Will Helping Corporations Help Everyone Else? How Corporate Tax Rates Are Related to GDP Growth and FDI Inflows

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Abstract

This paper hypothesizes that lower corporate tax rates are associated with higher GDP growth and FDI inflows. To test the hypothesis, samples of both developed and less developed economies were used to examine the relationship that exists amongst the relevant variables using regression analysis. The results of the regression analyses used to test this hypothesis indicate that a statistically significant negative relationship indeed exists between corporate tax rates and GDP growth within developed economies, while no significant relationship exists between the two variables within less developed economies. The results also indicate that, contrary to this paper’s hypothesis, FDI inflows are positively correlated with corporate tax rates in both developed and less developed economies. The FDI inflows/corporate tax rate regression results, however, are only statistically significant when using developed country data to perform the regression.
Corporations have become behemoths in the modern global economy. The annual revenues of these massive organizations often surpass the GDP of small nations – evidence that the corporation is likely one of the most powerful institutions at work in the larger marketplace. It is arguable that corporations are only surpassed in economic influence by the very governments under which these companies exist. Given the significance of these economic actors, it is interesting to pose a question that examines the economic interplay between corporations and the governments that regulate their activity: how do the corporate tax rates set by a nation’s government affect that nation’s GDP growth and FDI inflows?

I hypothesize that lower corporate tax rates do indeed result in an increase in growth and FDI inflows. The importance of understanding the relationships that exist amongst these variables is clear: should there be a clear benefit to lowering corporate tax rates in which excess cash in corporate hands results in favorable outcomes across the larger economy, then fiscal policy should obviously ensure that corporate tax rates remain low. It is very likely that fiscal policy directed towards corporations does indeed have an effect on the growth of the larger economy and foreign investment, given the sheer amount of money flowing through these companies. The Global Policy Forum (2010) found that General Motors’ revenues in 2010 were larger than the GDP of nations such as Vietnam, Bangladesh, and Iraq. Lundeen (2014) finds that, in the U.S., corporations represent only 5% of the nation’s companies, but earn 62% of revenues. Anderson and Cavanagh (2000) found that, of the 100 largest economies in the world, 51 were corporations while only 49 were countries, based on a comparison of corporate sales and country GDPs. Under these considerations, the connection between corporate wealth and country wealth – and the implications it may have for GDP growth and FDI inflows - seems nearly inevitable.

The literature on the relationship between corporate tax rates and GDP growth is largely supportive of my hypothesis. There are, however, also studies that alter or even negate my hypothesis about the relationship between corporate tax rates and GDP growth. One such study supports the hypothesis of a non-linear relationship between the two, while another suggests that corporate tax rates are positively, not negatively, correlated with GDP growth.

Studies surveying the relationship between corporate tax rates and FDI inflows are also controversial, with results varying depending on the region of study or methodology employed. Some studies show empirical support for a negative relationship between corporate tax rates and FDI, while others deny the existence of any significant relationship whatsoever between the two variables.

Some findings within these studies even suggest a possible causality between FDI and economic growth. However, as with the other findings discussed thus far, there is controversy in the literature. Another study I surveyed denounced any relationship whatsoever between FDI and GDP growth.
The controversy within current literature findings regarding corporate tax rate effects on FDI inflows and GDP growth, which will be discussed in greater detail later in this paper in a literature review, presents opportunities for my own research. Given that these studies generally used data from different regions and date ranges, their conflicting results could mean that the relationships amongst the factors in question are not well-defined, but rather that they vary depending on certain characteristics of the countries observed.

None of the studies investigate this possibility – that certain characteristics of countries surveyed, such as economic freedom levels or OECD membership, can actually impact the nature of the relationships that exist within those countries amongst GDP growth, FDI inflows, and corporate tax rates. Instead, they generally survey many countries which oftentimes represent vastly differing backgrounds to come up with broad conclusions regarding those relationships, which are often presented as having external validity.

My research can contribute to this area of knowledge by observing relationships between corporate tax rates, FDI inflows, and GDP growth within more narrowly defined groupings of countries using data from a more recent window of time. This will allow me to see, using up-to-date data, whether the relationships between the three variables in question vary with respect to the “type” of countries under consideration.

