

18-18 Sector Gains Are Uneven Under the 2017 Tax Act

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September 2018

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Author's note: I thank Olivier Blanchard, Jérémie Cohen-Setton, Jason Furman, Joseph Gagnon, Colombe Ladreit, Egor Gornostay, Helen Hillebrand, and Richard Prinszano for very helpful comments.

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The Tax Cuts and Jobs Act (TCJA) signed into law at the end of 2017 will decrease the statutory corporate tax rate from 35 to 21 percent while also substantially changing the tax base and the taxation of international income. Despite the large fiscal cost of the law, both the Congressional Budget Office (CBO) and markets expect a relatively modest aggregate economic impact.¹ During the legislative process, market expectations that Congress would pass a new tax law favorable to corporate interests accounted, on average, for only 2 to 6 percentage points of the overall 25 percent increase in stock prices following the November 2016 presidential election to the end of 2017 (Blanchard et al. 2018). It turns out that these modest benefits from the market's anticipation of the new tax law were not evenly spread among sectors. The actual changes to the tax code are not likely to be sector neutral either; different sectors and industries will not benefit equally from the uniform reduction in statutory rates because their effective tax rates prior to the new tax law were wide

ranging, from 4 to 32 percent. A myriad of other changes have sector-specific implications; for example, the substantial changes to the tax base, such as limits on deducting net interest payments, will harm specific capital-intensive sectors such as real estate and utilities.

This Policy Brief presents evidence that the TCJA is expected to affect the present discounted value (PDV) of after-tax corporate profits with significant differences across sectors. Sectors that had high effective tax rates before the bill, low leverage, low capital expenditures, and low foreign exposure are poised to benefit from the TCJA with stock price increases of close to 10 percent—two to three times more than aggregate S&P 500 prices. The new tax law is negative on net for some sectors—real estate, information technology, and utilities—because the reduction in statutory rates for sectors with already low effective tax rates will be more than offset by the tax base expansion from provisions such as the limit on net interest deductions, the limit on the use of net operating losses, and sunset clauses for capital expensing.

By including market projections of the TCJA's impact by sector, this Policy Brief extends the methodology that Blanchard et al. (2018) developed to estimate how much of the stock market price increases seen between the 2016 US presidential election and December 2017 can be attributed to market expectations that the tax bill would be signed into law. It complements other economic projections² by adding market expectations and predictions of the future impact of the tax bill on the present value of firms listed on the S&P 500 index. Market predictions could differ from previous economic analysis if, for example, lower tax rates were expected to offset the increase in the present discounted value (PDV) of firms through higher expected interest rates.³

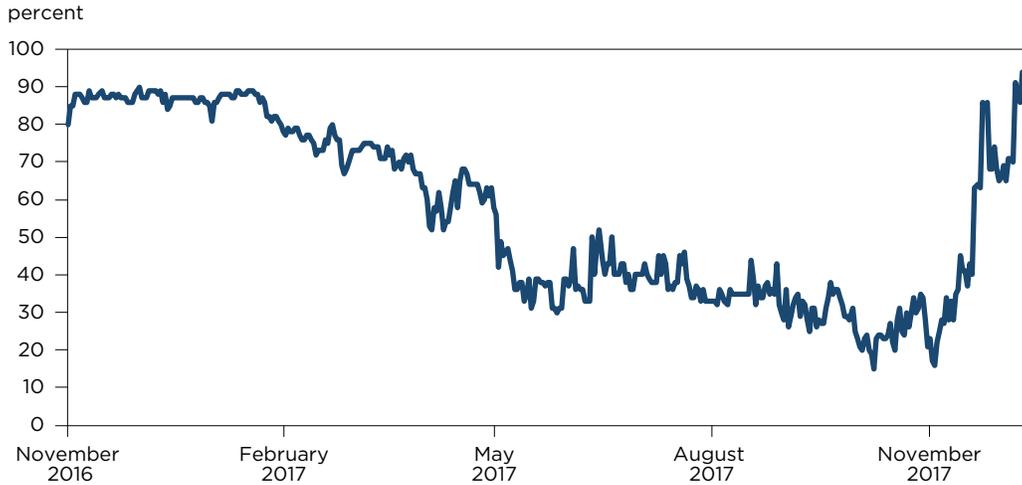
The methodology also differs from previous econometric analysis (Wagner et al. 2017) by using a dataset covering the entire legislative process, from the 2016 US presidential election to the tax law's passage in December 2017, rather than just the aftermath of the election. The methodology can therefore account for significant changes

1. Thomas Pellet, "CBO and Markets Agree: The 2017 US Tax Act Will Not Raise Stock Prices Much," RealTime Economic Issues Watch, Peterson Institute for International Economics, May 4, 2018.

2. UBS, "US equities Update: Sector implications of tax reform," December 21, 2017; PWBM (2017a, b).

3. For more context, see Thomas Pellet, "CBO and Markets Agree: The 2017 US Tax Act Will Not Raise Stock Prices Much," RealTime Economic Issues Watch, Peterson Institute for International Economics, May 4, 2018.

Figure 1 Market predictions of the probability of passage of the TCJA by the end of 2017



TCJA = Tax Cuts and Jobs Act
 Source: www.predictit.org.

made to the original campaign tax proposal, such as the announcement of measures to counter tax base erosion, with corresponding changes in market expectations for foreign exposed sectors.

REVEALING MARKET EXPECTATIONS OF THE TCJA: METHODOLOGY

The analysis presented here takes daily sectoral stock prices from Bloomberg and daily estimates of the likelihood of TCJA passage from the website PredictIt.org, a “stock market for politics” that lets investors trade real money on the likelihood of future political events. Comparing these two sets of daily data helps identify a causal link between the tax legislation process and market projections for sectors of the economy. The methodology interprets the price fluctuations on PredictIt.org as changes in the probability of an event happening according to market participants. One such prediction market opened on November 9, 2016, to bet on the likelihood of future corporate tax cuts following the US presidential election (figure 1).

This market was relatively liquid over the period studied, with on average 500 transactions a day and spikes above 10,000 transactions on specific dates. If both the stock market and betting markets were reacting to news about the legislative process, changes in the former should be correlated with changes in the latter. Tracking weekly changes in prices and probabilities helps control for long-term trends in stock prices.⁴ Since other factors in the global economy were also

driving stock prices over 2017, controlling for the global financial cycle helps isolate US tax-driven changes in stock prices. The specification estimated is the following:

$$\Delta P_t^i = \alpha^i + \gamma^i \Delta R_t^{MSCIW\ ex\ US} + \beta^i \Delta ProbTax_t + \varepsilon_t^i \quad (1)$$

ΔP_t^i is the stock return of index i during week t , where i is one of the following Global Industry Classification Standard (GICS) sectors of the S&P 500: consumer discretionary, consumer staples, energy, financials, health care, industrials, information technology, materials, real estate, telecommunication services, and utilities. $\Delta R_t^{MSCIW\ ex\ US}$ is the stock return of the MSCI World index, excluding the United States, during week t . The variable $\Delta ProbTax_t$ denotes changes during week t in the probabilities (more accurately, the betting odds) of passage of a corporate income tax bill by the end of 2017.

