

# Corporate Income Taxes, Corporate debt, and Household Debt<sup>1</sup>

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## Abstract

This paper empirically investigates whether a decrease in corporate income tax (CIT) rates leads to a decrease in corporate debt and an increase in household debts, using a panel data of 26 OECD countries from 1995 to 2015. A lower CIT rate leads to smaller loans to the corporate sector (Modigliani and Miller, 1963; Gordon and Lee, 2001). If the total supply of loanable fund is not affected by a lower CIT, a lower CIT leads to a larger fraction of the total private debt to the household sector. Since the mid-1980s, globalization and international tax competition induced a lower CIT rate around the world. Using the changes in statutory CIT rates as identifying variations, we find that CIT rates are significantly positively (negatively) associated with corporate (household) debt. A decrease in corporate income tax rate can explain around 1/4 of the 6.7%p increase in the average household debt occurred during the last two decades.

Key Words: Household Debt, Corporate Income Tax Rates, Corporate Debt

JEL Classification: E62, H31

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<sup>1</sup> This paper started from the second chapter of Jinbaek Park's Ph.D. thesis. We significantly revise and almost rewrite the paper, by broadening the scope of the paper, updating the data, using different specifications, and modifying interpretation. We thank for productive comments of participants at 2013 Fall Conference of the Korean Association of Public Finance (KAPF).

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## 1. Introduction

Household indebtedness rose considerably in many advanced economies since the early 1980s (see Barba and Pivetti, 2008; Cloyne and Surico, 2017; Crawford and Faruqui 2011; Girouard and Kennedy 2006; Glick and Lansing, 2010). Why has household debt been rising in many OECD countries? The literature provides several causes, including low interest rates, financial innovation, higher housing price, and the housing bubble. Empirically investigating the reasons for the household debt's surge, this paper provides evidence that a lower corporate income tax (CIT) is an important, exogenous cause of the surge in household indebtedness.

Theoretically, the tax deductibility of interest payments encourages firms to use more debts when CIT is high (Modigliani and Miller, 1963). Gordon and Lee (2001) find that CIT is positively associated with corporate debts in the US, confirming the theoretical prediction. If the total supply of loanable funds is not directly affected by a lower CIT, a lower CIT leads to a lower corporate debt, a lower interest rate, and a larger household debt. Using the data from 26 countries over 1995-2015, we find that corporate tax rate is significantly negatively associated with household debt after controlling for other determinants of the corporate and household debt.

The main contributions of this paper are threefold. First, the paper is the first study to investigate and yield supportive evidence for a distortion in household indebtedness caused by corporate income tax cut. As far as we recognize, no previous studies examine CIT as a factor affecting household debt. Second, this paper carefully investigates various determinants of corporate and household debt using macro-level data, including CIT, urbanization, housing price, tertiary education enrollment, GDP per capita, stock market capitalization, unemployment, the size of the service sector, and the share of self-employment. Third, the paper is different from previous studies on CIT and corporate debt in that we use country-level panel data on corporate debt and statutory CIT rate. Previous studies on CIT and corporate debt utilize various methodologies and specifications, but no previous studies use country-level panel data. Using macro data

allows us more appropriate macroeconomic implications from the study.

This paper is organized as follows. Section 2 reviews the literature on taxes, corporate financial policy, and household debts. Section 3 describes the empirical specification for the relationship between corporate tax rate, corporate debt, and household debt. Section 4 describes the data and summary statistics. Section 5 presents regression results. We conclude the paper with a summary, policy implications, and limits of this study.

## 2. Literature review

In this section, we first review the literature on tax competition. We then review the relationship between the corporate debt and CIT starting from Modigliani and Miller Theorem. Finally, we briefly review previous studies on the causes and the consequences of household indebtedness.

### *Literature on tax competition*

In the past three decades, there has been a downward trend of the corporate tax rates in the world. It is commonly believed that the reason for these declining CIT rates is a process of tax competition (Devereux et al., 2008). In the theoretical framework, tax competition can be harmful or beneficial depending on the existence of negative externality among countries. Harmful tax competition leads to racing to the bottom and tax revenues are lower than the level for efficient supply of public good. Tax competition can improve efficiency by allowing taxpayers to select jurisdiction fitting their preference and by constraining governments' budget (Wilson, 1999; Fuest et al., 2005). Many studies report strong empirical evidence on international tax competition. Leibrecht and Hochgatterer (2012) and Devereux and Loretz (2013) provide an excellent review of the issue. Devereux et al. (2008) find that the statutory tax rates and effective tax wedges are positively correlated with those of other countries in advanced economies. Using the data of 67 countries between 1981 and 2015, Lee (2017) finds that that tax competition is a key determinant in setting CIT in

developing countries as well as in developed countries. Lee (2017) also find evidence that countries tend to adjust tax **rates** only more strongly when lowering rates than they do when raising rates, which is like the kinked demand curve model in spirit.

### *Literature on CIT and corporate finance*

Taxes and corporate financial policy have always been an active research area. According to Modigliani and Miller (1963), the value of the tax deductibility of interest costs grows with the marginal corporate income tax rate.<sup>4</sup> Since interest payments to lenders usually are fully deductible from taxable income while dividend payments to shareholders are not, tax systems encourage the use of debt (Desai et al., 2004). MacKie-Mason (1990) finds that loss carryforwards lower the effective marginal tax rate and significantly reduce the probability that a firm uses debt. Graham (1996) provides evidence that the lagged marginal tax rates are positively associated with the change in debt using US data from 1981-1992. Gordon and Lee (2001) report that the corporate tax rate subtracting the personal income tax (PIT) rate has a significantly positive effect on the corporate debt finance. Gordon and Lee (2007) also find that the interaction variables of tax rates with interest rates are significantly positively correlated with use of debt. Pfaffermayr et al. (2013) find this tax distortion using firm-level data from 35 European countries. They find that a firm's debt ratio increases with the corporate tax rate and that older firms exhibit smaller debt ratios than their younger counterparts. De Mooij (2011) and Feld *et al.* (2013) perform a meta-analysis of previous empirical studies on CIT and corporate debt. De Mooij (2011) carefully documents the earlier studies and notes that they differ considerably in effect size and reveal an equally large variety of methodologies and specifications. De Mooij (2011) finds that a one percentage point higher tax rate increases the debt-asset ratio by between 0.17 and 0.28. Feld *et al.* (2013) perform a meta-analysis using 48 previous

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<sup>4</sup> The 'static trade-off' theory (Myers, 1984) modifies the excessive use of debt by trading-off the benefits of debt against the costs from the increased likelihood of bankruptcy resulting from higher levels of debt (Hall et al., 2004).

studies and predict a marginal tax effect on the debt ratio of about 0.27.

Considering that corporate tax rates have been globally on the downward trend in recent decades, it is not surprising to see a large decrease in corporate debt-financing.<sup>5</sup> A decline in corporate debt caused by a decrease in CIT can affect the composition of bank lending if the total supply of the private credit is not affected by a decrease in CIT. From the point of view of commercial banks, a decrease in corporate loans forces them to find new customers — *i.e.*, households.<sup>6</sup> As mentioned earlier, household indebtedness significantly increases in most advanced countries since the beginning of the 1980s.

### *Literature on household debt*

The literature on household debt examine the causes of, the consequences of, and necessary policy response to deepening household indebtedness. Crawford and Faruqui (2011) find that rapid increases in household debt of Canada were caused by generally favorable income growth, low interest rates, higher homeownership rate, higher house prices, and financial innovation. Barba and Pivetti (2009) claim that the rising household debt is viewed as the outcome of persistent changes in income distribution and growing income inequalities. Glick and Lansing (2010) documented that household borrowing in many industrial countries grew rapidly in the years before 2008, which was caused by combination of factors, including low interest rates, higher house prices, lax lending standards, a proliferation of exotic mortgage products, and the growth of a global market for securitized loans. They also show that countries experiencing the largest increases in household leverage before the crisis tended to experience the most severe recessions. Cloyne and Surico (2017) examines the role of household indebtedness in the transmission of macroeconomic shocks in advanced economies, finding that households with mortgage

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<sup>5</sup> Of course, the scale of the corporate debt-financing has been larger than past. The emphasis in this paper is not the scale, but the relative ratio to household debt or total private debt.

<sup>6</sup> Private credit is composed of corporate loan and household loan.

debt exhibit substantial and significant consumption responses to tax changes.