Instead of using data from the 1960s all the way to the modern day, as many studies have done, I will restrict my data to a more recent date range, using only data from 2015 and 2016. This will ensure that the data yields results that are still relevant in a modern context. I will also create groupings for country data that place countries with certain defining characteristics within the same data group, and thus the same regression. Rather than coming up with an “average” relationship by looking at broad datasets of countries with dissimilar backgrounds, I will compartmentalize country data according to country characteristics. Specifically, I will conduct one set of regressions on OECD member countries to observe the relationships amongst corporate tax rates, FDI inflows, and GDP growth that exist within highly developed economies. My other grouping will consist of countries rated as “mostly unfree” in terms of economic freedom by The Heritage Foundation. Given the characteristics that relegate countries to being deemed as “mostly unfree” – such as having less property right protections, lower business and labor freedom, and lower government integrity - the relationships observed amongst the three variables within this grouping will be more representative of less developed economies. By making these “advanced” and “less advanced” economy groupings and using them to conduct two different sets of regressions, I can ascertain whether the relationships amongst corporate tax rates, FDI inflows, and GDP growth differ depending on the economic status of countries being observed.

My findings using these methods will allow me to determine whether there are relationships amongst corporate tax rates, FDI inflows, and GDP growth and, if so, whether these relationships differ depending on the level of development within the economy under consideration.

**Literature Review**

I hypothesize that lower corporate tax rates result in an increase in GDP growth. Given the corporation’s tendency to invest excess funds in things such as research and development, cash-positive projects, and employee training, it is probable that any mechanism that would decrease costs for these companies would have a desirable trickle-down effect across the larger economy and
spur growth. Any excess cash within a corporation would be more likely to be put to productive uses – either now or in the future - than excess cash in the hands of an individual. Additionally, I pose that FDI inflows should also increase as a result of lower corporate tax rates. Investors are more likely to send their funds to countries with more favorable, less burdensome regulatory conditions for business activity, such that their investments are more likely to yield positive returns.

The literature on the relationship between corporate tax rates and GDP growth is fairly supportive of the hypothesis I set forth in this paper. Using both statutory and effective corporate tax rates to build out a regression model, Gemmel et al. (2014) uses a sample of OECD member countries to perform an analysis which provides broad support for the hypothesis that lower GDP growth tends to be associated with higher domestic corporate tax rates. By implication, this would mean that higher GDP growth is associated with lower domestic corporate tax rates within OECD countries, as I hypothesize. Lee and Gordon (2015) use a cross-section data set measuring 70 countries over the years 1970-1997 and find through OLS regression that the statutory corporate tax rate is significantly negatively correlated with economic growth.

There are, of course, also studies that alter or even negate my hypothesis about corporate tax rate effects on GDP growth. Hunady and Orviska (2015), for example, finds that there is actually a non-linear relationship that exists between corporate tax rates and GDP growth. The study’s panel data regression model constructed from EU country data from 1999-2011 confirms an inverted U-shape effect for both statutory and effective corporate tax rates on economic growth - when tax rates are low, increasing them has positive effects on GDP growth and, when rates are high, a hike in taxes has negative effects on GDP growth. Anguelov (2017), almost in total contradiction to Hunady and Orviska’s findings as well as my own hypothesis, uses panel data across 60 countries to construct a time series regression from 1999-2009, and surprisingly finds that relatively high statutory marginal corporate tax rates contribute to GDP growth, while aggressively lowering corporate tax rates can diminish growth. The study explains this anomaly in that generally, the nations that most aggressively lower their MCTRs are largely poorer nations that are more dependent on corporate taxes because their GNI brackets are too low to generate substantial tax revenue from payroll and individual income taxes. Thus, when poorer nations aggressively lower their corporate tax rates, it often has such a disruptive effect on tax revenues and, in turn, public infrastructure spending that it inhibits growth.

