

Will a Lower Corporate Tax Rate Boost Economic Growth?

The Evidence from OECD Countries, 2000 to 2015

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The Trump administration and Republican lawmakers are now working on personal and corporate income tax cuts in order to fulfill their campaign promises. The proposed tax code overhaul could be the largest since the Tax Reform Act in 1986. The question is: Will these tax cuts boost economic growth as President Trump predicts? For a personal income tax cut, the economics literature provides mixed evidence. Because there are many moving parts and confounding factors, we will not address personal income tax in this report. Rather, we will focus on a corporate tax cut. Other things being equal, will a (permanent) corporate tax cut boost long-term GDP growth? The answer is yes, provided that the government's deficit is under control.¹ This report will provide a literature review and present the evidence via a simple regression analysis using data from OECD countries from 2000 to 2015. To be more precise², we suggest that a lower tax rate of a country is associated with a higher GDP growth.

Corporate Tax Rates in OECD Countries

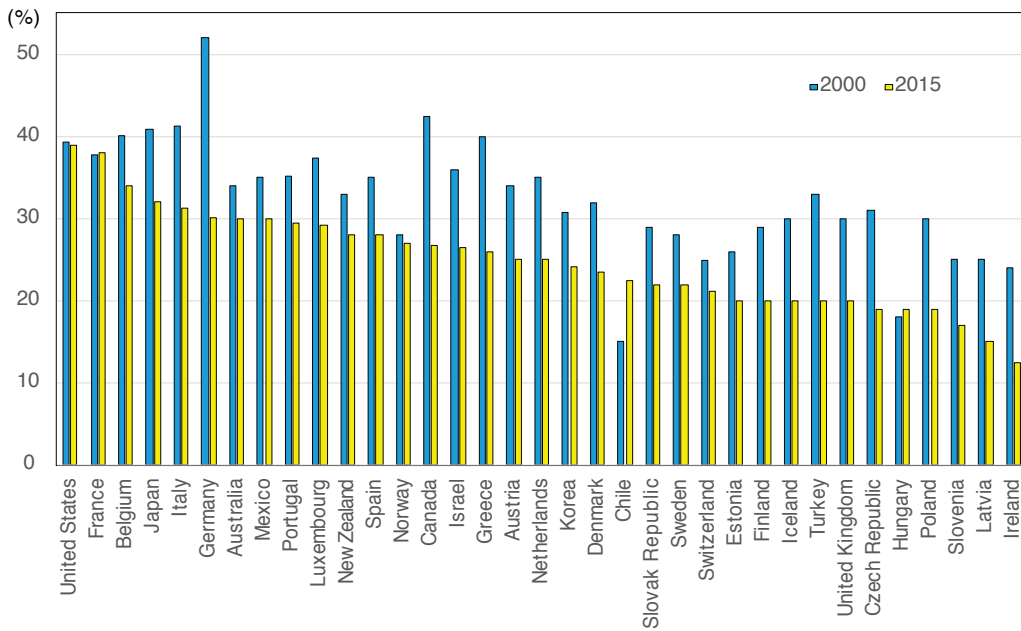
Figure 1 shows the corporate income tax rates (central and sub-central governments combined) of 35 countries in the Organization for Economic Cooperation and Development (OECD) in 2000 (blue bar) and 2015 (yellow bar). In 2000, several countries, e.g. Germany, Canada, Italy, Japan, and Belgium, had higher corporate tax rates than the U.S.'s 39%. From 2000 to 2015, although we see tax cuts across most of those countries, the U.S. rate remains almost unchanged. More importantly, the U.S. has become the OECD country with the highest statutory corporate income tax, followed by France and Belgium.

