Simone & Olbert, 2022)
  - Macroeconomic outcomes

Thank you very much!

Back-up slides

Stock prices around the global tax reform announcement



Key reform elements

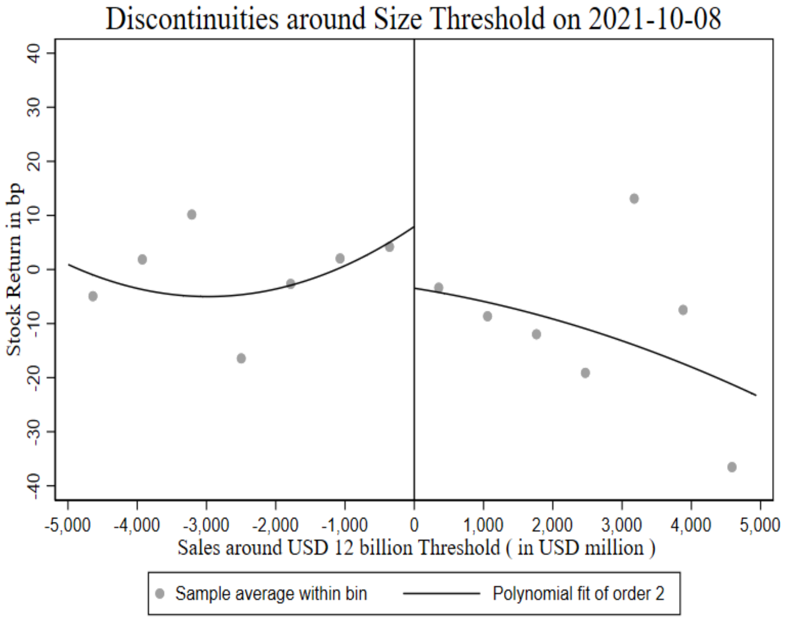
- Pillar 1 = Taxation of portion of MNCs' profits in consumer market countries
  - Multinational companies with revenue > 10 billion EUR
  - When > 1 million EUR in transaction value in given country
  - *Amount A*: 25% of "residual profit" (profit in excess of 10% of revenue)

- Pillar 2 = Global minimum tax rate: 15%
  - Multinational companies with revenue > 750 million EUR
  - "Top up" tax using a jurisdiction-based effective tax rate
  - Global anti-Base Erosion Rules (GloBE) rules (Income inclusion + Deduction denial)
  - Treaty-based source taxation rule

Discontinuity analysis: EUR 10 billion threshold for Pillar 1

- On October 8, 2021: release of detailed rules
- OECD officially announced size threshold of EUR 20 and 10 billion sales for Pillar 1 (the new consumer-location-based taxation of corporate profits).
- $\Rightarrow$ RDD

$$\Delta p_{i,t} = a \cdot Treated_i + b \cdot \mathrm{RV}_i + c \cdot \mathrm{RV}_i * Treated_i + \epsilon_{it},$$


Discontinuities around Size Threshold on 2021-10-08
Stock Return in bp
40
30
20
10
0
-10
-20
-30
-40
-5,000
-4,000
-3,000
-2,000
-1,000
0
1,000
2,000
3,000
4,000
5,000
Sales around USD 12 billion Threshold (in USD million)
Sample average within bin
Polynomial fit of order 2

Stock prices responses around the Pillar 1 size thresholds

Panel A: Main specifications				
	High-freq. stock returns $\Delta p_{i,t}$			
	(1)	(2)	(3)	(4)
RD Estimate	-34.61	-32.66	-32.63	-29.36
	[-1.98]	[-1.91]	[-2.57]	[-2.60]
Observations	1,444	1,444	1,444	1,444
Observations in BW	222	167	109	72
Polynomial Order	2	1	2	1
Threshold	10 billion	10 billion	20 billion	20 billion
Event date	October 8	October 8	October 8	October 8
Sample	Foreign Earnings			