Studies surveying the relationship between corporate tax rates and FDI inflows are also controversial, with results varying depending on the region of study or methodology employed. Some studies show empirical support for a negative relationship between corporate tax rates and FDI. Anguelov (2017) indeed finds that there was a negative correlation between statutory corporate tax rates and foreign direct investment, agreeing with my hypothesis. Djankov and Simeon (2010) finds through panel data of 85 countries that both statutory and effective corporate tax rates are negatively correlated with FDI inflows at a significant level. Jimborean and Kelber (2017) surveys Central and Eastern European countries, observing a negative and statistically significant correlation between statutory corporate tax rates and FDI inflows. Bellak and Leibrecht (2009) looks at this same region, finding that a 1% decrease in the statutory corporate tax rate will result in a 1.45% increase in FDI inflows.

However, Bellak and Leibrecht (2009) also asserts that statutory corporate tax rates are not a good measure of tax effects on FDI, as these rates do not account for adjustments and deductions made by companies. It further asserts that the importance of corporate tax rate effects on general FDI
flows need not be overstated, as their results find that statutory rates have insignificant effects on FDI outflows in Central and Eastern European countries. Another study, also surveying a specific region of Europe, is unsupportive of my hypothesis. Kersan-Skabic (2015) employs eight different models to examine the influence of corporate tax rates on FDI in Southeast Europe, and finds that the difference between corporate tax rates in countries and those of their neighbors exerts no significant influence on FDI inflows in any of the models used. That said, despite this finding that undermines my hypothesis, this same method of surveying differences between corporate tax rates in a given country and those of its neighbors was the same method employed by Jimborean and Kelber (2017) to – in agreement with my hypothesis - find a significantly negative relationship between corporate tax rates and FDI inflows in Central and Eastern Europe.

Some findings within these studies even suggest a possible causality between FDI and economic growth. Jimborean and Kelber (2017) finds a positive impact of FDI inflows on economic growth during the 2007 economic crisis that becomes insignificant at the onset of the subsequent 2011 crisis. While the findings from 2007 data suggest a potential causality running between FDI inflows and economic growth that could pose a problem for my hypothesis, Anguelov (2017) reaffirms the insignificance of such a causality, stating that aggregate FDI inflows and outflows are not significant contributors to GDP change.

My analysis can contribute to the debate regarding these relationships by using more recent data observations to run regressions and investigate whether any statistically significant relationships exist amongst corporate tax rates, FDI inflows, and GDP growth and, if they do, whether they are positive or negative. Additionally, running different regressions for both “less developed” economies (that is, those that are deemed “mostly unfree”) and advanced economies (that is, OECD member countries) will allow me to observe whether these relationships differ depending on the level of development of the economy under consideration.

**Methods**

To test my hypothesis, I will be conducting ordinary least squares (OLS) regressions using Microsoft Excel, with data for economic indicators from the World Bank Group (2018) and data on corporate tax rates from KPMG (2018). I will use similar methods to conduct my regressions for both developed economies (all 35 OECD members) and less developed economies (27 “mostly unfree” countries, as deemed by The Heritage Foundation).

To investigate whether corporate tax rates affect GDP growth, I will use country data for 2016 GDP growth rates as my dependent variable, and I will use 2015 data for my independent variables. By using 2015 data for my independent variables and 2016 data for my dependent variable, I can mitigate the problem of reverse causality – that is, diminish the possibility that my dependent variable is affecting my independent variables. The logic here is that there is no way that 2016 occurrences can have an effect on the outcomes recorded in 2015.

My independent variables that I will use in my initial regression will include 2015 corporate tax rates (my primary independent variable of interest) and several control variables put in place to ensure that any coefficient measuring the effect of corporate tax rates on GDP growth is not unduly inflated. The 2015 control variables will include the following for all countries observed: PPP conversion factors (on a USD basis), balance of payments, inflation rates, unemployment rates, and foreign direct investment inflows. Including FDI inflows within my control group will allow, to
some extent, investigation into the causal relationship between FDI inflows and GDP growth discussed in some of the literature previously discussed. These same independent variables will be used for the regressions on both OECD countries and “mostly unfree” countries.