In contrast, during the same period, Ireland cut its corporate tax rate from 24% to 12.5%, the lowest among OECD countries. Because of this, the Celtic Tiger has become the home of American corporate inversion, in which

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1. *We don't know the final version of tax rate cuts and reform. Based on the current information, Republican lawmakers want to make this tax reform revenue neutral in order to make the overhaul of the tax codes permanent.*
 2. *The true causality (a tax cut boosts economic growth) is much more difficult to prove.*

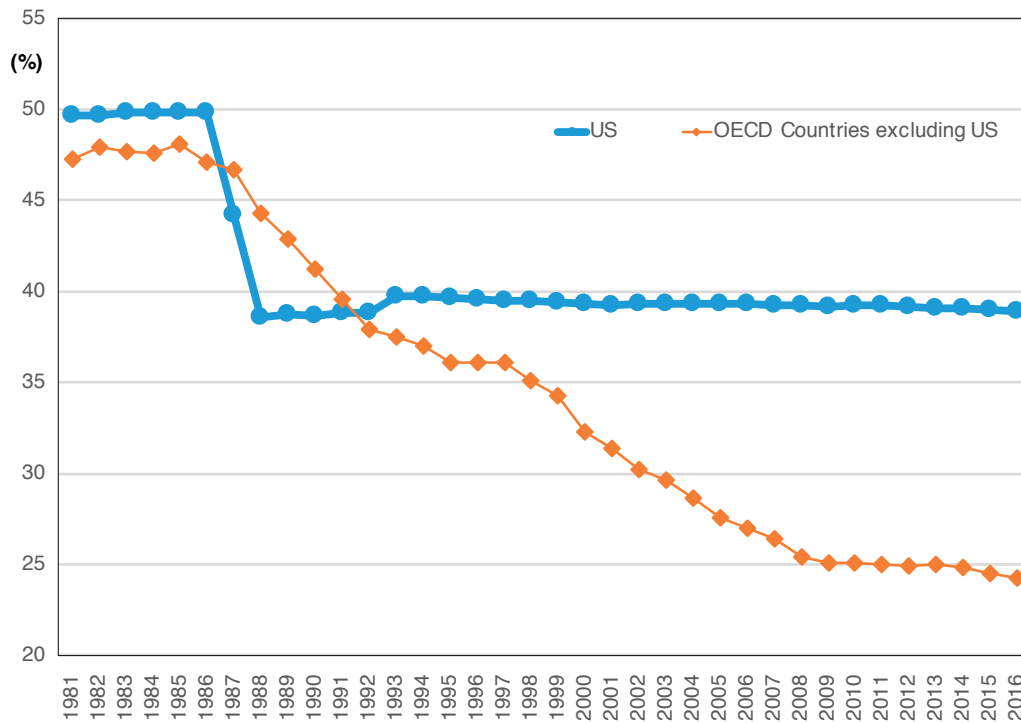
WILL A LOWER CORPORATE TAX RATE BOOST ECONOMIC GROWTH?

Figure 1 The Corporate Income Tax Rates in OECD Countries in 2000 and 2015



Source: OECD Data

Figure 2 The Corporate Income Tax Rates in the U.S. and OECD Countries from 1981 to 2016



Source: OECD Data

multinational companies move their headquarters to Dublin through merger to cut their tax bills. Meanwhile, Ireland has recovered rapidly from its financial crisis in 2008. Guess what the GDP per capita growth rates were for Ireland in 2014 and 2015? **8% and 26%**³, respectively! Ireland's GDP per capita in 2015 was \$65,290, which surpassed the US's \$51,640. It is undeniable that the low corporate tax rate in Ireland is a major driver of this economic success.

Figure 2 presents the corporate income tax rate for the U.S. and the rest of the OECD countries from 1981 to 2016. Prior to 1986, all OECD countries had a tax rate higher than 45%. In 1987, the U.S. rate was reduced to the 38%-39% that has lasted until today. On the other hand, the rest of the OECD countries have continued to cut their tax rates to an average of 24% currently.