### 3. Empirical Strategy

We test the hypothesis that the worldwide decrease in CIT during the last **two** decades caused the household debt surge observed in many countries. This paper is a first attempt at capturing the corporate tax distortion on household debts. The econometric model for the relationship between share of household debt to private credit and the corporate tax rate is written as

$$D_{it} = \beta_0 + \beta_1 \tau_{it} + X_{it}^G \gamma^G + X_{it}^B \gamma^B + X_{it}^C \gamma^C + X_{it}^H \gamma^H + \sum \beta_{3i} N_i + \sum \beta_{4t} T_i + \epsilon_{it} \quad (1)$$

where  $D_{it}$  is country  $i$ 's measures of corporate and household debts in the year  $t$ . As indebtedness measures, we use six variables: the ratio of corporate debt to surplus, the ratio of corporate debt to GDP, the ratio of corporate debt to the total private debt, the ratio of household debt to net disposable income, the ratio of household debt to GDP, and the ratio of household debt to the total private debt. We normalize household and corporate debt by three types of normalizer, the first one representing ability to pay back debt in the sector, the second one the size of economy, and the third one the size of total private debt. Each **normalizer** has own merit and demerit. When the ratio of debt are taken relative to surplus and net disposable income, these ratios capture debt relative equity or self-financing. When the ratio of debt are taken relative to GDP, these ratios capture debt relative to the size of economy. Note that the total private debt of OECD defined as the sum of the debt of non-financial corporations and households and NPISHs (S11+S14+S15).<sup>7</sup> The ratio of corporate debt to the total private debt and the ratio of household debt to the total private

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<sup>7</sup> Categorization of institution by OECD is as follows. Total economy (S1); Non-financial corporations (S11), Financial corporations (S12), General government (S13), Households (S14) and Non-Profit Institutions Serving Households (NPISHs, S15). Examples of sub-categorization are Banking sector (S121+S122+S123), Central government (S1311).

debt, therefore, sum to 1. Estimation results of the former, hence, are the same as those of the latter except for the opposite sign of the estimates. We do not report the regression results of the ratio of corporate debt to the total private debt, which can be easily inferred from those of the ratio of household debt to the total private debt.

$\tau_{it}$  is the statutory corporate top tax rate. Theoretically, to measure the appropriate impact of taxes on debt, we need to use the so-called Miller-tax-term (MTT) (Gordon and Lee, 2001; De Mooij, 2011). MTT is equal to  $\tau_{it} - [t_{it}^I - (1 - \tau_{it})t_{it}^E] = [\tau_{it} + (1 - \tau_{it})t_{it}^E] - [t_{it}^I]$  where the tax advantage of corporate debt is determined by corporate tax rate, tax on interest income ( $t_{it}^I$ ), and tax on equity returns ( $t_{it}^E$ ). The latter expression, easier to understand, can be interpreted as comparing taxes on equity-financing in the first bracket and taxes on debt-financing in the second bracket. In the literature, tax on equity returns often dropped because there is considerable ambiguity in calculating  $t_{it}^E$  (see, for example, Gordon and Lee, 2001). Calculating taxes on interest income is not easy because progressivity of PIT and special tax treatments for interest income, such as dual income tax, make difficult to calculate the marginal PIT on interest income. Due to this ambiguity and data availability, we ignore the tax on equity returns and the tax on interest income.<sup>8</sup>

The coefficient  $\beta_1$  is of primary interest, as it captures main hypothesis that lower CIT rates induce corporations to borrow less and household to borrow more. We expect the sign of the coefficient  $\beta_1$  is positive in regressions for corporate debt and negative in regressions for household debt.

There are many other determinants of corporate debt and household debt. To capture these macroeconomic conditions, we include control variables. We can categorize them into four groups. The first category includes general social and economic structure variables,  $X_{it}^{G'}$ , affecting both household debt and corporate debt, such as the level of economic development and the urbanization. The second category is a set of

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<sup>8</sup> When we add PIT in our regressions, its estimated coefficients are not significant except for taking the expected negative in the regression of the ratio of corporate debt to surplus.

macro-economic variables representing business cycles,  $X_{it}^{B'}$ , affecting both household and corporate debt. We include growth rates and unemployment rates in this category. The third category consists of variables,  $X_{it}^{C'}$ , presumably affecting mainly corporate debt market, such as stock market capitalization, industry structure, and the ratio of self-employed in the total employed. The fourth category are set of variables,  $X_{it}^{H'}$ , representing conditions of household debt market. We include the level of real house price, and gross tertiary school enrollment. We abstain from including interest rates as an independent variable in our preferred specifications because of potential endogeneity problem with interest rates. As a sensitivity test, however, we also tried regressions with interest rates.

As other control variables in the regression for corporate debt relative to surplus or GDP, we include  $X_{it}^{G'}$ ,  $X_{it}^{B'}$ , and  $X_{it}^{C'}$ . As other control variables in the regression for household debt relative to net disposal income or GDP, we include  $X_{it}^{G'}$ ,  $X_{it}^{B'}$ , and  $X_{it}^{H'}$ . We put the full set of other control variables,  $X_{it}^{G'}$ ,  $X_{it}^{B'}$ ,  $X_{it}^{C'}$ , and  $X_{it}^{H'}$ , in regressions for the share of households (corporations) debt in the total private debt, because these dependent variables, by construction, capture the other debt market as well as its own debt market.

The discussion of the expected association of several control variables with debt is necessary. We expect corporate debt are positively associated with income, negatively with urbanization (perhaps through larger equity financing), negatively with growth rates (through larger temporary borrowing in recessions), and positively with unemployment rates. Stock market capitalization can be associated with corporate debt positively or negatively, depending on the relative size of the ‘income effect’ and the ‘substitution effect’. Larger stock market implies a larger corporate sector (‘income effect’), and easier equity-financing relative to debt-financing (‘substitution effect’). When corporate debt is normalized relative to surplus, this dependent variable mainly captures the substitution effect between debt and equity. On the other hand, when corporate debt is normalized relative to the total private debt, this dependent variable captures more of income effect of a larger corporate sector compared to the household sector. We have estimation results consistent with this story. The size of service sector captures economic development and



perhaps the size of the banking sector. We expect the size of the service sector is positively associated with corporate debt. The share of self-employed in the total employment is expected to be negatively associated with corporate debt because it implies a smaller corporate sector.

We expect household debt are associated positively with income (through higher demand for housing), positively with urbanization (through higher housing price and overcoming the lack of economies of scale related to household lending),<sup>9</sup> positively with unemployment rate and negatively with growth rates (perhaps through larger temporary borrowing for living in recessions), positively with house price, and positively with tertiary school enrollment (perhaps through higher demand for housing and durable goods). Higher house price is expected to be positively associated with household debt from both the demand and the supply side. On the demand side, higher housing price increases the collateral value of assets, boosting credit demand (Dyan and Kohn, 2007; Pouvelle, 2012). On the supply side, the rise in asset prices eases the collateral constraint imposed by banks on borrowers and may make banks more willing to extend new loans (Pouvelle, 2012). As Dyan and Kohn (2007) point out that debt use of households varies with demographic factors, we add tertiary school enrollments.

We include country fixed effect,  $N_i$  for country  $i$ , to control for any time-invariant country-specific factors that may be correlated with explanatory variables. We also include year dummies to control global changes affecting all countries equally.

Following Gordon and Lee (2007), we experiment with the interaction term of CIT and nominal interest rates as the key tax incentive variable because the net tax gain from use of corporate debt is proportional to interest rates. If one assumes again that the total supply of corporate and household debts is unaffected by the nominal interest rates, household debt would be negatively associated with the interaction term between CIT and nominal interest

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<sup>9</sup> Beck et al (2012) conjecture that urbanization help to overcome the lack of economies of scale associated with household loans and that the share of urban population in a country is a trait that is positively associated with a higher share of household credit in total credit. In our regression results, urbanization becomes insignificant in household debt regressions when the country-specific time trends are added.

rates. The empirical specification for this can be expressed as

$$D_{it} = \beta_0 + \beta_2 \tau_{it} \times i_{it} + X_{it}^G \gamma^G + X_{it}^B \gamma^B + X_{it}^C \gamma^C + X_{it}^H \gamma^H + \sum \beta_{3i} N_i + \sum \beta_{4t} T_t + \epsilon_{it} \quad (2)$$

where  $i_{it}$  is country  $i$ 's nominal interest rate of the short-term money market in the year  $t$ . If interest rates work as we expect, the coefficient  $\beta_2$  is negative (positive) in regressions for household (corporate) debt.