A LARGE DISCREPANCY ACROSS SECTORS: THE RESULTS

Table 1 displays the percent change in stock prices, from the time of the 2016 presidential election through December 2017, that can be attributed to the passage of the TCJA for all GICS sectors, derived from β^i estimates in equation (1).

The results vary widely across sectors, with a spread of 11.5 percentage points. Three of the eleven sectors saw a decrease in stock prices based on market predictions that the TCJA would pass, namely information technology, real

4. Results are robust to different values for the time window of price changes. Estimates are even more significant for

biweekly changes. However, weekly changes were used instead in order to limit omitted-variable bias.

Table 1 Percent changes in stock prices attributable to the passage of the TCJA (November 9, 2016–December 19, 2017)

	S&P 500 aggregate	Telecommunication services	Financials	Consumer discretionary	Industrials	Materials
Percent change	2.52***	9.35***	6.96***	4.26***	3.76***	3.66***
Standard error	(0.502)	(2.51)	(2.10)	(0.843)	(1.36)	(0.776)
	Energy	Health care	Consumer staples	Information technology	Utilities	Real estate
Percent change	2.15	2.09**	1.36	-0.323	-1.68	-2.10*
Standard error	(1.196)	(0.905)	(1.55)	(1.82)	(1.22)	(1.15)

*** p<0.01, ** p<0.05, * p<0.1

TCJA = Tax Cuts and Jobs Act

Notes: Detailed regression results are presented in appendix table A.1.

Sources: Bloomberg Finance L.P., www.predictit.org, and author's calculations.

estate, and utilities. But only the estimate for the real estate sector, -2.1 percent, is statistically significant. Only telecommunications and financials were predicted to be poised to largely benefit from the new tax law with an effect on stock prices of 9.4 and 7.0 percent, respectively.⁵ A price change of this magnitude is not trivial and suggests that some measures of the TCJA are concentrated (intentionally or not) on specific sectors, as explained in the next section. Once again, these estimates only reflect how much market participants expected the TCJA would affect the PDV of stocks. These market projections are, however, well aligned with economists' projections, as shown in appendix figure A.1,⁶ suggesting a consensus among financial and economic forecasters about the sectoral impact of the TCJA.

This exercise is restricted to listed firms, however, and therefore does not reflect expectations about the entire US economy. Listed firms will be affected differently by the TCJA, as they also tend to be larger than private firms. For example, the limit on net interest deductions applies to firms with gross receipts greater than \$25 million and therefore is not likely to affect small and medium nonlisted firms. Similarly, listed banks are likely to benefit from the shift to territorial taxation in the long run, while private local banks will remain unaffected as they generate a limited amount of foreign earnings.

5. Controlling for the probability of passage of individual tax reform in equation (1), as a proxy for deregulation momentum in general, yields roughly similar results. Controlling for 1-month, 3-month, 6-month, or 1-year US treasuries interest rates in weekly changes or levels gives virtually identical results.

6. To check the plausibility of these estimates, it is possible to compare them with the Penn Wharton Budget Model (PWBM) tax gain estimates by industry (PWBM 2017a). Market expectations are broadly in line with economic analysis. Financials is the only sector for which market expectations are much higher than PWBM estimates. PWBM suggests larger tax gains for technology and real estate than markets expect.

CHANGES IN MARKET EXPECTATIONS OVER TIME

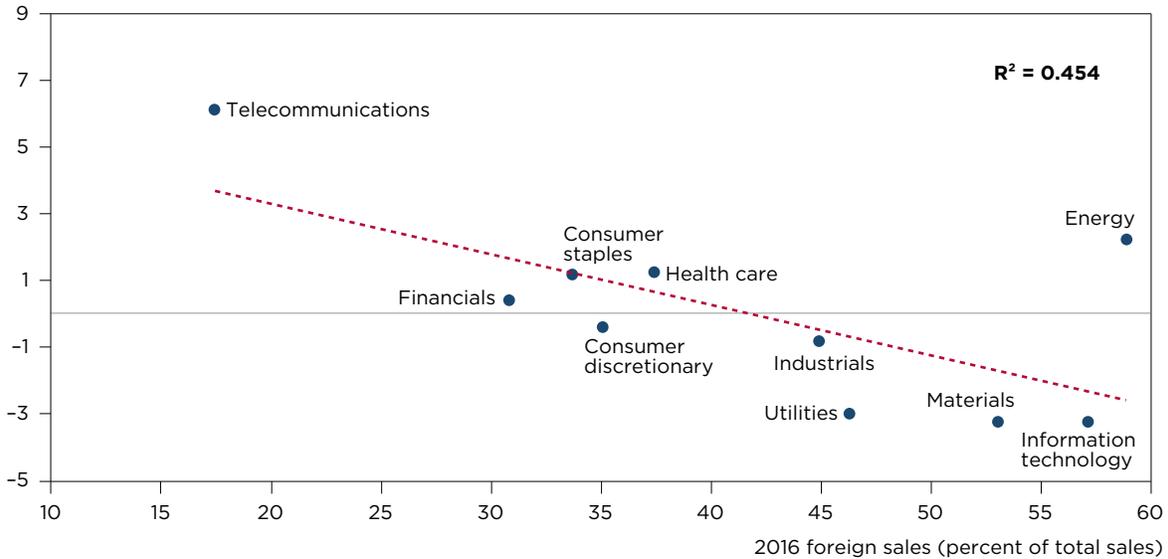
The tax proposal changed significantly during the period on which equation (1) is estimated. The original campaign proposal included a 15 percent flat tax rate on retained earnings, as opposed to 21 percent in the final bill. Another campaign promise was the repeal of most if not all business deductions, whereas the final bill kept limited interest deductions and prolonged capital expensing for five years. A House Republican blueprint of tax changes began circulating on June 24, 2016, and major announcements were made with the tax reform outline on April 26, 2017, and the "Unified Framework for Fixing Our Broken Tax Code" on September 27, 2017. The shift to a territorial tax system was not clearly stated during the campaign, and some provisions such as the Base Erosion and Anti-Abuse Tax (BEAT) and Global Intangible Low-Taxed Income (GILTI) were largely unexpected until November 2017.

Estimations of equation 1 are essentially a weighted average of the expected impact of all the various draft bills during the period, between the US election day in November 2016 and the passage of the bill in December 2017. If the final bill was perceived as significantly different from the campaign proposal, estimates right after election day should be different from estimates right before the vote on the final bill. The methodology used here can reveal how market perceptions of the TCJA changed over time. The appendix (figure A.2) presents evidence that market expectations remained broadly stable over time, suggesting that the changes to the tax bill during the legislative process did not fundamentally alter the way markets projected what the TCJA would be and how it would affect the economy.

