SAVING BEHAVIOR OF NON-FINANCIAL FIRMS IN TURKEY

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Abstract

This paper proposes a method to calculate undistributed profits, thus saving rates of non-financial firms using only the information given in their balance sheets. This allows us to analyze the saving behavior of non-financial firms even in the absence of their statement of cash flows, which contains "dividend payments" data. The balance sheets of non-financial firms are provided by TurkStat only for 2013 and 2014, so this paper is confined to the cross sectional analysis of the saving behavior of non-financial firms in Turkey. We find that the saving rate increases as past net profit margin increases for firms with profits in the preceding year. For the firms which declare loss in the preceding year, saving rate increases as the past value of net profit margin decreases. Our findings for the rest of the firm-level determinants are consistent with the previous studies: Firm size plays a role on corporate savings; leverage ratio has a negative impact on the saving rate; and the positive impact of export orientation is higher for SMEs.

Keywords: Firm Behavior, Savings of non-financial firms, Turkey
JEL classifications: D22; E21; E22; C21; O16

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1 Introduction

There has been a growing interest in empirical research on corporate saving rates recently. The main motivation seems to be the global increase in corporate saving rate, which is estimated to rise from below 10 percent of global GDP around 1980 to nearly 15 percent in the 2010s (Chen et al., 2017). This increase is registered for most industries and in the majority of countries, including all of the 10 largest economies. However no statistics is available for many developing countries, including Turkey, since corporate and household savings are not compiled separately. According to Bebczuk (2000), there are one practical and two theoretical reasons used to justify this omission. The practical reason is that the national saving is calculated as a residual and data availability does not allow to discriminate between the household and corporate components. The first theoretical reason is related to the neoclassical assumption that households are the owners of corporations, so it is sufficient to concentrate on private sector as a whole. The second theoretical reason relies on the perfect competition paradigm that long-run corporate profits are zero. There are a couple of theoretical arguments to dismiss the presumed irrelevance of gathering data on corporate savings[1], but one quantitative argument is enough to indicate its importance: Corporate saving represents almost two-thirds of private saving to global GDP as of 2013[2].

The global rise of corporate savings is accompanied by a downward trend in world average household saving rate (Grigoli et al., 2014). Chen et al. (2017) also document a pervasive shift in the composition of saving away from the household sector and toward the corporate sector. Even if the shift between its two components is symmetrical leaving the private saving rate unchanged, household and corporate savings are not perfect substitutes of each other, because capital market imperfections affect private saving decisions (Bebczuk, 2000). Furthermore, since the factors affecting household and corporate savings differ, it is important to gather data on saving behavior by disaggregating private saving into its components before analyzing private saving behavior. Unfortunately, corporate saving rate of Turkey has not been announced by Turkish Statistical Institute (TurkStat) yet.

In spite of the lack of formal data on corporate savings, Özmen et al. (2012) analyze the saving behavior of non-financial firms in Turkey by using the Worldscope dataset and the Istanbul Stock Exchange (ISE) dataset. They conclude that firm savings are low in Turkey, and the reason is associated primarily with low operating profits. ISE dataset covers around 200 non-financial firms listed on the ISE, but these are mostly large firms, so the sample is not representative of the total population of non-financial firms in Turkey. In the same paper, they further use the Central Bank of the Republic of Turkey's (CBRT) dataset, which contains balance sheets for over 6,000 non-financial firms in Turkey, to find what determines investments and net profit margins instead of analyzing the determinants of saving rate of the firms directly. The reason is that the CBRT dataset does not have information on dividend payments.[3] This lack of data prevents them from calculating

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[1]See Bebczuk (2000) for these theoretical arguments.

[2]Chen et al. (2017), Figure 1a.

[3]Information on dividend payments of the firms are recorded in the cash-flow statement, which is not compiled by the CBRT or TurkStat.

corporate saving rate - the ratio of undistributed profits to net sales.

We propose a method to overcome the problem related to dividend payments by calculating undistributed profits from the balance sheet data of the firms using the basic accounting principles as explained in the methodology section. This way, we can obtain saving rate of not only the listed firms but a larger set of non-financial firms in Turkey using their balance sheets, which are now compiled by TurkStat, not by the CBRT. However, at the moment balance sheets of the non-financial firms are available in TurkStat only for two years (2013 and 2014), so we cannot conduct a panel data analysis as it is the case in Özmen et al. (2012) to address the effects of macroeconomic factors on the corporate savings. Therefore, this paper is confined to the cross sectional analysis of the saving behavior of non-financial firms by using firm-level data, as the first step of our research on corporate savings. We can compare the results of cross sectional analysis for the years 2013 and 2014, to deduct the effects of macroeconomic environment on corporate saving rate in broad terms.