Panel B: Robustness specifications				
	High-freq. stock returns $\Delta p_{i,t}$			
	(1)	(2)	(3)	(4)
RD Estimate	-66.81	-13.28	23.51	
	[-4.11]	[-1.08]	[0.60]	
Placebo Estimate				11.56
				[0.80]
Observations	2,015	2,047	7,024	1,444
Observations in BW	514	358	939	410
Polynomial Order	2	2	2	2
Threshold	10 billion	10 billion	10 billion	10 billion
Event date	October 8	October 8	other Events	October 8
Sample	no firms within 10% $<$ threshold	Full		Foreign Earnings

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Persistence of the effects: Trading strategy

Long and short portfolios

⇒ further quantify the economic relevance

- ▷ Deciles based on companies' foreign earnings ratio
- ▷ Long portfolio: buys the value-weighted stocks in the first decile (i.e., small $ForeignEarnings_i$)
- ▷ Short portfolio: sells the value-weighted stocks in the last decile (i.e., high $ForeignEarnings_i$)
- ▷ We close the position two weeks after each tax event

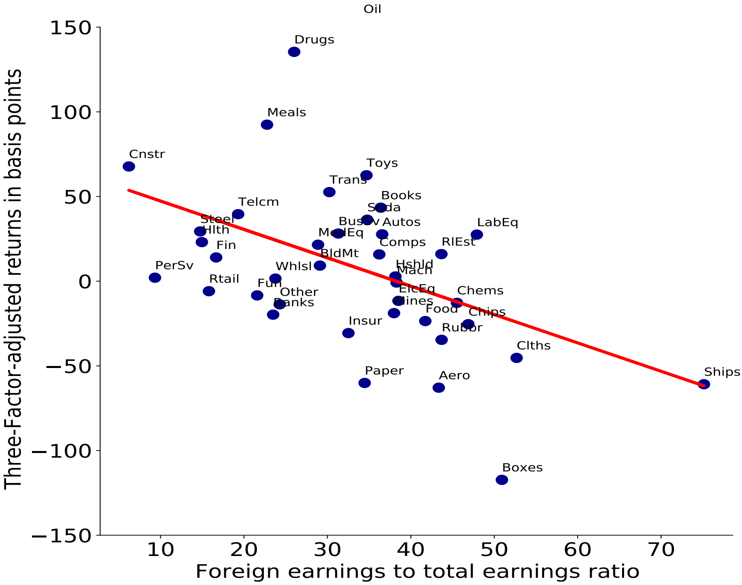
Daily alphas from the "Long-Short" portfolio

Performance from 1 day after to 20 days after the tax events

	Long	Short	Long - Short
CAPM alpha	6.57	-11.22	17.79
	[0.60]	[-2.45]	[2.29]
Three-factor alpha	5.16	-9.11	14.27
	[0.80]	[-3.86]	[2.10]
Four-factor alpha	5.24	-9.12	14.36
	[0.80]	[-3.90]	[2.11]

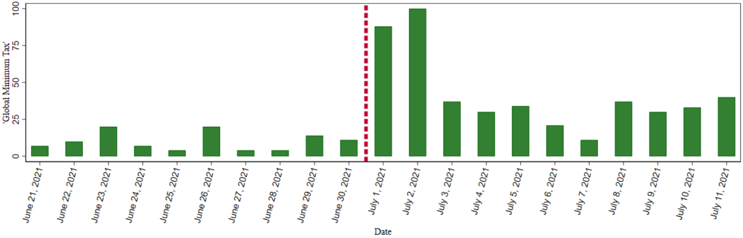
- The Long-Short portfolio earns substantial risk-adjusted returns
- Most of the out-performance comes from the short leg

Aggregate results by industry

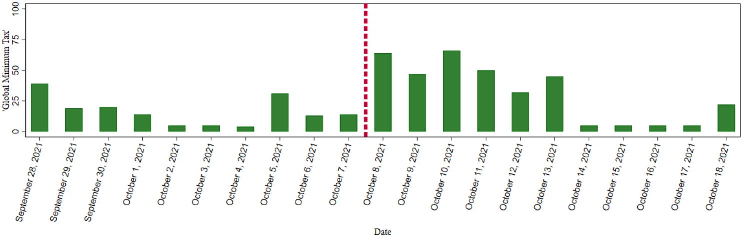


Google trends on 'global minimum tax'