There may exist two-way causality between CIT and debt, especially corporate debt. On the one hand, the tax advantage of debt induces a larger debt. On the other hand, a higher corporate debt may lower the tax revenue and induce the government to raise CIT rates. To control for the reverse causality from debt to CIT, we experiment with instrumental variable estimation for CIT. Following Slemrod (2004), Devereux et al. (2008), Overesch and Rincke (2011), Devereux and Loretz (2013), and Lee (2017), we attempt to explain CIT rates by global tax competition, domestic economic / social need, and economic / social / political environment. Generally using the specification used in Lee (2017), as IVs we use a weighted average of lagged CIT rates in neighboring countries ( $\bar{\tau}_{-i,t-1}$ ) and PIT rates ( $t_{i,t}$ ). Tax competition is represented by average CIT in other countries, weighting by the reciprocal of the square of distance between the two countries.<sup>10</sup>

#### 4. Data and Descriptive Statistics

Household debt and corporate debt come from OECD Statistics.<sup>11</sup> Since debt data from OECD is available from 1995, our analysis period depends on this. CIT and PIT rates, also

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<sup>10</sup> As weights, we experiment with the reciprocal of distance (as in Lee and Gordon, 2005), the reciprocal of the square of distance (as in Overesch and Rincke, 2011), and GDP of the other country divided by the square of distance.  $R^2$  of first stage regressions are the largest when the reciprocal of the distance is used.

<sup>11</sup> OECD (2017), Household debt (indicator). doi: 10.1787/f03b6469-en (Accessed on July 2017) Data are under 2008 System of National Accounts (SNA 2008) for all countries except for Chile, Japan and Turkey (SNA 1993).

from OECD statistics, are combined rates of the central and local governments. Few additions and corrections were made to the OECD CIT and PIT rates, using *World Tax Database* of the Office of Tax Policy Research (OTPR) at the University of Michigan, World Bank's *World Development Indicator* (WDI), Price Waterhouse Cooper (PwC)'s *Corporate Taxes: Worldwide Summaries*, Ernst & Young's *Global Executive: Individual tax, Social Security and Immigration*, KPMG's *the Corporate Tax Rate Survey around the World*, and Deloitte's *the Corporate Tax Rate Research*.<sup>12</sup> The OTPR used to provide extensive tax data compiled from various sources, including the World Bank's World Development Indicator (WDI) and PwC, *Corporate Taxes: Worldwide Summaries*. OTPR and WDI stop compiling the data around 2003, the data after 2003 are compiled using OECD statistics, PwC's publications, Ernst & Young's publications, KPMG's publications, and Deloitte's publications. Housing price index is from OECD statistics. All the other control variables are from World Development Indicator (WDI) and Global Financial Development Database (GFDD) from World Bank.

<Figure 1A and Figure 1B here>

In most of our sample countries, CIT shows a decreasing trend during the sample period, especially from 1998 through 2008 (see Figure 1A). The average CIT rates dropped by 10.4%, decreasing from 35.6% to 25.2% during the same period (See Figure 1B). CIT among the 26 OECD countries appear to converge with lower averages and smaller standard errors in the later period, but the convergence trend becomes weak in the 2010s. Between 2010 and 2015, the average CIT rates decreased only by 0.9%p. The average did

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<sup>12</sup> As in Lee (2017), we made the following corrections and additions to CIT and PIT data. CIT rates are corrected or compiled for France (36.09% in 2012 and 2013; 37.99% in 2014-2016 reflecting CIT surcharge for large firms), Korea (32.25% in 1995). Estonia (26% between 1994 and 1999), Slovenia (25% between 1995 and 1999). PIT rates are corrected or compiled for Denmark (70% between 1981 and 1986; 68% in 1987), Greece (60% in 1983; 45% in 2000; 42.5% in 2001), Luxembourg (57% in 1983 and 1984; 50% in 1997; 42% in 2001), Slovak Republic (42% in 2001), Slovenia (50% in 2000 and 2001), Spain (56% in 1997 and 1998; 48% in 1999), Switzerland (compiled using original tables of OECD for tax rates before 1999).

not change much in the 2010s because some countries, such as France, Greece, Portugal, and the Slovak Republic, raised the CIT rates, while some other countries, such as Japan, United Kingdom, Finland, Denmark, and Norway, lowered the rates. During the sample period, a decreasing trend of CIT is strong in Germany (-25%p), Czech Republic (-22%p), Ireland (-17.5%p), Italy (-22%p), Japan (-17.8%p), Poland (-21%p), Slovak Republic (-18%p), and the United Kingdom (-13%p). There are several countries with only minor changes in CIT from 1995 to 2015, such as the United States (39.6% to 39%), France (36.7% to 38%), Norway (28% to 27%), and Hungary (18% to 19%).

<Figure 2 and Figure 3 here>

Figure 2 shows that the ratio of corporate debt to GDP increased in most of our sample countries. Upward trend is strong in Greece, Ireland, and Estonia. On the contrary, Japan, Netherlands, Slovak Republic show a decreasing trend in corporate debt. Figure 3 reveals that most of the sample countries the ratio of household debt to GDP increased during the last two decades. Only two countries in our sample, Germany and Japan, show a stable level of household debt.<sup>13</sup> Influenced by the Financial Crisis in 2008-2009, household debt peaked in the late 2000's in several countries, including the United States, the United Kingdom, Denmark, Estonia, Hungary, Greece, Ireland, Netherlands, Portugal, and Spain. Although these countries were affected by the financial crisis, they still show a larger household debt in the mid-2010s than in the mid-1990s. Comparing Figure 2 and Figure 3 show that household debt increase relatively more than corporate debt do. This implies the share of household debt in the total private debt increased during the sample period.

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<sup>13</sup> When the associations between CIT and household debt are investigated for each country, Germany is one of few countries not showing a negative relation. There might be changes in Germany favoring the use of household debt while CIT was lowered. One candidate for these changes is the German's introduction of dual income tax in 2009. Interest incomes used to be fully taxed at progressive personal income tax rates before 2009, and as from 2009 were taxed at flat 25%. This large drop in interest income tax rates may keep the attractiveness of corporate debt while CIT rates decreases. Note that Mille-tax-term,  $[\tau_{it} + (1 - \tau_{it})t_{it}^E] - [t_{it}^I]$ , may not change much when both CIT rates and interest income tax rates decrease at the same time.

<Figure 4A and Figure 4B here>

Figure 4A shows the trend of the composition of the total private debt and CIT rates from 1995 through 2015. In our sample of 26 OECD countries, the average share of corporate debt in the total private debt decreased from 72.1% in 1995 to 65.3% in 2015 (a change of 6.7%p), while the average CIT rates decreased from 35.6% to 25.2% during the same period (a change of 10.4%p). This strong positive correlation between corporate income tax rates and the share of corporate debt provides evidence for Modigliani and Miller theorem at the macro level.

Figure 4B explores the association between CIT and household debt using partial plots. The upper-left panel shows the raw correlation between the two variables, which is quite weak. Once we control for country dummies and focusing on the global over-time changes in CIT and household debt, the negative correlation reveals. Both the upper-right panel of Figure 4B and Figure 4A shows this pattern. The bottom-left panel indicates that controlling for year dummies rather weakens the correlation. This is not surprising because identifying variations of CIT come from a decrease in CIT rates occurred concurrently in many countries during the last two decades. The bottom-right panel shows that controlling for other determinants/covariates of household debt increases the correlation between CIT and household debts. The bottom panels are partial plots for the results in columns (1) and (2) of Table 4.

<Table 1A, 1B, 1C here>

Table 1A, 1B, and 1C, respectively, presents summary statistics for regressions for the corporate debt relative to surplus and GDP, the household debt relative to net disposable income and GDP, and the share of household (corporate) debt in the total private debt. Corporate debt on average is 440% of surplus and 125% of GDP. Household debt on average is 129% of net disposable income and 70% of GDP. The average shares of

household debt and corporate debt to the total private debt are 35% and 65%, respectively.

To construct instrument CIT, we use distance data of most populated cities from Centre D'Etudes Prospectives Et D'informations Internationales (CEPII). In constructing instrumental variables for CIT, we utilized CITs in 73 countries.<sup>14</sup>

## 5. Regression Results

<Table 2 here>

Table 2 reports regression results for corporate debt. Corporate debt is significantly positively associated with CIT, as predicted by the theory. A 10%p decrease in CIT is predicted to lower the ratio of corporate debt to surplus by 45.2%p and the ratio of corporate debt to GDP by 14.9%p. Hausman's tests indicate random effect estimations are preferred in 4 out of 6 regressions, but the estimated coefficients of CIT do not change in a significant way over the estimation methods. We report estimation results of the specification which is preferred by Hausman's test in the main table and supplemented it with results corresponding the other specification at the bottom of the column. When we use the lagged CIT, the estimated coefficients and significance remain in a comparable range.

Most of the control variables take the expected sign. Urbanization is negatively associated with corporate debt, perhaps because urbanization might be associated with larger household debt and more developed direct financing market. When growth rates were low, i.e., the economy is in recession, the ratio of corporate debt to surplus is larger.