Yet a simple comparison of estimated sector sensitivities to the TCJA between the first and second half of 2017 suggests market expectations did change somewhat (appendix figure A.3). What drove the changes in market perceptions during the last half of 2017? Regressing estimates of sector

Figure 2 Explaining the shift in expectations over time: Market expectation (beta) revisions compared to foreign exposure of sectors

residual from July–December 2017 sample estimates on November 2016–June 2017 sample estimates



Sources: Bloomberg Finance L.P., S&P Global, www.predictit.org, and author’s calculations.

sensitivities from the second half of 2017 on sensitivity estimates from the rest of the sample can explain the residual, which is intuitively the shift in market expectations between the two periods.

As figure 2 shows, having larger foreign exposure is a good predictor of a downward revision in market expectations of the passage of the TCJA for the second half of 2017. This suggests that the mid-November announcement of an overhaul to the international taxation regime, with measures such as GILTI and BEAT, affected market expectations. To test this hypothesis statistically, it is possible to estimate the following model:

$$\Delta P_t^i = \alpha^i + \gamma_1^i \Delta R_t^{MSCIW\ ex\ US} + \beta_1^i \Delta ProbTax_t + \beta_2^i \Delta \text{Time dummy} + \gamma_2^i \text{Time dummy} + \varepsilon_t^i$$

Where the *Time dummy* is zero before November 20, 2017, and the announcement of the international corporate income tax overhaul and 1 thereafter. β_2 and γ_2 estimates will reflect the slope and level effect of the international tax reform announcement on market expectations. Table A.3 presented in the appendix shows that stock prices for seven sectors shifted significantly with changes in market expectations following the international tax reform announcement, along the lines of foreign sales exposure.⁷ The telecommu-

nications sector largely benefited from the announcement, while the information technology sector was hurt by its foreign exposure. As the legislative process moved away from campaign tax promises to include a territorial taxation regime, markets anticipated that the transition would hurt sectors that generate more sales abroad on average. This supports the claim that such a switch was a major amendment to the campaign tax proposal that would hurt multinationals.⁸

SECTORAL DIVERGENCES EXPLAINED BY THE REDUCTION IN STATUTORY RATES

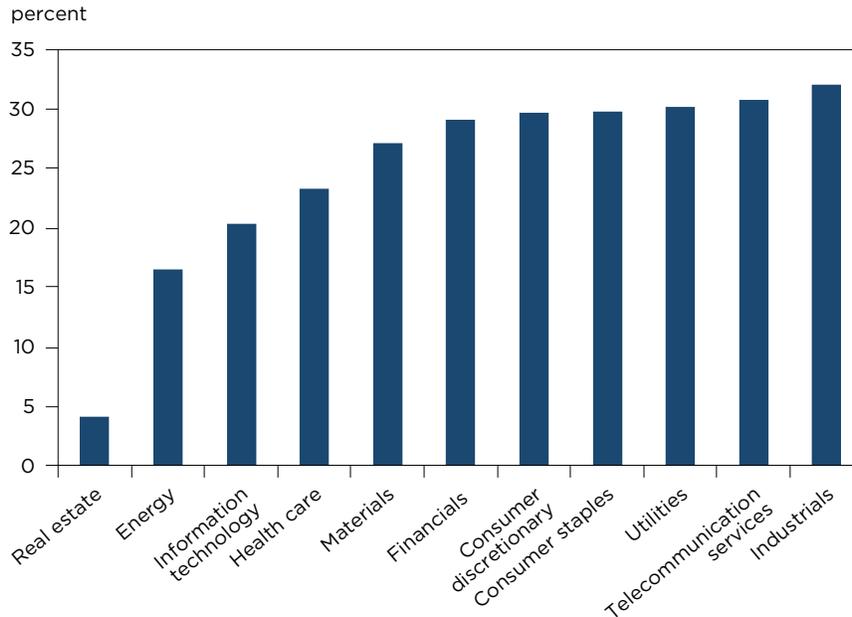
Abstracting from changes to the tax base and focusing on the reduction in statutory rates, a general pattern emerges: The TCJA moved the tax system closer to sectoral neutrality. Previously higher taxed sectors got larger tax cuts, which is reflected in the differential market performance of different sectors. Blanchard et al. (2018) estimate that higher taxed firms benefit more from the TCJA than lower taxed firms, suggesting that the same would be true for higher taxed and lower taxed sectors. Figure 3 shows the large disparities in average effective tax rates by sector prior to the new tax law. The real estate sector faced a low 4 percent effective tax rate

porting the fact that the international tax overhaul drove the market to update its expectations at the end of 2017.

8. Gary Clyde Hufbauer and Zhiyao (Lucy) Lu, “Corporate Tax Reform Favors Domestic Production, Not US Multinationals,” Realtime Economic Issues Watch, Peterson Institute for International Economics, January 12, 2018.

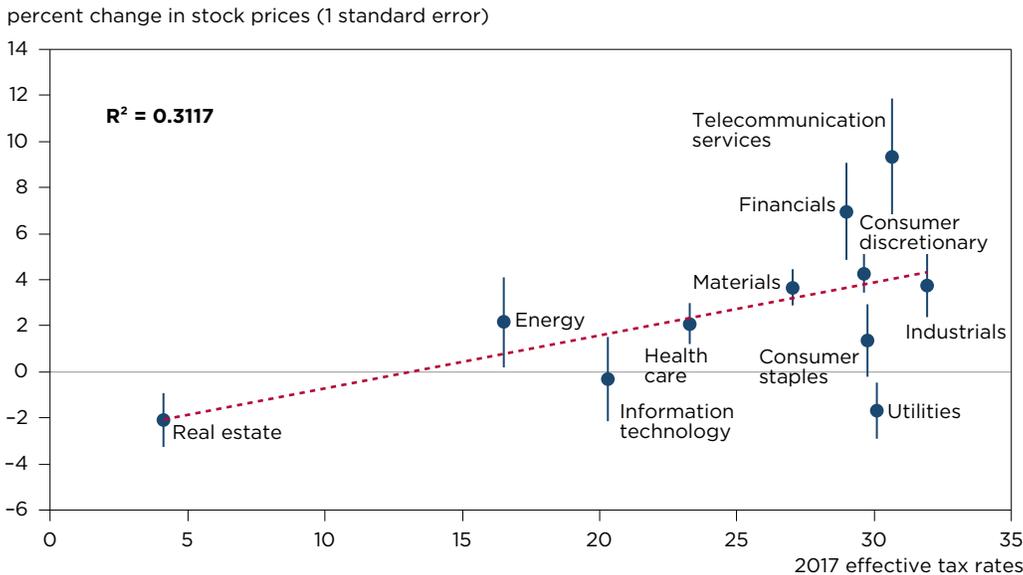
7. Regressing the Corporate tax * Time dummy interaction term on foreign sales yields similar results to figure 2, sup-

Figure 3 Effective tax rates by GICS sector before the enactment of the TCJA



GICS = Global Industry Classification Standard; TCJA = Tax Cuts and Jobs Act
 Sources: Aswath Damodaran, "Tax Rates by Sector (US)," available at http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/taxrate.htm (accessed on April 13, 2018); and author's calculations.