The rest of the paper is organized as follows: The next section presents the international evidence on corporate saving behavior. Section 3 explains the methodology and how the dataset is constructed using balance sheets and income statements of 63,906 non-financial firms in Turkey for both 2013 and 2014. The empirical results are presented in Section 4 and the last section concludes.

2   Corporate Saving Behavior: International Evidence

The research on saving behavior of non-financial firms using firm level cross sectional analysis is scarce, to our knowledge. One such research is on the private companies in Britain, where Bates and Henderson (1967) examine the determinants of income appropriation in a sample of large and small firms in the United Kingdom. They conclude that small firms tend to save more out of their income than do large companies; the rate of saving is determined mainly by the level of profits and dividends paid in the preceding year; and they rely more heavily on savings as a source of finance than their larger counterparts.

Recent research on corporate savings uses in general, national accounts of countries for which corporate saving rate data are available or consolidated financial statement data of publicly listed firms of some countries. They are motivated either by the rise of corporate savings during the last three decades, or by the corporate saving glut observed since the beginning of 2000s and try to find the reasons behind. Regarding the former, Karabarbounis and Neiman (2012) document that a significant increase in corporate saving, which became the largest component of national saving for many countries, is associated with the decline in global labor share over the last 30 years. They stress the necessity of studying the labor share and corporate saving jointly, and offering a unified explanation for their trends. Their conclusion is that the global decline in the cost of capital beginning around 1980 induced firms to shift from labor to capital, financed in part with an increase in corporate saving.

Chen et al. (2017) confirms the conclusion of Karabarbounis and Neiman (2012) that the rise of corporate saving mirrors the decline in the labor share for the global economy.

By definition, corporate gross value added is distributed among compensation to labor, payments to capital, corporate taxes, and corporate gross saving. Therefore, an increase in the saving share of value added must be offset by declines in the share of payments either to labor, to creditors and owners, or to taxes. Using broad sample of data from the UN, Chen et al. (2017) reveal that payments to capital and taxes have barely changed relative to gross value added since 1980. This implies that the rise of corporate saving is caused by the decline in the labor share. They further disaggregate payments to capital into its subcomponents for a narrower data set comprising of OECD countries due to data limitations, and find that dividends are relatively stable at 10 percent of corporate gross value added whereas interest payments and transfers fluctuate around zero since 1980. In conclusion, forces causing the decline in the labor's share of income did not produce commensurate increases in tax, dividends, and interest payments, resulting in an increase in corporate saving. Since investment per value added did not increase much as well, firms used part of the increased profits to accumulate cash and other types of financial assets, thus the sectoral composition of private saving changed in favor of corporate saving during the last three decades. This conclusion is plausible considering that the global decline in labor share is consistent with the decrease in household income, thus household saving.

Chen et al. (2017) also examine the cross-sectional patterns in the rise of corporate saving rates using firm-level data and find similar results to those obtained by using the national accounts data as summarized above. Unlike the national accounts data, the firm level data exclude financial firms and the firms that are not publicly listed. The reason behind the increase in non-financial corporation's saving in the cross-section of firms is the increases in firm profits instead of other forces such as changes in dividends, interest payments, or tax payments. Furthermore, they found no evidence that trends in firm saving relate significantly to firm size and age as well as the industry type.

The second strand of recent research on corporate savings is motivated by the "corporate saving glut" observed in many developed and Asian economies since the beginning of 2000s. The "corporate saving glut" is defined as the excess of saving over investment, where saving is calculated as the undistributed profits[4] of non-financial corporations and investment represents spending by non-financial corporations on capital formation. Horioka and Terada-Hagiwara (2014) study the "saving glut" phenomenon in case of Asia by analyzing empirically the saving behavior of firms from 11 Asian countries using firm-level data in the Oriana Database for the 2002-2011 period. They try to find why firms channel their cash flow into liquid assets rather than investing in physical capital or distributing as dividend. Among the determinants of the changes in cash holdings that they take as a proxy for corporate saving glut, they focus on income uncertainty and the cost of external finance. Considering that financial sector development has lagged behind in Asia, whether these two factors are of importance for Asian firms may shed light if financial constraints are binding for them. They find some evidence that cash flow has a positive impact on the change in cash holdings. Furthermore, the positive impact of cash flow on the change in cash holdings is larger and more significant for smaller firms compared to larger ones in both developed and developing economies of Asia. These findings imply that "corporate saving glut" tends to be the case especially for smaller Asian firms, considering that smaller firms are more likely to be financially constrained.