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<sup>14</sup> The seventy three countries we use to measure instrument are Argentina, Australia, Austria, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Cote d'Ivoire, Croatia, Czech Republic, Denmark, Ecuador, Egypt, Arab Rep., Finland, France, Germany, Greece, Guatemala, Hong Kong SAR, China, Hungary, Iceland, India, Indonesia, Ireland, Italy, Japan, Kenya, Korea, Kuwait, Latvia, Lithuania, Luxembourg, Malaysia, Malta, Mexico, Morocco, Netherlands, New Zealand, Nigeria, Norway, Pakistan, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Saudi Arabia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, Tunisia, Turkey, Ukraine, United Kingdom, United States, Uruguay, Venezuela, and Vietnam.

Note that recession can affect not only numerator but also denominator. Comparing the estimated coefficient of growth rates for the corporate debt to surplus ratio and for the corporate debt to GDP ratio reveals that the very large estimated coefficient for the corporate debt to surplus ratio may come from the tendency that surplus decreases drastically during the recession. Unemployment rates are estimated to be negative or positive depending on the dependent variables, and significant only at 10% level. It is hard to explain the estimated coefficients of unemployment. It might be due to the multi-collinearity between GDP growth rates and unemployment and a time lag of unemployment as an indicator of business cycle.<sup>15</sup>

The size of the service sector is estimated to be positively associated with corporate debt. We conjecture this positive association since the size of the service sector captures economic development and perhaps the size of the banking sector. The share of self-employed in the total employment is estimated to be negatively correlated with corporate debt, perhaps because larger self-employed implies a smaller corporate sector.

<Table 3 here>

Table 3 report regression results for household debt. Without control variables, the estimated coefficients of CIT turn out to be insignificant and even have a wrong sign. The estimated coefficients take the expected negative sign when we add control variables. When we use the lagged CIT, the estimated coefficients become significant. We interpret these results implying that household debt responds to CIT with a time lag. This time lag is **probable** because CIT affects indirectly household debt through its effect on corporate debt and households have fewer options and stronger rigidity than corporations do. In Table 3 our preferred specifications indicated by the shaded cells, therefore, are columns (3) and (6). Hausman's tests indicate random effect estimations are preferred in 4 out of 6 regressions,

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<sup>15</sup> Unemployment tend to move counter-cyclically, but with a considerable time lag. Therefore, unemployment is a weak indicator for business cycle.

but the estimated coefficients of CIT do not change in a significant way over the estimation methods as in the regressions for corporate debt.

Most of the control variables take the expected sign. Fully consistent with previous studies, household debt is larger in more developed and urbanized economy. Household debt is estimated to be larger in the recession where growth rates are low and unemployment rates are high. Unemployment rates are estimated to be positively associated with household debt probably because unemployment rates may represent the financially difficult condition of the household in addition to an indicator of recessions with a time lag. Consistent with previous studies, higher housing price induces household to borrow more. Tertiary enrollment turns out to be insignificant, though it takes the expected positive sign.

<Table 4 here>

Table 4 shows the results of the ratio of household debt to the total private debt. Since the ratio of corporate debt to the total private debt and the ratio of household debt to the total private debt always sum to 100 by construction, regression results for the ratio of corporate debt to the total private debt are the same as those in table 4 except for the sign of the estimated coefficients. Note that we include all control variables when the ratio to the total private debt is used as a dependent variable because by construction the dependent variable represents the effect of both household debt and corporate debt market. CIT is estimated to be significantly negatively associated with household debt, which confirms the existence of distortion effect of CIT on the household debt market. Our most preferred specification for the share of household debt in the total private debt is in column (2), which is indicated by shading box. The result implies that  $1/4$  ( $\approx \frac{1.59\%p}{6.7\%p}$ ) of the 6.7%p increase in the household debt occurred the last two decades can be explained by the effect of the 10.4% decrease in CIT ( $=\beta_1 \times \Delta\text{CIT}=0.153 \cdot 10.4\%=1.59\%$ ).

Control variables take the expected sign. Countries with more urbanized economy tend to have a larger household debt. As in the regressions of the ratio of household debt to net



disposable income and GDP, the share of household debt in the total private debt increase during the recession and unemployment rates are high. The positive estimated coefficients of growth rates indicate that household debt increase more than corporate debt does during the recession. Stock capitalization is positively associated with household debt (and negatively with corporate debt), perhaps because household can borrow more when they possess a larger amount of stock and corporate finance directly through the stock market.

In columns (4) and (5), we report the results of robust regression and median regression, where the significance of the estimated coefficients increases. Household debt increase in an economy more developed and more people with tertiary education. In these regression results, we also find that higher housing price induces household to borrow more. The rise of the housing price index can affect not only the demand side through positive wealth effect and collateral effect but also the supply side through the ease of collateral constraint (Dyan and Kohn, 2007; Pouvelle, 2012).

In column (6), we exclude big five countries with the largest GDP. Excluding the United States, Japan, Germany, the United Kingdom, and France from the sample doubles the estimated coefficient of CIT. In column (7), we divide the sample country into two groups depending on the size of GDP, and we include the interaction term between CIT and the small country dummy. We find the estimated coefficient of CIT for the smaller countries, -0.25, is more than the two times of that for the larger countries, -0.11. We experiment with the more open country dummy similarly to find the estimates less significant and with the opposite sign. Note that previous studies on the determinants of CIT find that trade openness is not strongly associated with a lower CIT.<sup>16</sup>

<Table 5 here>

In Table 5, we investigated the potential endogeneity problem of CIT. Here, we use fixed

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<sup>16</sup> Overesch and Rincke (2011), for example, find no evidence that countries that have become more open have reduced their tax rates more.

effect estimations as baseline model because we can test endogeneity and fixed effect estimations and random effect estimations produce very similar results. When we test the null hypothesis that CIT is exogenous, we can reject the hypothesis except for the regressions for the ratio of corporate debt to surplus and the ratio of corporate debt to GDP. This is probable because corporations consider CIT directly in their financing decision and they have stronger incentive to influence CIT. Therefore, our preferred specifications for the ratio of corporate debt to surplus and the ratio of corporate debt to GDP are IV estimation results in columns (1) and (2) in Table 5. The estimated coefficients CIT increase from 4.52 in OLS estimation to 24.46 in IV estimation for the ratio of corporate debt to surplus and from 1.56 to 4.66 for the ratio of corporate debt to GDP. [need to work more on IV for CIT, since CIT is tested to endogenous in the HD/GDP regressions.] In the case of household debt including household debt to the total private debt, the null hypothesis of exogeneity of CIT cannot be rejected. Our preferred specifications for household debt would be the results of RE or FE estimation.

<Table 6 here>

Table 6 reports the regression results with the interaction term between CIT and interest rates. For the regressions for corporate debt, we also implemented IV estimations. Test of exogeneity of the interaction term cannot be rejected the null hypothesis. Therefore, our preferred specifications of regressions with the interaction term are FE or RE estimation results. Our preferred specifications based on test statistics are indicated by the shaded cell. We find the interaction term take the expected sign, positive for corporate debt and negative for household debt. The interaction term is significant in the regressions of the ratio of corporate debt to GDP, the ratio of household debt to GDP, and the ratio of household debt to the total private debt (, and of course the ratio of corporate debt to the total private debt). Note that the coefficient of the interaction term should consider the value of short-term interest rates, the averages of which in our sample are around 3.

## 6. Conclusion

This paper is the first study that investigates the tax distortions of the statutory CIT rates on household debt. Regression results generate several interesting patterns which are quite consistent with our conjecture. Our key findings are as follows.

First, we find the existence of the distortionary effect of CIT on household debt. Approximately 1/4 of the rise of household debt occurred during the last two decades can be explained by the effect of CIT.

Second, we find that the responses of corporate debt to CIT are more elastic, more active, and more prompt than those of household debt. The estimated coefficients of CIT in the corporate debt regressions are larger and more significant. The null hypothesis that CIT is exogenous is rejected only in the regressions for the ratio of corporate debt to surplus and that to GDP. Furthermore, the interaction terms between CIT and short-term interest rates turn out to be significant in the regressions for corporate debt. Household debt responds to CIT passively and with a time lag. The null hypothesis that CIT is exogenous cannot be rejected in the regressions for household debt. In the regressions for household debt, the lagged CIT turn out to work equally well as or slightly better than the current CIT. It is natural to have a time lag in the response of household debt to CIT if corporations respond to CIT first and then the household debt was affected in the context of the general equilibrium nature of corporate debt and household debt market.

Third, corporations respond to CIT more elastically in small countries. In our regression results, the estimated coefficient of CIT for the smaller countries, -0.25, is more than the two times of that for the larger countries, -0.11.

These results may provide valuable implications to policy makers for future tax reform. The policy of the corporate tax rates can create economic distortions not only for corporations but also households, especially in the developed financial environment. This paper provides probable evidence that the corporate tax cut policy calls for extreme care because it can cause household debt to surge.