Figure 4 Market expectations of TCJA passage (percent change in stock prices) against 2017 effective tax rates prior to TCJA



TCJA = Tax Cuts and Jobs Act
 Sources: Aswath Damodaran, "Tax Rates by Sector (US)," available at http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/taxrate.htm (accessed on April 13, 2018); and author's calculations.

(mostly due to development and real estate investment trust activities), while the industrial sector faced a much higher 32 percent effective tax rate. Therefore, a common decrease in statutory tax rates from 35 to 21 percent is not sector neutral.

Sectors that had a high effective tax rate benefit more from the bill than previously low taxed sectors.

Figure 4 regresses percent changes in stock prices from table 1 against effective tax rates before the introduction of

the tax bill by sector. There is a clear positive correlation between 2017 effective tax rates and percent changes in stock prices attributable to market predictions of the TCJA passing. Where effective tax rates were low, the market expected the sector to benefit less from the TCJA, sending stock prices down, and where rates were higher, the market expected greater benefit, therefore raising stock prices.

Fiscal balance sheet “legacies” prior to the passage of the TCJA are another source of the uneven impact of the tax law. Reduced statutory rates affect the value of past deferred tax balances and losses carried forward. Sectors that were net debtors to the Internal Revenue Service (IRS), such as telecommunication services, made a one-off gain when the new statutory rates were applied, as the value of their liability decreased considerably with the lowered statutory rates. Sectors that had carried forward large losses and that were creditors to the IRS, such as information technology firms, suffered a one-off loss, as the amount of gross tax receipts on which firms could deduct losses carried forward decreased.⁹

The TCJA did more than just reduce statutory rates, however. In its estimate of the effect of the TCJA on the budget, the bipartisan Joint Committee on Taxation (JCT) provides a 10-year budget impact assessment for each provision in the bill and expects various tax base expansions to offset the reduction in statutory rates by more than half (JCT 2017). Other factors are at play in explaining the large range of sectoral elasticities to the TCJA.

SECTORAL DIVERGENCES EXPLAINED BY A CHANGE IN THE TAX BASE

The TCJA also makes numerous changes to the tax base, although there is considerable uncertainty about the future of many of these provisions because of phase-in and sunset provisions. In that sense, estimates from table 1 say as much about market expectations for passage of the TCJA as they do about expectations of future tax changes and deduction extensions. According to the JCT’s analysis of the law over the next 10 years, three provisions appear to significantly change the tax base and increase corporate taxes. First, the cap on net interest deductions is the largest expansion of the tax base, accounting for 36 percent of gross tax increases over the decade. Highly leveraged sectors with low taxable income are likely to face a significant increase in taxable income, as the cap is a function of taxable income. IRS data show the utilities and real estate sectors were the main beneficiaries of net interest deductions and therefore will suffer more from the cap than the rest. Figure 5 shows the relatively strong

relationship between market expectations (as measured in stock price changes) for sector sensitivities and its net debt over sales¹⁰ and shows the relatively high leverage of the real estate and utilities sectors.

Second, the limit on the use of net operating loss carry-forwards and the end of carryback deductions, representing 28 percent of total gross tax increases, hit sectors that have a low to negative operating surplus on average and nonliquid assets on their balance sheets. Utilities and the energy sector (in an environment of low oil prices) fit that category. The information technology sector also includes loss-making companies with illiquid intangible assets.

Third, the TCJA broadens the definition of eligible tangible assets for capital investment expensing on the short run and extends the bonus depreciation provision for five years. In the medium run, the TCJA gradually phases out capital expensing provisions and restricts expensing for intangible assets such as research and development¹¹ and software programming (CBO 2018, 119) starting in 2022 (although reportedly many companies expect this provision will never come into force). Figure 6 shows the TCJA negatively affects sectors with high capital expenditures,¹² suggesting that markets are looking past temporary bonus depreciation rules and instead setting prices based on reduced capital expensing in the long run.

The previous regressions show two outliers: the telecommunications and the financial sectors. Their relative elasticity is not easily explained by effective tax rates, leverage, or capital expenditure levels. According to JCT (2017), tax increases that target the financial sector account for a minor 4.7 percent of total gross tax increases in the bill. The TCJA includes substantial changes to international taxation likely to benefit the financial sector on net—including a one-time (abated) charge on overseas retained earnings, permanent gross tax cuts through a territorial system, and deductions for foreign-derived intangible income (FDII)—despite permanent gross tax increases with several new base erosion provisions. Figure 7 shows the financial sector holds a large amount of retained earnings, suggesting relatively large foreign retained earnings and therefore that the sector would benefit from the shift to a territorial regime.

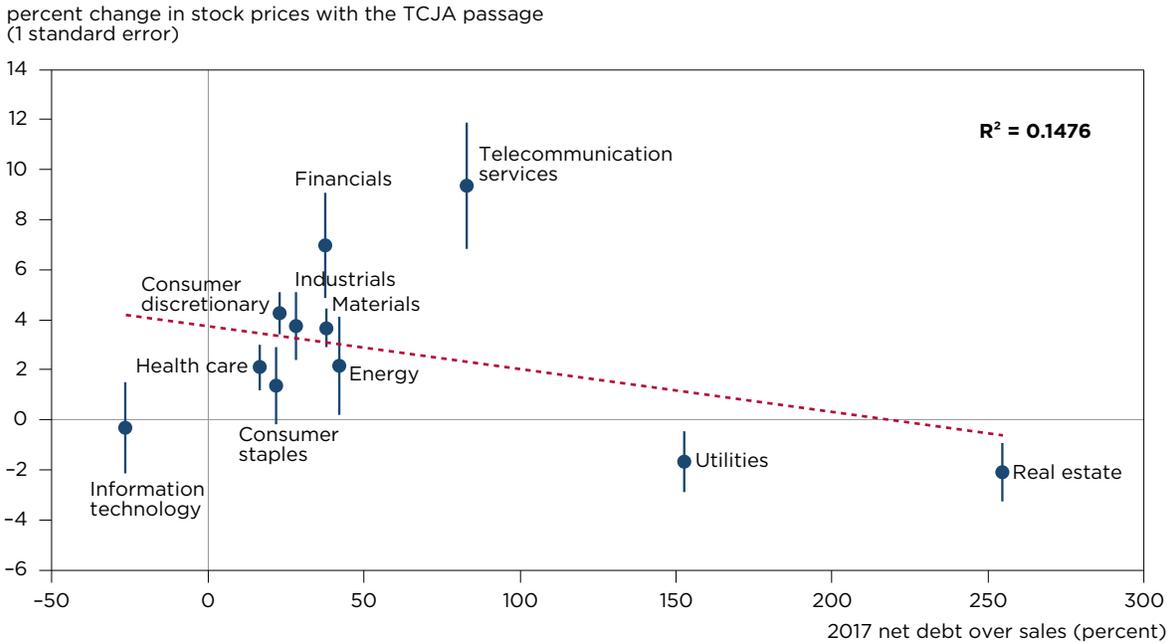
9. Rochelle Toplensky, Patrick Mathurin, and Andrew Edgecliffe-Johnson, “US companies count costs and benefits of Trump tax law,” *Financial Times*, April 22, 2018.