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[4]After-tax profits less dividends to shareholders.

Gruber and Kamin (2015) study the "corporate saving glut" among the corporations of the seven biggest developed economies (G7), especially in the aftermath of the global financial crisis (GFC). They document that as of 2013, corporate net lending[5] of non-financial corporations in Canada, Japan, and the U.K. has been positive since around 2000 and in the U.S. after 2002. Among European countries of the G7, in Germany net lending of the non-financial corporations turned positive in 2005 while in France and Italy they still borrow on net from the rest of the economy to finance their investments, i.e. they experience negative net lending positions. Increases in corporate net lending since the GFC are correlated with higher current account balance. This suggests that higher corporate saving has not been offset by lower saving in other sectors of the domestic economy. This is consistent with the argument of Bebczuk (2000) that the household and corporate components of private saving are not perfect substitutes of each other.

According to Gruber and Kamin (2015), the data suggest that countries with the greatest shortfall in growth during GFC have tended to experience larger increases in corporate lending. There may be three reasons behind this coincidence. The first is that the rise in net lending may reflect cutbacks in investment spending in response to the recession and subsequent slow economic growth. The second possibility is that in reaction to the financial turbulence and credit crunch associated with the GFC, corporations increase net lending on purpose in order to accumulate financial assets. Finally, it is possible that corporate net lending has increased not because of such precautionary measures, but simply because firms do not perceive suitable investment opportunities. Gruber and Kamin (2015) consider that the way corporations choose how to allocate their profits among investment, paying shareholders through dividends or equity buybacks, and adjusting their balance sheets, reveals which of the three reasons prevails. They estimate econometric equations linking these three variables of interest to an array of standard macroeconomic indicators, including real GDP growth, interest rates, the relative price of capital goods, and profitability. These equations are estimated up until 2006, and then are used to forecast the paths of investment, payouts, and net financial accumulation during the period 2007-2013. Then, they compare the actual paths of these variables to their predicted paths to assess whether they are exhibiting normal responses to the macroeconomic disruptions during GFC, or there is any unusual pattern of behavior. Their results show that the allocation of corporate profits during the GFC principally reflects the typical reaction of investment to macroeconomic developments - notably weak economic activity and exceptionally low interest rates. However, investment declined from a surprisingly weak starting point, as corporate investment in many of the G7 economies started falling below predictions of their model prior to the GFC. Moreover, dividends and equity buybacks have trended up since 2000. This implies that precautionary demand for financial buffers has not been the primary reason behind the increase in corporate net lending. Overall, the results suggest that corporate net lending has increased because firms do not perceive profitable investment opportunities.

International evidence on corporate saving behavior indicate that the rate of saving is determined mainly by the level of profits in the preceding year (Bates and Henderson, 1967 and Chen et al., 2017). Furthermore, small firms tend to save more out of their income than do large companies and they rely more heavily than large ones on savings as a source

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[5]Any excess of saving over investment represents net lending to the rest of the economy.

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of finance (Bates and Henderson, 1967 and Horioka and Terada-Hagiwara, 2014), though Chen et al. (2017) cannot find evidence that trends in firm saving relate significantly to firm size and age as well as the industry type.

The research on corporate saving behavior in Turkey is scarce, probably because formal corporate saving rate data is not available. Yet, Özmen et al. (2012) analyze the saving behavior of non-financial firms in Turkey both via international comparisons using the Worldscope dataset and a within country analysis for firms listed in the Istanbul Stock Exchange (ISE) using its dataset. They conclude that firm savings are low in Turkey, and the reason is associated primarily with low operating profits. In the second part of their study, they use CBRT dataset, which contains balance sheets for over 6,000 non-financial firms in Turkey, to reveal the determinants of investment and net profit margin of firms instead of analyzing the determinants of corporate saving rate directly. The reason is that the CBRT dataset does not contain information on dividend payments, avoiding the calculation of savings of a firm.[6]

3   Methodology and the Dataset

Building upon the work of Özmen et al. (2012), we aim to analyze saving behavior of a much broader set of non-financial firms in Turkey, instead of only of the ones listed in ISE. Firm-level data are now compiled by TurkStat instead of the CBRT. Since it is the largest source of information on balance sheet of firms in Turkey, it is preferable to use this dataset instead of the ISE dataset while assessing the saving behavior of the non-financial firms. However, TurkStat collects balance sheet and income statement of the firms, but not the statement of cash flows, which contains "dividend payments" data. We propose a method to overcome the missing data problem related to the information on dividend payments by calculating undistributed profits using the the balance sheet data of the firms. In this way, we can obtain savings rate of a much larger number of firms in Turkey than those listed in the ISE.