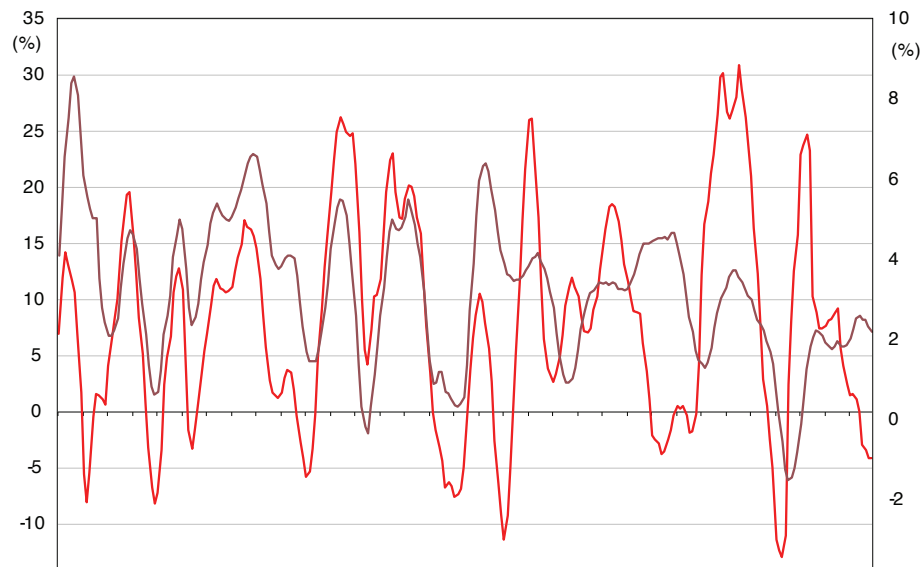
Do we have the evidence of American corporate inversion for lower corporate income tax plus the practices of outsourcing and transfer pricing for lower tax bills? Figure 3 compares year-over-year growth rates (with a 2-year moving average to smooth volatile ups and downs) of nominal

corporate profits after tax (red line, left scale) and real GDP (blue line, right scale). We can see that in the 1950s and 1960s, real GDP growth tended to be relatively higher than corporate profits. During the 1970s, '80s, and '90s, growth rates for both series tended to be more similar. In the 2000s and the 2010s, corporate profits are higher than GDP growth most of the time. One possible reason for relatively higher growth in corporate profits over the past two decades is that corporate America is actively practicing manufacturing outsourcing and corporate inversion to pursue low corporate tax rates overseas. In doing so, GDP growth falls behind corporate profit growth.

Literature Review

Gale and Samwick (2016)⁴ have examined how changes to the individual income tax rate affect long-term economic growth. They suggest the net impact on growth of personal income tax rate cuts is uncertain (e.g. small or even negative). However, they conclude that a base-broadening tax reform that improves incentives and reduces distortion will have positive impact on economic growth.

Figure 3 Year-over-Year Growth Rates (Two-Year Moving Average) for Corporate Profits After Tax and Real GDP in the U.S.



Source: Federal Reserve Economic Data

3. These stunningly amazing high GDP growth rates for a developed country like Ireland come directly from the reclassification of assets due to rising corporate inversions.
 4. William Gale and Andrew Samwick (2016), "Effects of Income Tax Changes on Economic Growth."

Lee and Gordon (2005)⁵ also find that personal tax rates are not significantly associated with economic growth. But they do find a significant effect for corporate tax rates on economic growth by controlling other factors in cross-country and time-series estimates for 70 countries from 1970 to 1997. Here are their baseline multivariate regression results:

- A 10% point decrease in corporate tax rate (from 1980 to 1989) is associated with a 0.64% point increase of GDP per capita growth.
- High GDP per capita in 1970 is associated with low GDP per capita growth during the sample period. This is so-called economic convergence, in which rich countries have slower growth while developing countries have higher growth.
- High primary school enrollment rate in 1970 is associated with high GDP per capita growth during the same period. A country with high human capital will have higher growth.
- High trade openness (1970-74) is associated with high GDP per capita growth.
- Countries with less corruption and better bureaucracy are associated with high GDP per capita growth.
- High inflation rates are associated with low GDP per capita growth.

One might ask a question: Why won't a cut on personal income tax boost economic growth while a cut on corporate taxes will? We suggest one possible reason is that in the globalized economy, corporations are much more likely and easier to move their capital across borders than citizens in the pursuit of low taxes. Therefore, a low and competitive corporate tax rate could not only increase domestic investment but also attract foreign investment. Ireland is a poster child lately.

In addition to the accumulation of capital, tax structure might have an effect on total factor productivity. De Long and Summers (1991)⁶ provide evidence that equipment investment may generate important positive spillovers. Cullen and Gordon (2002)⁷ suggest that a low corporate tax

rate relative to a personal tax rate encourages risk-taking and entrepreneurial activity. In short, the literature seems to support that a low corporate tax rate is associated with economic growth.