The relationship between FDI inflows and corporate tax rates will be examined using similar methods as those used to examine the GDP growth/corporate tax rate relationship. These methods will be applied to both OECD countries and “mostly unfree” countries. 2016 FDI inflows will be used as my dependent variable in these regressions. My 2015 independent variables will include corporate tax rates (again my primary independent variable of interest) and several 2015 control variables: PPP conversion factors (on a USD basis), balance of payments, inflation rates, unemployment rates, and GDP growth rates. The same concept of allowing investigation into the causal relationship between FDI inflows and GDP growth justifies my inclusion of GDP growth rates as a control variable.

Using these methods, I seek to make conclusions regarding four relationships.

- The relationship between GDP growth and corporate tax rates in more economically advanced OECD member countries
- The relationship between GDP growth and corporate tax rates in less economically developed, “mostly unfree” countries
- The relationship between FDI inflows and corporate tax rates in more economically advanced OECD member countries
- The relationship between FDI inflows and corporate tax rates in less economically developed, “mostly unfree” countries

Regression Results and Analysis of Results

GDP Growth and Corporate Tax Rates:

The observations for OECD member country data produced the regression results shown below.

<table>
<thead>
<tr>
<th>Regression Statistics</th>
</tr>
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<tbody>
<tr>
<td>Multiple R</td>
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<tr>
<td>R Square</td>
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<tr>
<td>Adjusted R Square</td>
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<tr>
<td>Standard Error</td>
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<td>Observations</td>
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<tr>
<th>ANOVA</th>
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<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Significance F</th>
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<tr>
<td>Regression</td>
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<td>28.4607913</td>
<td>4.743</td>
<td>4.2568</td>
<td>0.00361366</td>
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<td>Residual</td>
<td>28</td>
<td>31.20132089</td>
<td>1.114</td>
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<tr>
<td>Total</td>
<td>34</td>
<td>59.66211218</td>
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</table>

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Standard Error</th>
<th>t Stat</th>
<th>P-Value</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
<th>Lower 95.0%</th>
<th>Upper 95.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>2.4168231</td>
<td>1.198398826</td>
<td>2.017</td>
<td>0.0534</td>
<td>-0.03798559</td>
<td>4.8716318</td>
<td>-0.0379856</td>
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<tr>
<td>2015 Corporate Tax Rate</td>
<td>-0.071146</td>
<td>0.032851025</td>
<td>-2.17</td>
<td>0.039</td>
<td>-0.13843833</td>
<td>-0.003854</td>
<td>-0.1384383</td>
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<tr>
<td>2015 PPP conversion factor</td>
<td>1.5557163</td>
<td>0.897977735</td>
<td>1.732</td>
<td>0.0942</td>
<td>-0.28370771</td>
<td>3.3951403</td>
<td>-0.2837077</td>
</tr>
<tr>
<td>2015 BoP, USD</td>
<td>-1.42E-12</td>
<td>2.3476E-12</td>
<td>-0.6</td>
<td>0.5513</td>
<td>-6.224E-12</td>
<td>3.393E-12</td>
<td>-6.224E-12</td>
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<tr>
<td>2015 Inflation</td>
<td>0.3482852</td>
<td>0.094750945</td>
<td>3.676</td>
<td>0.001</td>
<td>0.15419667</td>
<td>0.5423737</td>
<td>0.15419669</td>
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<tr>
<td>2015 Unemployment</td>
<td>-0.0011326</td>
<td>0.042604117</td>
<td>-0.27</td>
<td>0.7923</td>
<td>-0.09859703</td>
<td>0.0759441</td>
<td>-0.098597</td>
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<tr>
<td>2015 FDI</td>
<td>-1.51E-12</td>
<td>2.70341E-12</td>
<td>-0.56</td>
<td>0.5807</td>
<td>-7.048E-12</td>
<td>4.027E-12</td>
<td>-7.048E-12</td>
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The overall regression model only explains 36.49% of the variability in GDP growth rates, but is statistically significant at the .05 level. This regression finds all independent variables included to be insignificant at the .05 level except for corporate tax rates and inflation. According to this model, a 1% increase in corporate tax rates should reduce GDP growth by .07%. This negative relationship is in agreement with my hypothesis of a negative relationship between corporate tax rates and GDP growth rates.