The saving rate is defined as the ratio of undistributed profits to net sales. Therefore we need to find undistributed profits to be able to calculate the saving rate of a firm. In case the statement of cash flows, which includes data on dividend payments, is available as it is the case for firms listed in the ISE, we can calculate undistributed profits in the following manner:

$$\text{Undistributed profits} = \text{Net profits} - \text{Dividend payments} \qquad (1)$$

Financial accounting defines undistributed profits as the retained part of current term's profits, which is transferred to retained earnings component of the balance sheet at the end of the period. Therefore, retained earnings cover the preceding years' profits, but not all of them, since some part of the profits should be reserved as a legal obligation. In

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[6]In a typical income statement of a firm, gross saving is defined as after-tax profits plus interest payments minus dividend payments (OECD, 2007).

order to find undistributed profits of the current term, first distributed profits[7] is found using the retained earnings and legal reserves of the current and the preceding term as well as preceding terms' profits such that

$$(\text{Distributed profits})_T = (\text{Retained earnings})_{T-1} + (\text{Legal reserves})_{T-1} + (\text{Net profits})_{T-1}$$
$$-(\text{Retained earnings})_T - (\text{Legal reserves})_T \tag{2}$$

where T is the current year. This implies that the part of the sum of retained earnings, legal reserves, and the profits of the preceding year, which is not transferred either to the retained earnings or to legal reserves components of the current year's balance sheet, should have been distributed (appropriated by the owner of the firm or distributed to shareholders as dividend payments). Then, it is straightforward to calculate undistributed profits at the current term as:

$$(\text{Undistributed profits})_T = (\text{Net profits})_T - (\text{Distributed profits})_T \tag{3}$$

Combining Equations 2 and 3 and rearranging gives:

$$(\text{Undistributed profits})_T = (\text{Net profits})_T + (\text{Retained earnings})_T + (\text{Legal reserves})_T$$
$$-(\text{Net profits})_{T-1} - (\text{Retained earnings})_{T-1} - (\text{Legal reserves})_{T-1} \tag{4}$$

Finally, the saving rate of a firm can be calculated by dividing undistributed profits obtained in Equation 4 to net sales.

$$(\text{Saving rate})_T = (\text{Undistributed profits})_T / (\text{Net sales})_T \tag{5}$$

Therefore, even in the absence of formal data on corporate savings rate, it is possible to analyze the saving behavior of a broader sample of non-financial firms in Turkey in addition to the ones listed in ISE using the basic accounting principles. Since balance sheets of the non-financial firms are available in TurkStat only for two years (2013 and 2014) at the moment, we cannot conduct a panel data analysis.[8] As the first step of our research on corporate saving in Turkey, we make a cross-sectional analysis to reveal its firm level determinants in this study. Nevertheless, comparing the cross sectional analyses for the years 2013 and 2014, for which the data are available, may allow us to deduct the effects of macroeconomic environment on corporate saving rate to some extent.

For the empirical analysis, we use the specification in which the dependent variable is the saving rate (SR) calculated using Equation (5) and, following Özmen et al. (2012), the independent variables are:

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[7]Instead of "dividend payments" we use the term "distributed profits", which has a broader scope and covers any payment regardless of the shareholder status or company type.

[8]Dynamic panel data methods give inconsistent estimators when the time dimension is less than 3 as explained in Bond (2002).

- **Net profit margin (NPM)** is the ratio of net profits (after interest and tax) to net sales. One year lagged value of NPM is used as independent variable, since this year's dividend, thus the saving rate is determined according to profits of the preceding year. Empirical research also shows that profits in the preceding year is the main determinant of the saving rate in the current year (Bates and Henderson, 1967; Chen et al., 2017; Özmen et al., 2012). This variable is directly linked with the savings rate if the dividend payout ratio is relatively stable. A firm, which has profits in the preceding year, is expected to retain a portion of its income for future investments, so the savings rate is expected to increase with net profit margin.