10. Results are similar when using net debt over earnings before interest, taxes, depreciation, and amortization (EBITDA).

11. The limit on amortization of research and development itself accounts for 17 percent of total gross tax increases in the bill, according to JCT (2017).

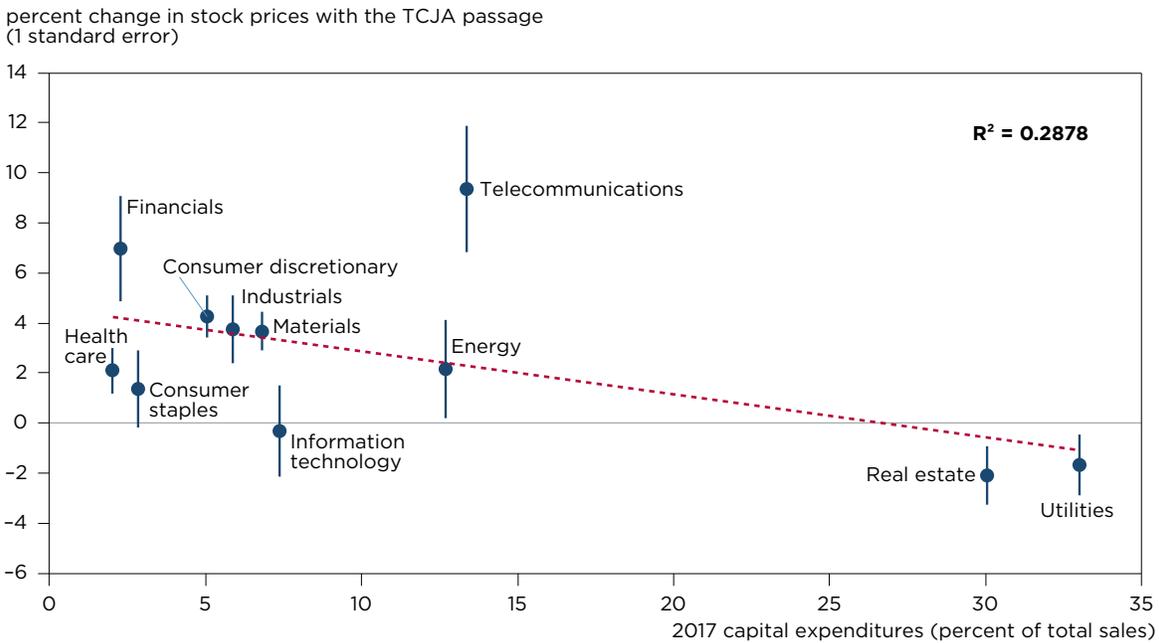
12. This is also true when taking jointly the effective tax rate and capital expenditures as independent variables, but coefficients are not significant considering the small number of observations.

Figure 5 Market expectations of TCJA passage against 2017 sectoral leverage



TCJA = Tax Cuts and Jobs Act
Sources: Bloomberg Finance L.P. and author's calculations.

Figure 6 Market expectations of TCJA passage against 2017 capital expenditures



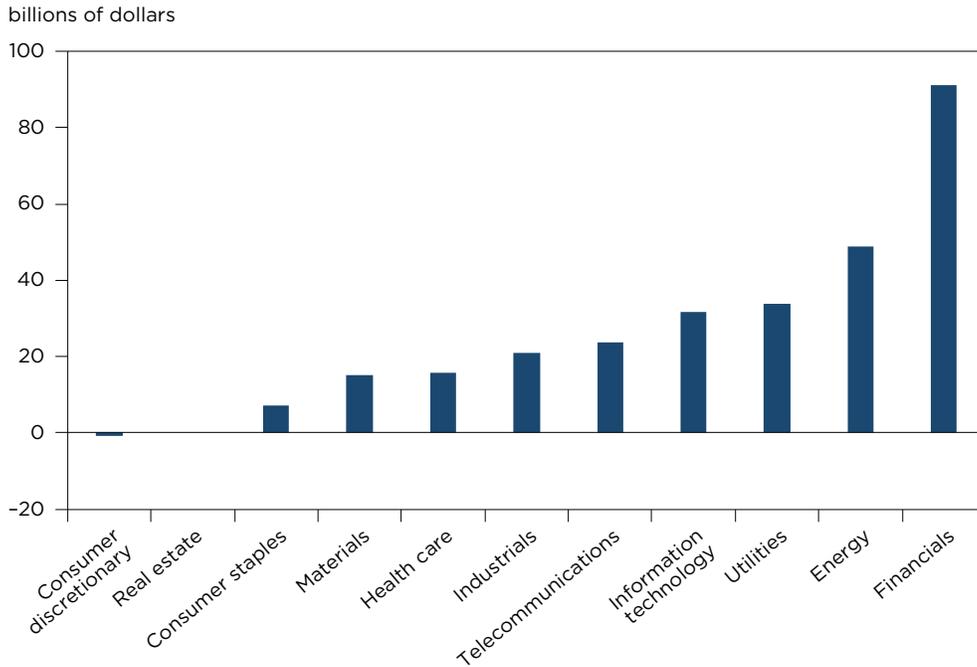
TCJA = Tax Cuts and Jobs Act
Sources: Bloomberg Finance L.P. and author's calculations.

As for telecommunications, Gutiérrez and Philippon (2017) show that firms in this sector have become concentrated over time, which has reduced competition and their need to invest. The large reduction in effective tax rates for the telecommunications sector is therefore more likely

to translate into higher dividends in the future, supporting today's stock prices, rather than higher investment. This could explain the sector's higher estimated sensitivities.