More careful theoretical investigation of the interaction between corporate and household

debt market is necessary. We hope that this additional theoretical work can guide future empirical works and theoretical and empirical studies together can provide a better understanding of the corporate and household debt and related policies.

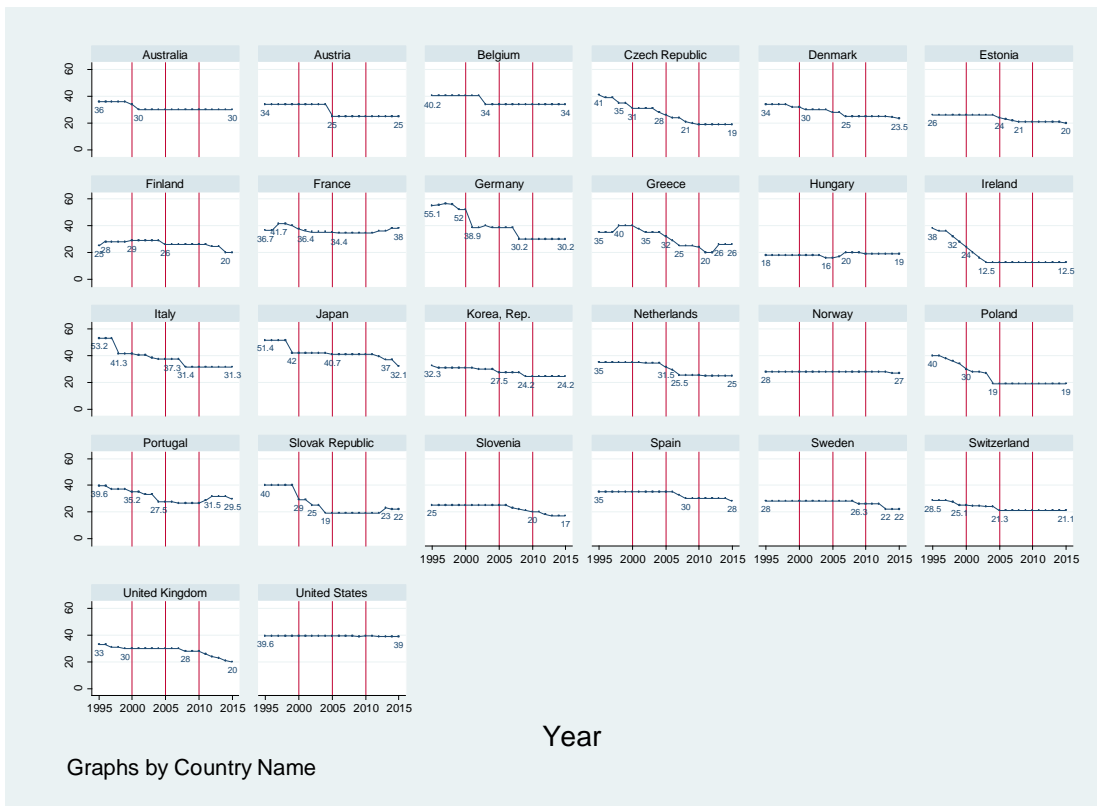
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Figure 1A. Combined Statutory CIT Rates, 26 Countries, 1995-2015



Source: The CIT data is from OECD Statistics. Few additions to and corrections of the data were made using the CIT rates from OTPR, the University of Michigan and PwC Worldwide Tax Summaries: Corporate Taxes.



Figure 1B. Average Corporate Tax Rate and 95% Confidence Interval, 1995-2015

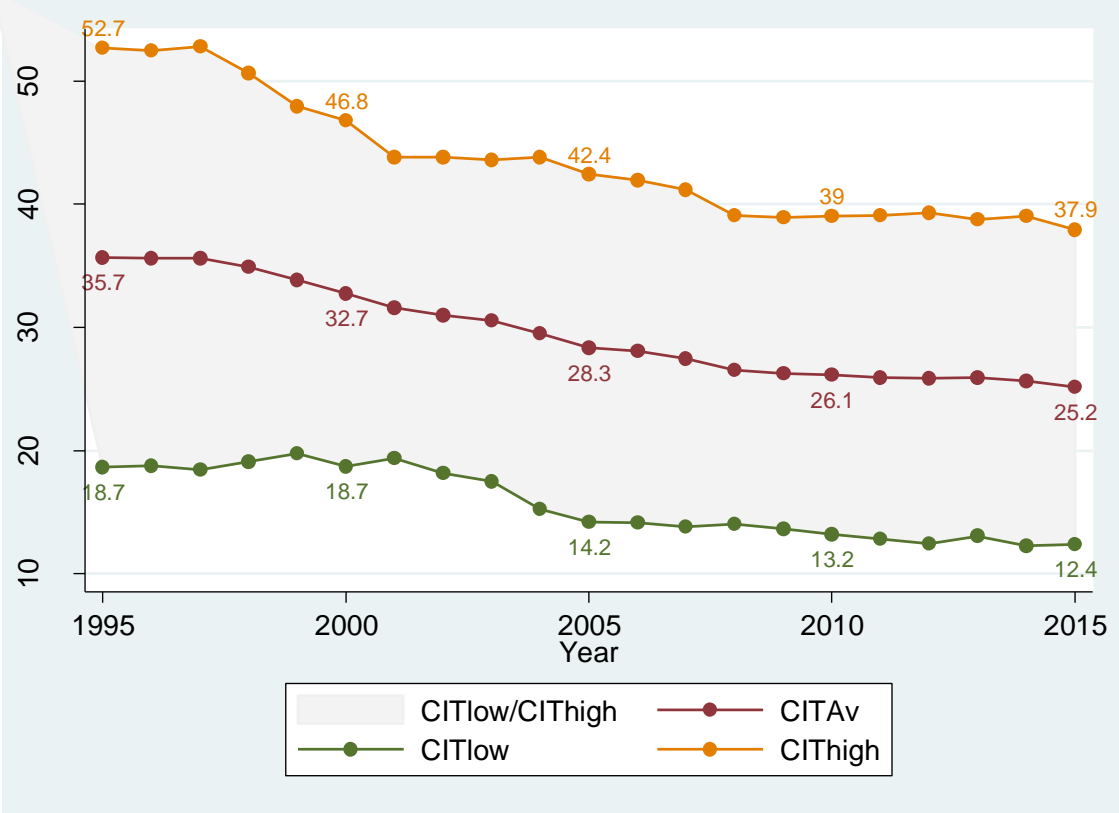
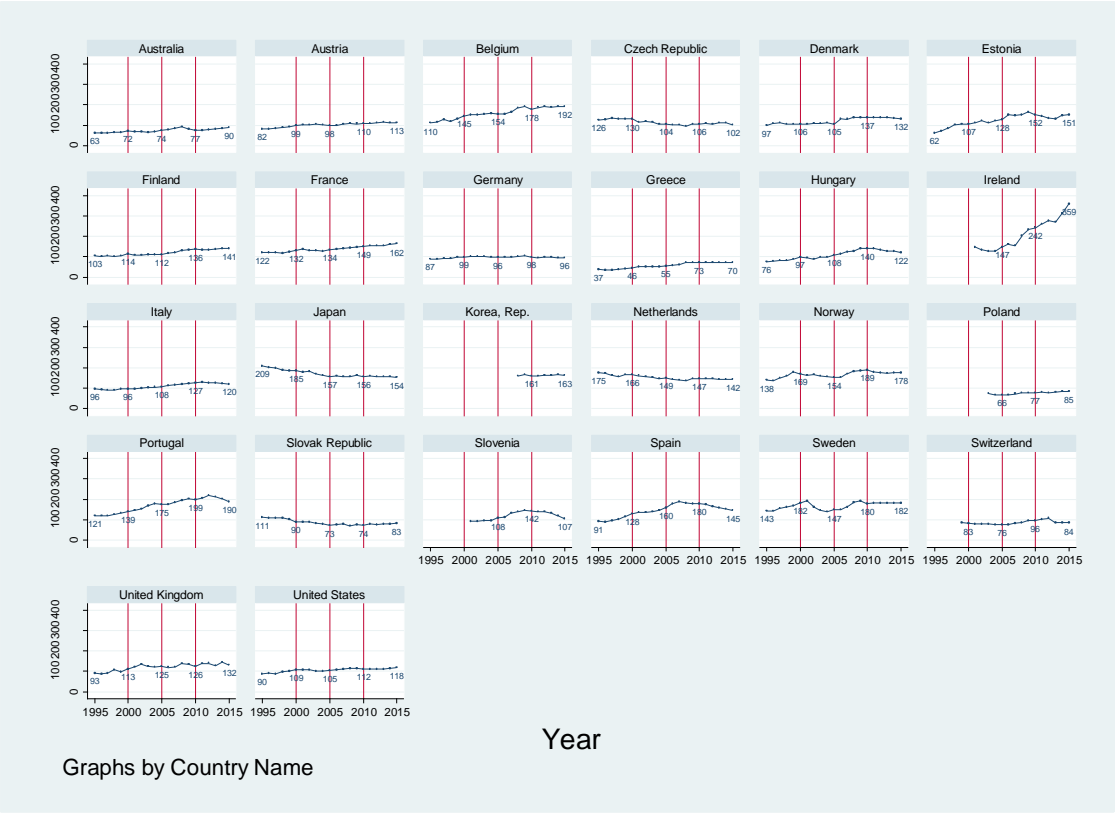
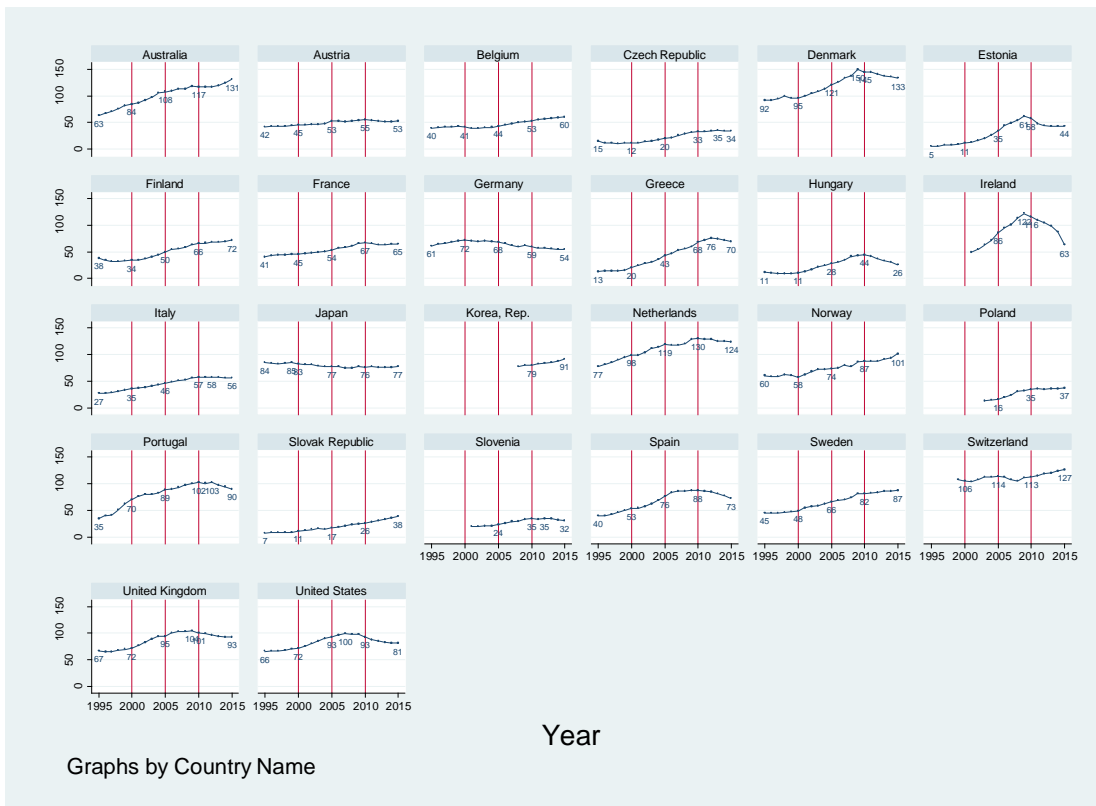