- **Logarithm of real assets (RA)** controls for the firm size. As a firm's assets grow, it is expected to save more (Özmen et al., 2012). However, considering that financial sector development has lagged behind in Turkey, as it is the case for many developing economies, financial constraints may be more binding for smaller firms compared to larger ones. In this case smaller firms are expected to save more. Therefore, the coefficient of RA may be negative as well.

- **Leverage ratio (LR)** is ratio of debt to total assets. Solvent firms are expected to save more while indebted firms less. Turkish indebted firms facing with a high interest burden would probably tend to save less.

- **Export share (X_S)** is the share of exports in total sales. The coefficient of X_S may take positive or negative values depending on the strength of forces that act in opposite directions. On the one hand, greater export orientation implies that these firms have international competitiveness, which indicates a higher profitability, thus higher saving rate. On the other hand, exporting firms have more chance to access external finance. This opportunity may reduce the need for internal funds, so they may tend to save less.

- **Tangibility rate (TR)** is the ratio of tangible assets to total assets. Firms with a high TR are less likely to save because they may not have room for further fixed investment. Therefore, firm savings rate is expected to decline with this ratio. Furthermore, since intangible capital is more difficult to pledge as collateral (Chen et al., 2017), firms with low TR face a higher cost of external financing. Therefore, they may prefer to retain profits to finance investments. This implies that firms with a low TR are expected to save more. Both of these considerations imply that there is a negative relationship between saving rate and tangibility rate.

- Özmen et al., (2012) use **Tobin's q** (the ratio of the market value of firms to book value) as an independent variable in determining the saving rate. They consider that as the market value of a firm increases, its desire to invest burgeons. Such firms tend to retain profits to finance investments, so they are expected to have a higher saving rate. However, Tobin's q cannot be used as a variable for firms not listed in the ISE since their market value cannot be determined.

We use balance sheet and income statement data of almost 64,000 non-financial firms in Turkey for 2013 and 2014, obtained from TurkStat. We construct two separate data sets for 2013 and 2014, as explained in the Appendix.

4 Empirical Analysis and the Results

We start our empirical analysis by using the dataset for 2013, which covers 40,834 non-financial firms after cleaning it as explained in the previous section. The international evidence (Bates and Henderson, 1967; Chen et al., 2017) and the work on Turkey using ISE dataset (Özmen et al., 2012) show that the rate of saving is determined mainly by the level of profits earned in the preceding year. Therefore, as a first step we try to see the relationship between saving rate (vertical axis) and one-year lagged value of the net profit margin (horizontal axis). Figure 1 illustrates the scatter plot of the saving rate against the one-year lagged values of the net profit margin for all non-financial firms in Turkey with appropriate data for the year 2013.

Figure 1: The saving rate vs. one-year lagged values of the net profit margin
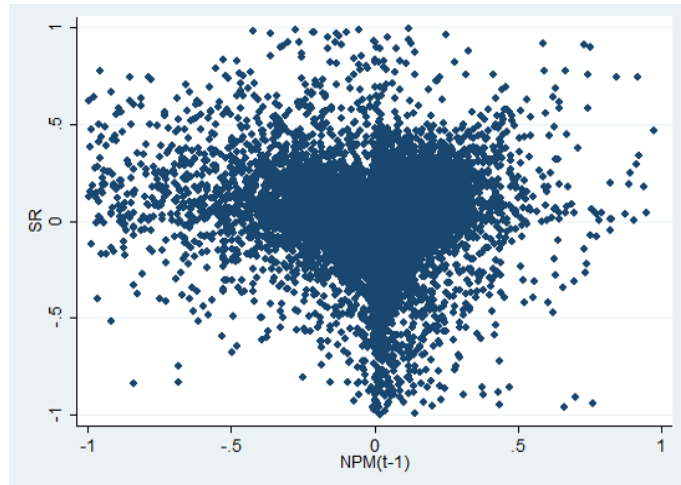
According to Figure 1, the correlation between these two variables seems to be different in sign and magnitude for profitable and unprofitable firms in the preceding year. This difference can have an insightful explanation. Theoretically, a firm that made profits the year before, would retain a portion of them for future investments. So the savings rate is expected to increase as one-year lagged net profit margin increases. In case of an unprofitable firm, we can plausibly expect that saving rate increases as lagged value of net profit margin decreases, because a firm with higher loss in the preceding year tends to save more in the current year in order to improve its financial position.

The two panels in Figure 2 plot the scatter diagrams of non-financial firms savings rates against one-year lagged values of their net profit margin, which is below zero and higher than zero, respectively, for the year 2013. Indeed, we observe a negative cross-sectional relationship between the saving rate and the one-year lagged net profit margin in Figure 2a for firms which register losses for the preceding year. In contrast, the second panel show that the relationship between the saving rate and the one-year lagged net profit margin is positive. Therefore, we should analyze the firms with positive and negative net profit margins in the preceding year, separately.