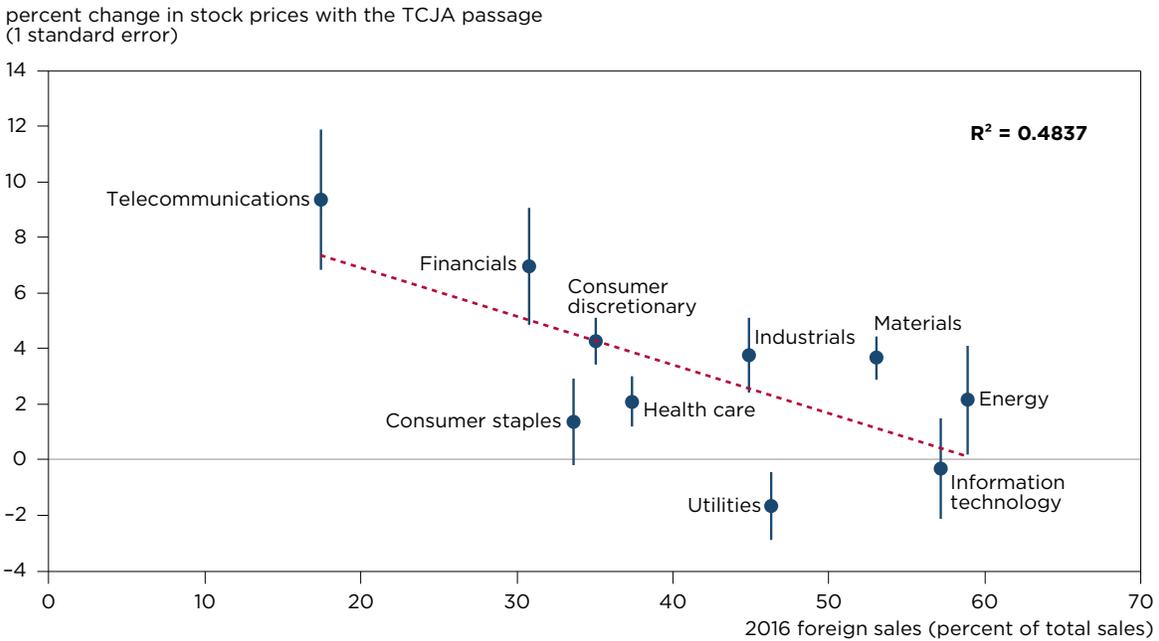
Exposure to the US market is also a key determinant of the expected impact of the tax act. Figure 8 shows that

Figure 7 Retained earnings by sector, 2017



TCJA = Tax Cuts and Jobs Act
 Sources: Bloomberg Finance L.P. and author's calculations.

Figure 8 Market expectations of TCJA passage against 2016 foreign sales



TCJA = Tax Cuts and Jobs Act
 Sources: Bloomberg Finance L.P. and author's calculations.

sectors with high exposure to the US markets are expected to benefit more from the tax bill than sectors generating most of their sales abroad. It is noteworthy that three out of the

eleven sectors generate more than 50 percent of their sales outside of the United States.

More formally, appendix table A.2 shows regression

results of sectoral elasticities to the TCJA on several sector characteristics. Because of the small sample size, estimates are not always significant, but qualitative results are consistent with the impact of the four main provisions of the TCJA analyzed above. Sectors that are highly leveraged, have a low effective tax rate, and are capital intensive will be negatively affected by the bill. The Tobin's Q ratio helps control for the differential between the return on equity (ROE) and the cost of equity pre-TCJA (table A.2b). Sectors with a low Q value are plagued with poor profits and/or high capital costs, and are therefore likely to benefit from the tax bill, all other characteristics being equal. Using microdata, Wagner et al. (2017) regress cumulated abnormal returns after the 2016 US presidential election on individual firm characteristics. They find that firms whose net operating losses, foreign exposure, interest expenses, and leverage are high all underperformed the aggregate stock market, broadly consistent with findings presented here.

CONCLUSIONS

The reduced statutory tax rates and changes to the tax base in the 2017 tax law will have significantly different effects across sectors. Several sector characteristics contribute to the varying impact: High effective tax rates before the law passed,

low leverage, low capital expenditures, and low foreign exposure all predict a higher impact from the TCJA. The new tax law is also negative on net for some sectors, as the tax base expansions from several provisions—the limits on net interest deductions and on the use of net operating losses, and capital expensing sunset clauses—are significant. The TCJA is also expected to affect the macroeconomic environment, with somewhat higher economic growth but mostly higher interest rates and capital costs.¹³ The financial sector tends to do well in this sort of macroeconomic environment, with higher spreads and higher investment, while real estate activity tends to decline. The real estate sector is further hit by the individual income tax chapter of the TCJA, which limits deductions for mortgage debt, reducing households' propensity to fund residential investment through debt, slowing down housing inflation.

REFERENCES

- Blanchard, Olivier, Christopher G. Collins, Mohammad R. Jahan-Parvar, Thomas Pellet, and Beth Anne Wilson. 2018. *Why Has the Stock Market Risen So Much Since the US Presidential Election?* PIIE Policy Brief 18-4 (February). Washington: Peterson Institute for International Economics.
- CBO (Congressional Budget Office). 2018. *The Budget and Economic Outlook: 2018 to 2028*. Washington.
- Gutiérrez, Germán, and Thomas Philippon. 2017. *Declining Competition and Investment in the U.S.* NBER Working Paper No. 23583 (July). Cambridge, MA: National Bureau of Economic Research.
- JCT (Joint Committee on Taxation). 2017. *Estimated budget effects of the conference agreement for H.R.1, the "Tax Cuts and Jobs Act."* JCX-67-17: 1-10. Washington.
- PWBM (Penn Wharton Budget Model). 2017a. *The Tax Cuts and Jobs Act, as Reported by Conference Committee (12/15/17): Tax Effects by Industry*. Penn Wharton Digest. Philadelphia, PA: University of Pennsylvania.
- PWBM (Penn Wharton Budget Model). 2017b. *Implementing Alternative Tax Reforms in the Penn Wharton Budget Model Static Tax Simulator*. Technical Brief. Philadelphia, PA: University of Pennsylvania.
- Wagner, Alexander F., Richard J. Zeckhauser, and Alexandre Ziegler. 2017. *Company Stock Price Reactions to the 2016 Election Shock: Trump, Taxes and Trade*. HKS Faculty Research Working Paper Series RWP17-005 (February). Cambridge, MA: Harvard Kennedy School. Available at <https://doi.org/10.2139/ssrn.2909835>.

13. Thomas Pellet, "CBO and Markets Agree: The 2017 US Tax Act Will Not Raise Stock Prices Much," RealTime Economic Issues Watch, Peterson Institute for International Economics, May 4, 2018.

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APPENDIX

Table A.1 displays complete regression results based on estimation of equation 1. The economic interpretation of estimates in the table is straightforward. With the enactment of the TCJA, the probability of passage becomes 100 percent. Multiplying the corporate tax act sensitivity estimates by 100 yields the percentage change in a sector's average stock price associated with the passage of the TCJA, as expected by markets (and shown in the main text).