A Simple Model and Evidence from OECD Countries from 2000 to 2015

Lee and Gordon (2005) use data of 70 countries from 1970 to 1997 and find that a low corporate tax rate is associated with high GDP per capita growth. Will the result be the same in the 21st century? To answer the question, we use OECD (35 countries as shown in Figure 1) data from 2000 to 2015 by using a simple regression model as follows. Figure 4 seems to indicate a negative correlation between the corporate tax rate (average from 2000 to 2008) and GDP per capita growth (average from 2000 to 2015), meaning that as the tax rates shrink, the GDP grows higher.

Figure 4 The association between the average corporate tax rate '00-'08 and the average GDP per capita growth '00-'15



Source: OECD Data and World Development Indicators

5. Young Lee and Roger Gordon (2005), "Tax Structure and Economic Growth," *Journal of Public Economics* 89.
 6. Bradford de Long and Larry Summers (1991), "Equipment Investment and Economic Growth," *Quarterly Journal of Economics* 106.
 7. Julie Cullen and Roger Gordon (2002), "Taxes and Entrepreneurial Activity: Theory and Evidence for the U.S.," NBER Working Paper No. 9015.

WILL A LOWER CORPORATE TAX RATE BOOST ECONOMIC GROWTH?

GDP per capita growth = α + β_1 *Corporate tax rate						Equation 1
(estimator) (t-stat) R squared = 0.42	5.13 (6.7)	-0.12 (-4.8)				Observation = 35
GDP per capita growth = α + β_1 *Corporate tax rate + β_2 *GDP per capita 2000						Equation 2
(estimator) (t-stat) R squared = 0.53	5.3 (7.8)	-0.1 (-4.3)	-0.0002 (-3.2)			Observation = 35
GDP per capita growth = α + β_1 *Corporate tax rate + β_2 *GDP per capita 2000 + β_3 *Debt to GDP ratio + β_4 *Corporate tax rate *Debt to GDP ratio						Equation 3
(estimator) (t-stat) R squared = 0.64	8.1 (6.4)	-0.16 (-3.8)	-0.0002 (-3.5)	-0.07 (3.1)	0.0019 (2.8)	Observation = 35

Now let's take a look at the regression results from three settings as shown in Equations 1 to 3. All three equations present consistent results, so we will focus on explaining only Equation 3. The estimation for the corporate tax rate (from 2000 to 2008)⁸ is -0.16. That said, other things being equal, if a country cut its corporate tax by 10 percentage points, we predict its GDP per-capita growth rate could increase by 1 to 1.6 percentage points. The GDP per capita level in 2000 is the variable to control for the initial economic development levels among these OECD countries. The estimation is negative, which means rich countries will have lower growth and vice versa.

The third variable is the government debt to GDP ratio from 2000 to 2008. The estimation is -0.07 meaning that when the debt to GDP ratio is rising by 10% over GDP due to the tax cuts, the growth rate will be reduced by 0.7% point. The net effect is similar to the estimation in Equation

2. The fourth variable is the interaction between tax rate and debt to GDP ratio. The estimation is positive meaning that the lower the debt ratio of a country, the bigger the boost a corporate tax cut will have on GDP growth. This suggests that a revenue-neutral tax cuts/reform will be more beneficial to the U.S. economy in the long run.

Conclusions

The literature and our empirical evidence for OECD countries from 2000 to 2015 suggest that a cut on the corporate tax rate might have a positive impact on GDP growth, assuming the government budget deficit and debt level are under control. Therefore, given the expectation of implementation of tax reform on the corporate tax rate in the coming months under the Trump Administration, the recent exuberance in stock markets is not totally irrational.

8. We calculate the average corporate tax rate and debt to GDP ratio for each country from 2000 to 2008 instead of the whole sample period 2000 to 2015. The reason to choose the first half period is to make the right-hand-side variables more exogenous. In a robustness check, we used the corporate tax rate in 2000 as an alternative variable. The coefficient is also statistically significant.