Figure 2. Corporate Debt / GDP, 26 Countries, 1995-2015



Source: OECD Statistics.

Figure 3. Household Debt / GDP, 26 Countries, 1995-2015



Source: The ratio of household debt to net disposable income comes from OECD (2017), Household debt (indicator). doi: 10.1787/f03b6469-en (Accessed on 17 July 2017)

**Figure 4A. Average Corporate Tax Rate and Debt Composition, 1995-2015**

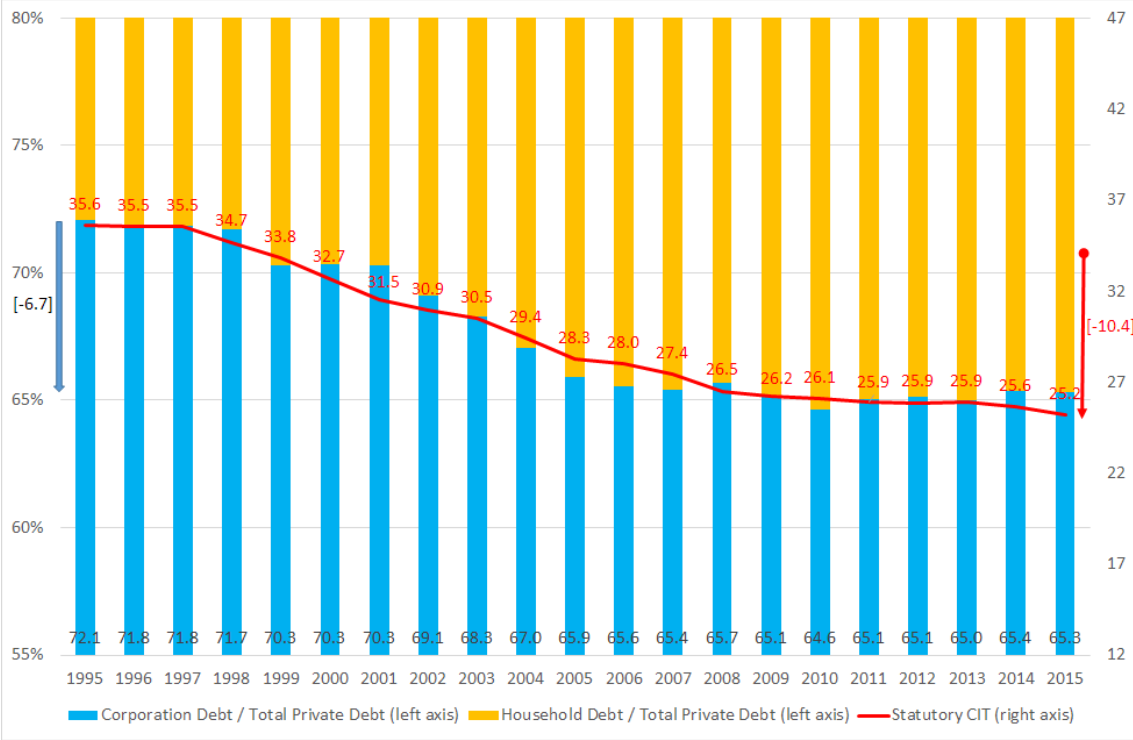
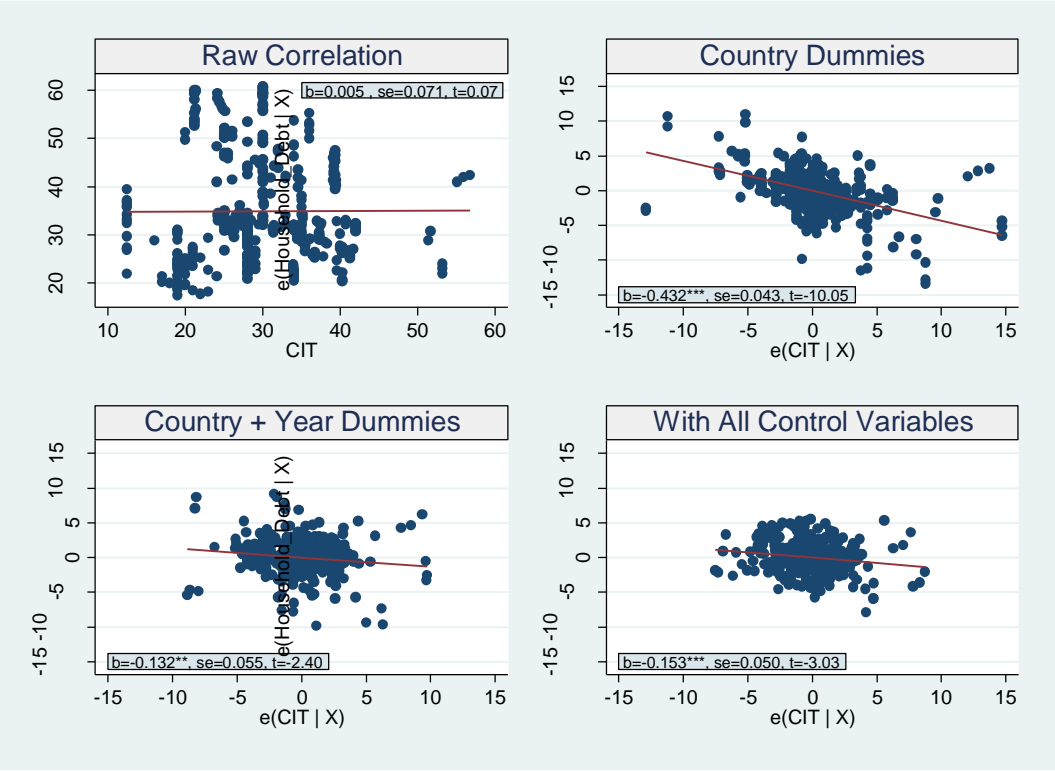