▷ Around July 1 2021



▷ Around October 8 2021



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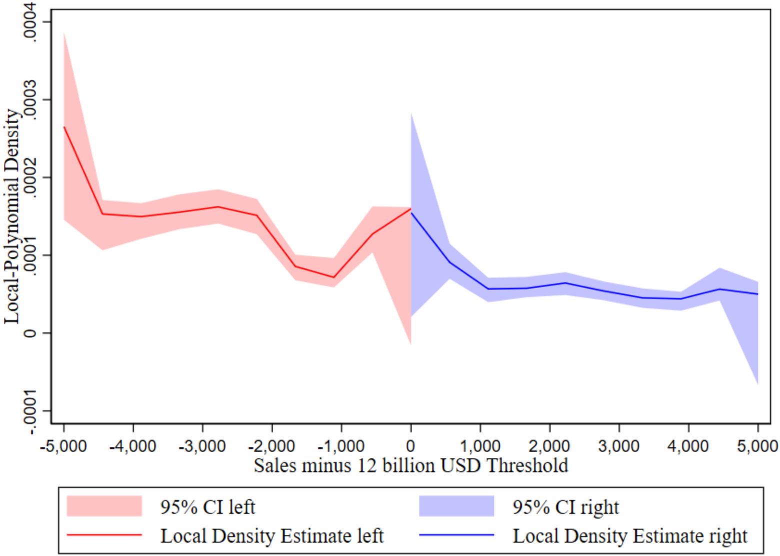
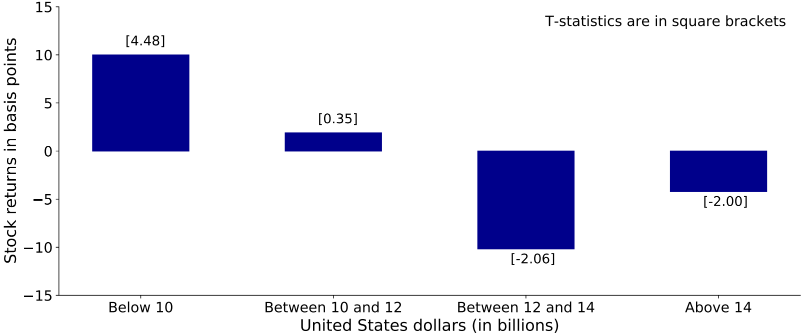
Density of company observations around EUR 10 (USD 12) billion sales threshold



High-frequency stock prices responses around the EUR 10bn sales threshold on October 8



Alphabet Inc.

Item 1A. Risk Factors

We could be subject to changes in tax rates, the adoption of new U.S. or international tax legislation, or exposure to additional tax liabilities.

Our future income taxes could be negatively affected by earnings being lower than anticipated in jurisdictions that have lower statutory tax rates and higher than anticipated in jurisdictions that have higher statutory tax rates, the net gains and losses recognized by legal entities on certain hedges and related hedged intercompany and other transactions under our foreign exchange risk management program, changes in the valuation of our deferred tax assets or liabilities, the application of different provisions of tax laws or changes in tax laws, regulations, or accounting principles (including changes in the interpretation of existing laws), as well as certain discrete items.

In addition, we are subject to regular review and audit by both domestic and foreign tax authorities. As a result, we have received, and may in the future receive, assessments in multiple jurisdictions, including in Europe, on various tax-related assertions, such as transfer-pricing adjustments or permanent-establishment claims. Any adverse outcome of such a review or audit could have a negative effect on our operating results and financial condition and could require us to change our business practices in a manner adverse to our business. It may also subject us to additional litigation and regulatory inquiries, resulting in the diversion of management's time and attention. In addition, the determination of our worldwide provision for income taxes and other tax liabilities requires significant judgment, and there are many transactions and calculations for which the ultimate tax determination is uncertain. Although we believe our estimates are reasonable, the ultimate tax outcome may differ from the amounts recorded in our financial statements and may affect our financial results in the period or periods for which such determination is made.