The scatterplot below plots all 35 OECD member observations, visually exhibiting the negative relationship between GDP growth and corporate tax rates. As shown, the only OECD country exhibiting negative GDP growth is Greece, which is unsurprising given the country’s recent economic turmoil.

The regression output that follows was produced using data from the 27 “mostly unfree” countries included in my analysis.
This model is shown to be insignificant overall, even at a lenient .1 level of significance, and thus using it to explain GDP growth in less developed economies would not be appropriate. The unreliability of this model could be explained by the high volatility and variability of GDP growth rates within developing economies. The observations for GDP growth rates among OECD countries only showed a standard deviation of 1.32%, while those for GDP growth rates within “mostly unfree” countries exhibited a standard deviation of 3.12%. The variability in the data for less developed economies, as well as the weakness of the trendline produced by these observations, are visually displayed in the scatterplot that follows.

FDI Inflows and Corporate Tax Rates:

Using the 35 OECD member countries as observations produced the following regression output.
The overall regression model explains 50.39% of the variability in FDI inflows and is statistically significant at the .05 level. However, several of the control variables proved insignificant in explaining FDI inflows: PPP conversion factor, inflation, unemployment, and GDP growth. Balance of payments and corporate tax rates are both statistically significant variables. According to this model, a 1% increase in the corporate tax rates should result in a $4,535,105,828 increase in FDI inflows. This is contradictory to my hypothesis in which I posed a negative relationship between the two variables. The positive relationship between corporate tax rates and FDI inflows can also be seen in the scatterplot that follows, which plots observations for all 35 OECD member countries.

Note, however, that there is a probable influence of outlier observations, such as the United States, on the trendline.

Balance of payments was actually found to have a much stronger relationship with FDI inflows than corporate tax rates, with a p-value of 2E-05. However, when the observations are displayed visually in the scatterplot that follows, it is hard not to question –yet again - the significant influence that the outliers in the data may have had on the strength of that relationship.
Regression results for the less developed economies are shown in the following table.

The overall regression model explains 52.65% of the variability in FDI inflows and is statistically significant at the .05 level. Interestingly, the same two variables as those exhibited in the regression using OECD observations – balance of payments and corporate tax rates - are the most significant amongst the independent variables included in this model for “mostly unfree” observations. It is noteworthy, however, that balance of payments is negatively correlated with FDI inflows in OECD countries, and positively correlated with FDI inflows in “mostly unfree” economies.

At the .05 level, only balance of payments passes the significance test. Corporate tax rates lag far behind in significance in this model, with a p-value of .19001. Although corporate tax rates are
statistically insignificant, it is nonetheless interesting that - as in the previous FDI inflows/corporate tax rate model using observations from OECD countries - these observations from “mostly unfree” countries also show a positive relationship between corporate tax rates and FDI inflows. In contradiction to my hypothesis, this model poses that a 1% increase in the corporate tax rate results in a $1,078,853,392 increase in FDI inflows. This positive relationship may have been rendered insignificant due to the heavy influence of three outliers in the data – namely, Brazil, India, and China - three of the four BRIC countries. Their heavy upward pull on the trendline can be visually seen in the following scatterplot.

Balance of payments once again proves to have a far more significant relationship with FDI inflows than corporate tax rates, even in less developed countries. The relationship displayed between FDI inflows and balance of payments is, however, positive in developing countries and negative in OECD countries. Although balance of payments proved a highly significant variable in predicting FDI inflows, with a p-value of 1.8E-05, it is possible that outliers affect the strength of this relationship. Similar to the OECD trend for the FDI/BoP relationship, there is possibly a heavy pull on the trendline coming from only a few outliers amongst the observations.

Source: KPMG 2018, The World Bank 2018

Source: The World Bank 2018
The notably strong significance of balance of payments in these regressions may suggest that balance of payments is a superior predictor of FDI inflows as compared to corporate tax rates. Additionally, the counterintuitive result of a positive relationship between corporate tax rates and FDI inflows (in both developed and developing economies) may further undermine the reliability of corporate tax rates as a predictor of FDI inflows. Lastly, the positive relationship between corporate tax rates and FDI inflows was only found to be significant within developed OECD countries (with a p-value just barely below the .05 significance threshold at .0496).