ROBUSTNESS CHECKS

1. Comparison with Economic Analysis

One way to check the plausibility of estimates in table A.1 is to compare them with forecasted tax gains by industry sector from the Penn Wharton Budget Model (PWBM 2017a). The model estimates the cumulated reduction in taxes paid over a 32-year window for North American Industry Classification System (NAICS) sectors at the two-digit level. For a given sector, a net decrease (increase) in taxes paid should correspond to a positive (negative) elasticity to the TCJA. There

should be a positive correlation between PWBM tax reduction estimates and elasticities to the TCJA. Figure A.1 plots estimated elasticities by sector against cumulated reduction in taxes over the 2018–40 period.

The picture is similar when discounting future tax gains using an estimated cost of capital or expressing tax gains as a percentage of average earnings over the last decade. Controlling for the probability of passage of changes in the tax code for individuals in equation 1 yields roughly similar results, suggesting that corporate tax changes rather than general deregulation are driving results. Market expectations are very much in line with the PWBM. The apparent consensus is that utilities will be a net loser from the TCJA. The materials sector, on the contrary, will be a net beneficiary. Financials, information technology, and real estate are the three sectors where economic analysis and market expectations seem to diverge. Market expectations are more optimistic about financials and more pessimistic about real estate and information technology than the PWBM.

What could explain the discrepancies between market and economic forecasts? First, the NAICS two-digit industry

Table A.1 Effects of changes in TCJA passage probabilities on sectoral stock prices (November 9, 2016–December 19, 2017)

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	S&P 500 aggregate	Materials	Energy	Financials	Industrials	Information technology
Corporate tax act	0.0252*** (0.00502)	0.0366*** (0.00776)	0.0215 (0.0196)	0.0696*** (0.0210)	0.0376*** (0.0136)	-0.00323 (0.0182)
MSCI excluding US	0.464*** (0.0596)	0.627*** (0.0810)	0.475*** (0.161)	0.273 (0.174)	0.460*** (0.0750)	0.761*** (0.102)
Constant	0.202*** (0.0623)	0.138 (0.0973)	-0.189 (0.198)	0.341** (0.173)	0.153 (0.107)	0.346** (0.138)
Observations	399	399	399	399	399	399
R2	0.331	0.271	0.0591	0.116	0.187	0.211
	(7)	(8)	(9)	(10)	(11)	(12)
Variables	Consumer staples	Utilities	Health care	Consumer discretionary	Real estate	Telecommunications
Corporate tax act	0.0136 (0.0155)	-0.0168 (0.0122)	0.0209** (0.00905)	0.0426*** (0.00843)	-0.0210* (0.0115)	0.0935*** (0.0251)
MSCI excluding US	0.234** (0.119)	0.222* (0.118)	0.368*** (0.0984)	0.509*** (0.0847)	0.457*** (0.167)	0.0919 (0.227)
Constant	0.127 (0.122)	0.212 (0.130)	0.168 (0.125)	0.190* (0.104)	0.0426 (0.131)	0.0788 (0.224)
Observations	399	399	399	399	399	399
R2	0.0403	0.0334	0.0789	0.252	0.105	0.0933

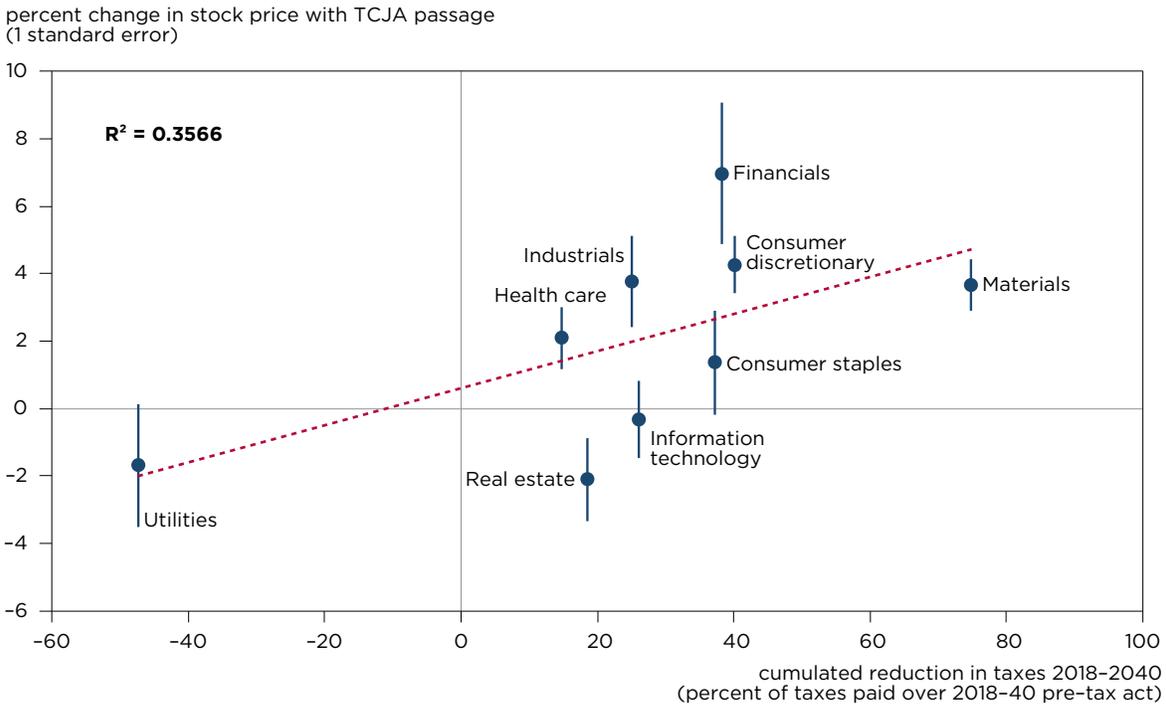
*** prob < 0.01, ** prob < 0.05, * prob < 0.1

TCJA = Tax Cuts and Jobs Act

Notes: This table reports the results of estimation of equation 1. The return series are listed on the top row. Newey-West (4 lags) corrected standard errors are in parentheses. The MSCI World Index excluding the United States is a broad global equity index that represents large and mid-cap equity performance across 22 developed market countries. It covers approximately 85 percent of the free float-adjusted market capitalization in each country and does not offer exposure to emerging markets.

Sources: Bloomberg Finance L.P., www.predictit.org, and author's calculations.