Furthermore, due to shifting economic and political conditions, tax policies, laws, or rates in various jurisdictions may be subject to significant changes in ways that impair our financial results. Various jurisdictions around the world have enacted or are considering digital services taxes, which could lead to inconsistent and potentially overlapping international tax regimes. The Organization for Economic Cooperation and Development (OECD) recently released proposals relating to its initiative for modernizing international tax rules, with the goal of having different countries implement a modernized and aligned international tax framework, but there can be no guarantee that this will occur.

In addition, in response to significant market volatility and disruptions to business operations resulting from the global spread of COVID-19, legislatures and taxing authorities in many jurisdictions in which we operate may propose changes to their tax rules. These changes could include modifications that have temporary effect, and more permanent changes. The impact of these potential new rules on us, our long-term tax planning, and our effective tax rate could be material.

Tax law in markets of operation

Tax law in foreign countries

Mention of international tax reform

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Apple Inc.

10k Tax footnote disclosure

Note 5 – Income Taxes

Provision for Income Taxes and Effective Tax Rate

The provision for income taxes for 2021, 2020 and 2019, consisted of the following (in millions):

	2021	2020	2019
Federal:			
Current	$ 8,257	$ 6,306	$ 6,384
Deferred	(7,176)	(3,619)	(2,939)
Total	1,081	2,687	3,445
State:			
Current	1,620	455	475
Deferred	(338)	21	(67)
Total	1,282	476	408
Foreign:			
Current	9,424	3,134	3,962
Deferred	2,740	3,383	2,666
Total	12,164	6,517	6,628
Provision for income taxes	$ 14,527	$ 9,680	$ 10,481

The foreign provision for income taxes is based on foreign pretax earnings of $68.7 billion, $38.1 billion and $44.3 billion in 2021, 2020 and 2019, respectively.

A reconciliation of the provision for income taxes, with the amount computed by applying the statutory federal income tax rate (21% in 2021, 2020 and 2019) to income before provision for income taxes for 2021, 2020 and 2019, is as follows (dollars in millions):

	2021	2020	2019
Computed expected tax	$ 22,933	$ 14,089	$ 13,805
State taxes, net of federal effect	1,151	423	423
Impacts of the U.S. Tax Cuts and Jobs Act of 2017	—	(582)	—
Earnings of foreign subsidiaries	(4,715)	(2,534)	(2,625)
Foreign-derived intangible income deduction	(1,372)	(169)	(149)
Research and development credit, net	(1,033)	(728)	(548)
Excess tax benefits from equity awards	(2,137)	(930)	(639)
Other	(300)	111	214
Provision for income taxes	$ 14,527	$ 9,680	$ 10,481
Effective tax rate	13.3 %	14.4 %	15.9 %

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Walmart

WALMART INC.

Item 1A. Risk Factors

Legal, Tax, Regulatory, Compliance, Reputational and Other Risks

Our international operations subject us to legislative, judicial, accounting, legal, regulatory, tax, political and economic risks and conditions specific to the countries or regions in which we operate, which could materially adversely affect our business or financial performance.

In addition to our U.S. operations, we operate our retail business in Africa, Canada, Central America, Chile, China, India and Mexico.

During fiscal 2021, our Walmart International operations generated approximately 22% of our consolidated net sales. Walmart International's operations in various countries also source goods and services from other countries. Our future operating results in these countries could be negatively affected by a variety of factors, most of which are beyond our control. These factors include political conditions, including political instability, local and global economic conditions, legal and regulatory constraints (such as regulation of product and service offerings including regulatory restrictions (such as foreign ownership restrictions) on eCommerce and retail operations in international markets, such as India), restrictive governmental actions (such as trade protection measures), antitrust and competition law regulatory matters (such as the competition investigations currently underway in Mexico related to our subsidiary Wal-Mart de Mexico, in Canada related to our subsidiary Wal-Mart Canada and competition proceedings in India related to our Flipkart subsidiary), local product safety and environmental laws, tax regulations, local labor laws, anti-money laundering laws and regulations, trade policies, currency regulations, laws and regulations regarding consumer and data protection, and other matters in any of the countries or regions in which we operate, now or in the future.