The counterintuitive nature of the relationship between corporate tax rates and FDI inflows, as well as the superior significance of balance of payments in predicting those inflows, suggests that corporate tax rates may not be the most reliable predictor for FDI inflows. Given that the balance of payments relationship with FDI inflows ran in two different directions – negative in OECD countries and positive in developing countries – it is unlikely that balance of payments, despite its strong significance, is a considerably more reliable predictor of FDI inflows than corporate tax rates. With that said, it is probable that there are other factors beyond the scope of this analysis that are more consistent and influential in determining FDI inflows.

**Limitations**

One of the greatest weaknesses of this analysis is the limited amount of data I am drawing from to make my conclusions. My sample size for developed countries only consisted of data spanning across two years for only 35 nations. My sample size for developing economies was even smaller, spanning two years of data for only 27 nations. Expanding the amount of data I am drawing from to make conclusions would require either spanning a greater time period or including more countries in my analysis.

Furthermore, my regression models still leave much of the variability in the data unexplained. The highest adjusted R squared I produced was 52.65%. Despite this shortcoming, the significance of my overall models was generally strong. With the exception of the GDP growth/corporate tax rate model for developing economies, all models used in this analysis proved significant at the .05 level. However, the significance of individual variables from which this analysis draws its conclusions is sometimes questionable. The significance of corporate tax rates in predicting OECD FDI inflows is just barely below the .05 significance threshold, at .0496, and the corporate tax rate variable proved insignificant altogether as a predictor of FDI inflows in the developing country regression model.

Lastly, the nature of the data used in this analysis could have impacted the strength of the relationships found. First, outliers were included the observations for all of the regressions produced in this study. Some of the big players, such as China, the United States, Brazil, and India, may have had considerable influence on the outcomes produced. Second, the data itself may not have been reliable, especially with respect to the “mostly unfree” countries included in this analysis; data from developing economies is prone to misstatement. Third, the corporate tax rate data may not have been a good measure of the actual cost borne by corporations within the countries observed, as nominal, rather than effective, corporate tax rates were used in this study. If effective tax rates had been used, this would have adjusted for items such as tax deductions and currency translation to find the true cost incurred by corporations as a result of the tax rates set within a country.
Conclusions

My hypothesis regarding FDI inflows and corporate tax rates was negated by the findings from both advanced and less advanced economies. Increases in corporate tax rates are actually associated with *increases* in foreign direct investment inflows in both types of countries – advanced and less advanced. That is, within both OECD member countries and those countries deemed “mostly unfree,” a positive relationship existed between FDI inflows and corporate tax rates. This relationship was, however, only statistically significant within OECD economies. Interestingly, balance of payments was found to be of stronger statistical significance in determining FDI inflows for both OECD countries and “mostly unfree” countries. However, balance of payments was found to be negatively correlated with FDI inflows in OECD countries, and positively correlated with FDI inflows in “mostly unfree” economies. As a noteworthy limitation, the relationships found in this analysis between FDI inflows and balance of payments, as well as those found between FDI inflows and corporate tax rates, all likely had considerable influence from outliers included in the observations.

My hypothesis of a negative relationship between GDP growth and corporate tax rates was supported at a statistically significant level by the observations from OECD member countries. Decreases in corporate tax rates were associated with increases in GDP growth. However, the observations from less advanced economies – those deemed “mostly unfree” – produced an insignificant regression output and were thus inconclusive in ascertaining any relationship between these two variables. This was likely due to the volatility and variability in GDP growth rates that is common within less developed economies.

It is difficult, given the nature of the results, to make any bright-line policy recommendations. Lower corporate tax rates may be associated with certain relationships regarding GDP growth or FDI inflows across different types of economies. However, this analysis does not confirm any causal relationship between lower corporate tax rates and GDP growth or FDI inflows. Therefore, it would be inappropriate to recommend any policy initiatives on the basis of these results alone. Nonetheless, the results indeed suggest that the relationships between corporate tax rates and various economic indicators are not always in line with the intuition provided by economic theory. This should be taken into account when formulating any fiscal policy regarding corporate tax rates.
References