Figure 4B. Partial Plot of CIT and Household Debt/Total private debt, 374 Observations



**Table 1A. Summary Statistics for Corporate debt, 26 Countries 1995-2015**

Variable	Obs	Mean	Std. Dev.	Min	Max
CorpDebt / Surplus	462	439.39	168.61	158.94	928.48
CorDebt / GDP	462	124.52	40.44	35.81	313.31
CIT	462	29.76	8.17	12.50	56.80
Lagged CIT	462	30.25	8.28	12.50	56.80
Ln(GDPpc)	462	10.21	0.65	8.31	11.54
Urbanization	462	74.47	11.10	49.65	97.86
Unemployment rate	462	7.97	4.18	2.12	27.47
Growth rate of GDPpc	462	1.68	2.85	-14.56	10.92
Stock Capitalization / GDP	462	63.65	48.12	1.46	265.13
Value added in the Service Sector / GDP	462	69.02	5.83	53.94	81.08
Self-employment / Total Employment	462	15.91	7.31	6.32	46.11

**Table 1B. Summary Statistics for Household Debt, 26 Countries 1995-2015**

Variable	Obs	Mean	Std. Dev.	Min	Max
HHDebt / NDI	405	129.14	62.54	21.25	339.78
HHDebt / GDP	405	70.62	28.95	14.64	149.70
CIT	405	29.55	7.90	12.50	56.80
lagged CIT	405	29.93	7.92	12.50	55.90
ln(GDPpc)	405	10.38	0.48	9.24	11.54
Urbanization	405	76.12	10.69	49.70	97.86
Growth rate of GDPpc	405	1.42	2.98	-14.56	25.56
Unemployment rate	405	7.66	4.02	2.12	27.47
Real Housing Price Indices	405	91.92	21.54	40.94	187.13
Tertiary Enrollment (Gross)	405	66.15	14.55	36.50	113.87

**Table 1C. Summary Statistics for Household and Corporate debt, 26 Countries 1995-2015**

Variable	Obs	Mean	Std. Dev.	Min	Max
HHDebt / Total private debt	374	34.91	10.69	17.57	60.78
CorDebt / Total private debt	374	65.09	10.69	39.22	82.43
CIT	374	29.81	7.84	12.50	56.80
lagged CIT	374	30.17	7.88	12.50	55.90
log of GDP per capita	374	10.38	0.48	9.24	11.54
Urbanization	374	75.95	10.83	49.70	97.86
Growth rate of GDPpc	374	1.33	2.81	-14.56	10.92
Unemployment rate	374	7.69	4.12	2.12	27.47
Real Housing Price Indices	374	91.68	21.66	40.94	187.13
Tertiary Enrollment (gross)	374	65.71	14.47	36.50	113.87
Stock Capitalization / GDP	374	71.64	49.22	3.91	265.13
Value added in the Service Sector / GDP	374	69.91	5.52	53.94	81.08
Self-employment / Total Employment	374	15.96	7.24	6.46	45.21

Note: The 26 countries in the sample are Australia, Austria, Belgium, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, and United States.

**Table 2. Baseline Regressions for Corporate debt, 26 Countries, 1995-2015**

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables	corporate debt / Surplus			corporate debt / GDP		
Estimation method	RE	FE	FE	RE	RE	RE
CIT	4.53*** (1.04)	4.52*** (0.89)		1.50*** (0.24)	1.49*** (0.22)	
Lagged CIT			4.61*** (0.84)			1.32*** (0.21)
ln(GDPpc)		-14.36 (22.41)	-7.13 (22.33)		7.51 (5.13)	9.27* (5.17)
Urbanization		-17.33*** (1.83)	-17.35*** (1.82)		-2.44*** (0.40)	-2.42*** (0.40)
Growth rate of GDPpc		-7.32*** (1.53)	-6.90*** (1.53)		-0.39 (0.39)	-0.30 (0.40)
Unemployment		-2.11* (1.21)	-2.16* (1.20)		0.52* (0.31)	0.48 (0.31)
Stock capitalization / GDP		-0.15 (0.18)	-0.14 (0.18)		0.04 (0.04)	0.04 (0.04)
Value added Service / GDP		19.88*** (1.97)	20.48*** (1.98)		3.51*** (0.47)	3.61*** (0.48)
Self-employed / total employment		-11.21*** (1.79)	-11.20*** (1.77)		-2.58*** (0.43)	-2.69*** (0.43)
Constant	342.0*** (45.34)	566.9* (341.13)	450.1 (342.27)	94.5*** (10.48)	-14.0 (76.95)	-35.3 (77.81)
Observations	462	462	462	462	462	462
R-squared	0.237	0.563	0.567	0.349	0.537	0.529
Hausman's chi (p-value)	-1.27 (1.000)	29.08** (0.034)	28.76** (0.037)	4.67 (0.862)	21.54 (0.203)	21.54 (0.204)
CIT estimates in alternative specification	FE 4.36*** (1.08)	RE 4.53*** (0.88)	RE 4.62*** (0.83)	FE 1.57*** (0.25)	FE 1.56*** (0.23)	FE 1.38*** (0.22)

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Country and year dummy variables are included in all regressions, but not reported



**Table 3. Baseline Regressions for Household Debt, 26 Countries, 1995-2015**

Dependent variables	Household Debt / Net Disposable Income			Household Debt / GDP		
	(1) FE	(2) RE	(3) RE	(4) FE	(5) RE	(6) RE
CIT	0.27 (0.31)	-0.37 (0.24)		0.05 (0.16)	-0.16 (0.13)	
Lagged CIT			-0.57** (0.24)			-0.23* (0.12)
ln(GDPpc)		42.61*** (6.67)	42.69*** (6.64)		18.67*** (3.38)	18.68*** (3.38)
Urbanization		2.89*** (0.42)	2.95*** (0.42)		0.77*** (0.21)	0.79*** (0.21)
Growth		-1.63*** (0.30)	-1.61*** (0.29)		-1.27*** (0.15)	-1.27*** (0.15)
Unemployment		2.98*** (0.33)	2.97*** (0.33)		1.69*** (0.17)	1.68*** (0.17)
Real house price indices		0.61*** (0.06)	0.63*** (0.06)		0.27*** (0.03)	0.27*** (0.03)
Tertiary Enrollment (gross)		0.13 (0.10)	0.12 (0.10)		0.02 (0.05)	0.02 (0.05)
Constant	77.7*** (12.25)	-612.86*** (76.22)	-613.15*** (75.93)	48.27*** (6.32)	-216.16*** (37.94)	-216.09*** (37.87)
Observations	405	405	405	405	405	405
R-squared	0.681	0.826	0.828	0.673	0.822	0.823
Hausman's chi	19.52* (0.077)	9.28 (0.901)	9.05 (0.911)	19.43* (0.079)	13.00 (0.673)	13.32 (0.649)
CIT estimates in alternative specification	RE 0.29 (0.31)	FE -0.32 (0.25)	FE -0.53** (0.24)	RE 0.09 (0.15)	FE -0.15 (0.13)	FE -0.22* (0.13)

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Country and year dummy variables are included in all regressions, but not reported