Tax law in markets of operation

Changes in tax and trade laws and regulations could materially adversely affect our financial performance.

Tax law in US

In fiscal 2021, our Walmart U.S. and Sam's Club operating segments generated approximately 78% of our consolidated net sales. Significant changes in tax and trade policies, including tariffs and government regulations affecting trade between the U.S. and other countries where we source many of the products we sell in our stores and clubs could have an adverse effect on our financial performance. A significant portion of the general merchandise we sell in our U.S. stores and clubs is manufactured in other countries. Any such actions including the imposition of further tariffs on imports could increase the cost to us of such merchandise (whether imported directly or indirectly) and cause increases in the prices at which we sell such merchandise to our customers, which could materially adversely affect the financial performance of our U.S. operations and our business.

No mention of international tax reform

We are subject to income taxes and other taxes in both the U.S. and the foreign jurisdictions in which we currently operate or have historically operated. The determination of our worldwide provision for income taxes and current and deferred tax assets and liabilities requires judgment and estimation. Our income taxes could be materially adversely affected by earnings being lower than anticipated in jurisdictions that have lower statutory tax rates and higher than anticipated in jurisdictions that have higher statutory tax rates, by changes in the valuation of our deferred tax assets and liabilities, or by changes in worldwide tax laws, tax rates, regulations or accounting principles.

We are also exposed to future tax legislation, as well as the issuance of future regulations and changes in administrative interpretations of existing tax laws, any of which can impact our current and future years' tax provision. The effect of such changes in tax law could have a material effect on our business, financial position and results of operations. In the U.S., the Tax Cuts and Jobs Act of 2017 (the "Tax Act") significantly changed federal income tax laws that affect U.S. corporations and additional guidance from the U.S. Treasury Department, the IRS, and other standard-setting bodies is still pending. As further guidance is issued by these taxing authorities, any resulting changes in our estimates will be treated in accordance with the relevant accounting guidance. Compliance with the Tax Act, including collecting information not regularly produced by the Company or unexpected changes in our estimates, may require us to incur additional costs and could affect our results of operations.

In addition, in response to significant market volatility and disruptions to business operations resulting from the global spread of COVID-19, legislatures and taxing authorities in many jurisdictions in which we operate may enact changes to their tax rules. These changes could include modifications that have temporary effect and more permanent changes. The impact of these potential new rules as well as any other changes in domestic and international tax rules and regulations could have a material effect on our effective tax rate.

Furthermore, we are subject to regular review and audit by both domestic and foreign tax authorities as well as subject to the prospective and retrospective effects of changing tax regulations and legislation. Although we believe our tax estimates are reasonable, the ultimate tax outcome may materially differ from the tax amounts recorded in our Consolidated Financial Statements and may materially affect our income tax provision, net income, or cash flows in the period or periods for which such determination and settlement is made.

go back to slides

Persistence of the effects

Daily data. Do effects persist and grow?

1. Daily raw returns: $r_{i,t,t+1}$

$$r_{i,t,t+1}$$

2. CAPM-adjusted returns

$$r^{ab}_{i,t,t+1} = r_{i,t,t+1} - \beta_m r_{mkt,t,t+1}$$

3. Three-factor-adjusted returns

$$r^{ab}_{i,t,t+1} = r_{i,t,t+1} - \beta_m r_{m,t,t+1} - \beta_s r_{smb,t,t+1} - \beta_h r_{hml,t,t+1}$$

4. Four-factor-adjusted returns

$$r^{ab}_{i,t,t+1} = r_{i,t,t+1} - \beta_m r_{m,t,t+1} - \beta_s r_{smb,t,t+1} - \beta_h r_{hml,t,t+1} - \beta_u r_{mom,t,t+1}$$

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