Figure A.1 Market estimates of the TCJA impact compared with PWBM economic projections



TCJA = Tax Cuts and Jobs Act; PWBM = Penn Wharton Budget Model
Sources: Bloomberg Finance L.P., www.predictit.org, PWBM, and author's calculations.

classification that the PWBM uses does not match perfectly with GICS classification, leading to measurement errors.¹⁴ For example, the information technology sector as reconstructed from the PWBM also includes telecommunications. Since telecommunications is poised to be the sector benefiting the most from the TCJA, it likely biases the PWBM estimates upward when compared to an information technology sector that excludes telecommunications. Second, the PWBM simulates corporate income tax liability based on a single representative corporation by sector. It does not distinguish private firms from S&P 500 listed firms and banks. Listed firms might be affected differently from the TCJA as they also tend to be larger. For example, the limit on net interest deductions applies to firms with gross receipts greater than \$25 million, which likely preserves the deduction for small

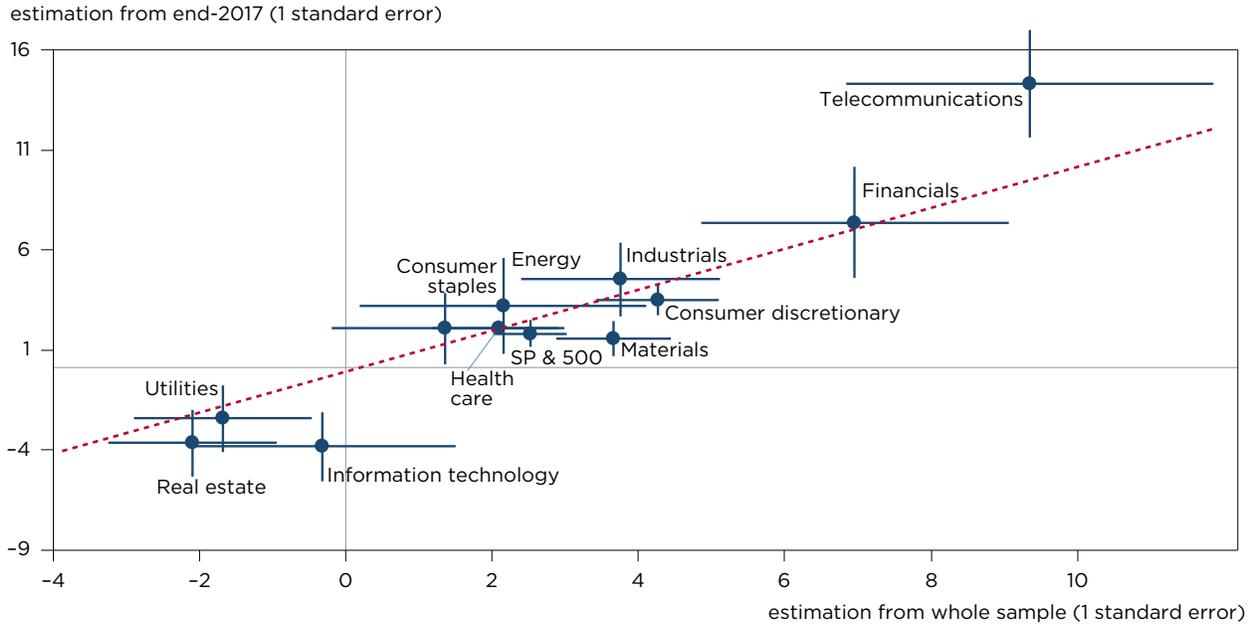
and medium nonlisted firms. Similarly, listed banks are likely to benefit from the shift to territorial taxation in the long run, while private local banks will remain unaffected, explaining why market expectations for financials are higher than the PWBM forecasts.

2. Stability of Estimates over the Sample Period

Figure A.2 compares estimates generated from the entire sample to estimates from the last quarter of 2017, on a 45-degree line. Fourth quarter 2017 estimates are not significantly different from full sample estimates, except for the telecommunications sector, suggesting that estimates are relatively stable or that last quarter probability changes drove full sample results. Figure A.3 compares estimates from the first half of the sample to estimates of the second half. Expectations for 10 out of the 11 sectors changed significantly over time. Energy, health care, real estate, and telecommunications saw a positive revision in market expectations over time, while utilities, information technology, consumer discretionary, financials, industrials, and materials saw a negative revision in market expectations.

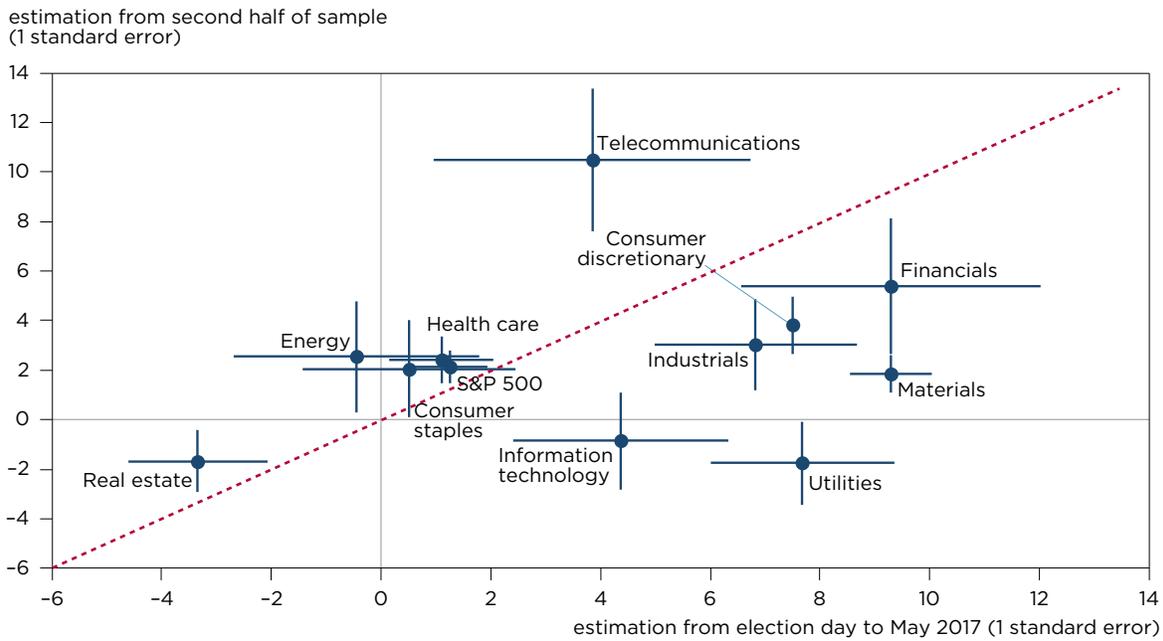
14. Using nomenclature used by Standard & Poor's, it is possible to match (imperfectly) NAICS sectors to GICS sectors for an approximate comparison. Energy and telecommunications cannot be matched to the NAICS two-digit industries and are therefore missing. The underlying data file for this Policy Brief contains the table that matches S&P nomenclature and GICS sectors.

Figure A.2 Subsample stability of estimates, comparison between whole sample and end-2017 estimates



Notes: Whole sample date range is November 9, 2016–December 19, 2017; end-2017 date range is October 1–December 19, 2017. Sources: Bloomberg Finance L.P. and author’s calculations.

Figure A.3 Subsample stability of estimates, comparison between first half and second half of the sample date range



Notes: First half of sample date range: November 9, 2016–May 31, 2017; second half of sample date range: June 1, 2017–December 19, 2017. Sources: Bloomberg Finance L.P. and author’s calculations.