**Table 4. Household Debt / Total private debt, Baseline and Sensitivity Test**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Estimation method	RE	FE	FE	Robust Reg	Median Reg	FE	RE	FE
Sample	All	All	All	All	All	excl. big 5	All	All
CIT	-0.12** (0.05)	-0.15*** (0.05)		-0.11*** (0.04)	-0.18*** (0.00)	-0.31*** (0.06)	-0.11** (0.05)	-0.18*** (0.05)
Lagged CIT			-0.12** (0.05)					
CIT× $D_{Small\ Country}$							-0.14** (0.07)	
CIT× $D_{Open\ Country}$								0.17* (0.09)
ln(GDPpc)		2.20 (1.51)	2.21 (1.52)	3.45*** (1.18)	2.72*** (0.00)	4.68** (2.33)	2.24 (1.41)	2.46 (1.51)
Urbanization		0.54*** (0.09)	0.54*** (0.09)	0.28*** (0.07)	0.38*** (0.00)	0.45*** (0.12)	0.51*** (0.08)	0.57*** (0.09)
Growth		-0.39*** (0.07)	-0.40*** (0.07)	-0.20*** (0.06)	-0.36*** (0.00)	-0.35*** (0.08)	-0.37*** (0.07)	-0.38*** (0.07)
Unemployment		0.18** (0.07)	0.17** (0.07)	0.07 (0.05)	0.09*** (0.00)	0.15* (0.09)	0.16** (0.07)	0.19*** (0.07)
Stock capitalizat'n / GDP		0.08*** (0.01)	0.07*** (0.01)	0.02** (0.01)	0.05*** (0.00)	0.07*** (0.02)	0.07*** (0.01)	0.08*** (0.01)
Value added Service / GDP		0.11*** (0.02)	0.11*** (0.02)	0.01 (0.02)	0.06** (0.00)	0.08*** (0.03)	0.09*** (0.02)	0.11*** (0.02)
Self-employed / total employment		-0.01 (0.01)	-0.01 (0.01)	-0.02*** (0.01)	-0.02*** (0.00)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
RHPI		0.03 (0.09)	0.03 (0.09)	0.15** (0.07)	0.07*** (0.00)	0.10 (0.11)	0.04 (0.09)	0.03 (0.09)
Tertiary Enroll		0.04 (0.12)	0.04 (0.12)	0.56*** (0.09)	0.10*** (0.00)	0.22 (0.13)	0.09 (0.11)	0.13 (0.13)
Constant	36.93*** (2.73)	-44.84** (20.86)	-45.03** (21.03)	-43.24** (16.71)	-26.1*** (0.00)	-63.46** (28.87)	-42.29** (18.43)	-51.97** (21.10)
Observations	374	374	374	374	374	297	374	374
R-squared	0.406	0.607	0.603	0.978		0.645	0.610	0.611
Hausman's chi (p-value)	12.27 (0.506)	36.96** (0.024)	31.34* (0.089)			247.6*** (0.000)	18.69 (0.665)	39.28** (0.019)
CIT estimates in alternative specification	FE -0.13** (0.06)	RE -0.15*** (0.05)	RE -0.12** (0.05)			RE -0.36*** (0.11)	FE -0.11 (0.06)	RE -0.16*** (0.05)
CIT (se)							-0.13* (0.08)	0.08 (0.07)
CITxD (se)								

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Country and year dummy variables are included in all regressions, but not reported

Regression results for the ratio of corporate debt to the total private debt are the same as those in table 4 except for the sign of the estimated coefficients because the ratio of corporate debt to the total private debt and the ratio of household debt to the total private debt always sum to 100 by construction.

**Table 5. Corporate and household debt, IV Estimations**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	CD/ Surplus	CD/ GDP	HD/ NDI	HD/ NDI	HD/ GDP	HD/ GDP	HD/ TD
Estimation method	FE IV	FE IV	FE IV	FE IV	FE IV	FE IV	FE IV
Reference estimation	Table 2 (2)	Table 2 (5)	Table 3 (2)	Table 3 (3)	Table 3 (5)	Table 3 (6)	Table 4 (2)
Reference CIT estimate	4.52***	1.56***	-0.32	-0.53**	-0.15	-0.22*	-0.15***
CIT	24.46*** (6.47)	4.66*** (1.33)	0.00 (0.87)		1.01** (0.50)		-0.17 (0.18)
Lagged CIT				-0.28 (0.94)		1.15** (0.56)	
ln(GDPpc)	-19.70 (31.56)	5.28 (6.48)	41.30*** (6.63)	41.53*** (6.58)	15.34*** (3.79)	15.44*** (3.92)	2.16 (1.46)
Urbanization	-21.28*** (2.86)	-3.61*** (0.59)	3.01*** (0.45)	3.06*** (0.47)	0.51** (0.26)	0.46 (0.28)	0.55*** (0.09)
Growth	-0.04 (1.82)	0.84** (0.37)	2.96*** (0.33)	2.98*** (0.32)	1.56*** (0.19)	1.62*** (0.19)	0.18** (0.07)
Unemployment	-5.08** (2.27)	0.03 (0.47)	-1.69*** (0.31)	-1.65*** (0.30)	-1.43*** (0.18)	-1.42*** (0.18)	-0.39*** (0.07)
Stock capitalization / GDP	-0.28 (0.26)	0.02 (0.05)					-0.01 (0.01)
Value added Service / GDP	25.18*** (3.25)	4.67*** (0.67)					0.02 (0.10)
Self-employment / total employment	1.02 (4.63)	-0.82 (0.95)					0.04 (0.12)
RHPI			0.60*** (0.08)	0.62*** (0.08)	0.20*** (0.04)	0.19*** (0.05)	0.08*** (0.02)
Tertiary Enroll			0.16 (0.11)	0.14 (0.12)	0.10 (0.06)	0.11 (0.07)	0.10*** (0.03)
Constant	-183.2 (603.67)	-190.1 (123.90)	-656.0*** (80.93)	-653.4*** (80.53)	-190.6*** (46.26)	-191.3*** (47.98)	-38.03* (23.03)
Observations	462	462	405	405	405	405	374
R-squared	0.792	0.847	0.968	0.969	0.952	0.948	0.962
H0 Exog: Durbin's p	0.000	0.004	0.698	0.788	0.006	0.004	0.925
Wu-Hausman's p	0.000	0.007	0.718	0.802	0.011	0.006	0.931
H0 overid: Basmann's p	0.217	0.845	0.596	0.850	0.155	0.072	0.027
Sargan's p	0.189	0.835	0.569	0.839	0.128	0.054	0.017

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Country and year dummy variables are included in all regressions, but not reported

**Table 6. Corporate and household debt, with CIT×Interest Rates**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable	CD/ Surplus	CD/ Surplus	CD/ GDP	CD/ GDP	HD/ NDI	HD/ GDP	HD/ TD
Estimation method	FE	FE IV	FE	FE IV	RE	RE	FE
Reference estimation	Table 2 (2)	Table 2 (2)	Table 2 (5)	Table 2 (5)	Table 3 (2)	Table 3 (5)	Table 4 (2)
Reference CIT estimate	4.52***	4.52**	1.49***	1.56***	-0.37	-0.16	-0.15***
CIT×Interest Rates	0.05 (0.05)	0.09 (0.06)	0.07*** (0.01)	0.09*** (0.02)	0.01 (0.01)	-0.02** (0.01)	-0.02*** (0.00)
ln(GDPpc)	-51.64** (24.02)	-46.00* (23.84)	5.45 (6.20)	6.32 (6.26)	32.02*** (7.08)	13.90*** (3.59)	3.48** (1.56)
Urbanization	-9.69*** (1.91)	-8.53*** (1.93)	-1.65*** (0.49)	-1.47*** (0.51)	3.60*** (0.47)	1.11*** (0.23)	0.59*** (0.10)
Growth	-6.50*** (1.51)	-5.89*** (1.40)	0.30 (0.39)	0.46 (0.37)	-1.68*** (0.29)	-1.30*** (0.15)	-0.45*** (0.07)
Unemployment	-3.33*** (1.22)	-3.31*** (1.18)	0.57* (0.31)	0.57* (0.31)	2.51*** (0.35)	1.45*** (0.18)	0.12* (0.07)
Stock capitalization / GDP	-0.10 (0.17)	-0.10 (0.16)	0.04 (0.04)	0.05 (0.04)			-0.01 (0.01)
Value added Service / GDP	19.34*** (1.88)	20.12*** (1.79)	3.87*** (0.48)	4.37*** (0.47)			0.07 (0.09)
Self-employment / total employment	-14.20*** (1.66)	-13.32*** (1.64)	-3.56*** (0.43)	-3.28*** (0.43)			0.27** (0.12)
RHPI					0.52*** (0.06)	0.23*** (0.03)	0.07*** (0.01)
Tertiary Enroll					0.19* (0.11)	0.01 (0.05)	0.09*** (0.02)
Constant	607.0* (354.14)	441.13 (366.38)	-31.78 (91.45)	-170.5* (96.19)	-556.8*** (78.09)	-189.1*** (38.82)	-68.96*** (20.35)
Observations	443	420	443	420	395	395	364
R-squared	0.600	0.921	0.573	0.911	0.836	0.833	0.655
H0 Exog: Durbin's p		0.351		0.100			
Wu-Hausman's p		0.384		0.124			
H0 overid: Basman's p		0.000		0.000			
Sargan's p		0.000		0.000			

Standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Country and year dummy variables are included in all regressions, but not reported