Figure 2: The saving rate vs. one-year lagged values of the net profit margin - separated

a. Firms with losses in preceding year
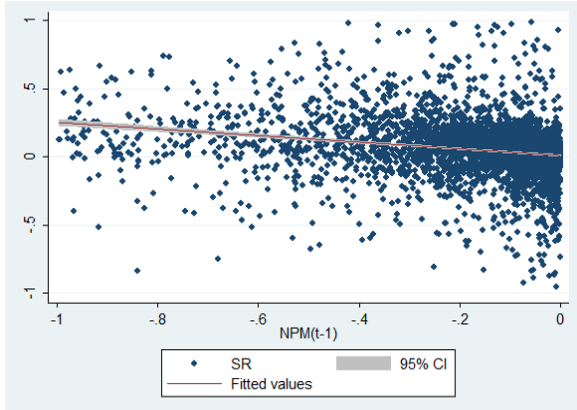
b. Firms with profits in preceding year
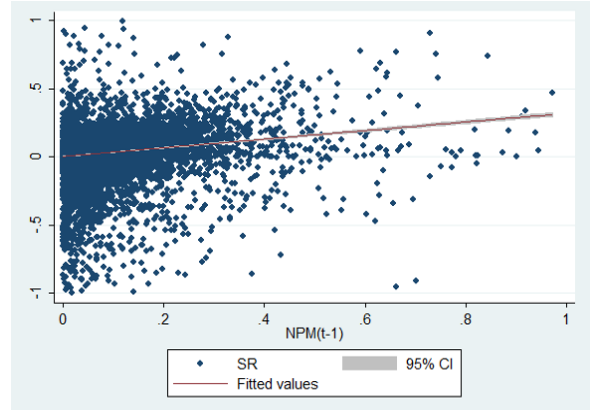
Before reporting the results of the regression analysis, Tables 1 and 2 give the summary statistics of the firm-level data for all non-financial firms with positive profits in the preceding year for the years 2013 and 2014, respectively. They show that the mean saving rate decreases from 1.8 in 2013 to 1.3 per cent in 2014 while the mean of net profit margin decreases from 3 per cent to 2.6 per cent. The decrease in mean net profit margin and mean saving rate from 2013 to 2014 can be a reflection of the deterioration in the macroeconomic outlook from 2013 to 2014. Indeed, the financial account of Balance of Payments for the year 2013 indicates a capital inflow of almost USD 73 billion, a record high level for Turkey. This is followed by USD 41 billion of capital inflow in 2014. Accordingly, the GDP growth rate is higher in 2013 than in 2014 (8.5 versus 5.2 per cent). Therefore, the deterioration in macroeconomic outlook from 2013 to 2014 seems to reflect itself in the decrease in mean net profit margin and mean saving rate. This gives an idea about the effects of macroeconomic outlook on corporate saving rate and motivates us to conduct a panel data analysis as soon as balance sheet data of the non-financial firms are available for a wider time-span.

To quantify the relationships in Figures 2a and 2b, we regress the saving rate on the one-year lagged values of the net profit margin, controlling for the firm size, leverage rate, export share, and tangibility ratio. Tables 3 and 4 present the results of the OLS regressions for firms with positive and negative net profits in the preceding year, respectively. In order to assess the extent to which the corporate saving behavior differs by industry type of firms and changes across firms with respect to number of workers, we divide the sample into subsamples and run the regressions separately as well. For the subsample selection, following the instructions in TurkStat (2013 and 2014) based on the statistical classification of economic activities in the European Union (NACE2), we eliminate firms with NACE2 codes < 1011 and NACE2 codes > 3320 to obtain data for manufacturing firms. The rest constitutes the non-manufacturing firms subsample. In the exercise with respect to number of workers of firms, we divide the whole sample, as well as manufacturing and non-manufacturing firm subsamples into two further subsamples. The firms with number of workers equal to or higher than 250 people are considered as large firms and those that employ less than 250 are considered as SME (small and medium-sized enterprises).

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Table 1: Summary statistics for firms with profits in the preceding year in 2013

Variable	Obs.	Mean	Std. Dev.	Min	Max
Ave_worker	35046	70.98576	246.6478	1	18624
SR	35046	0.0178615	0.0979983	-0.9992605	0.99183
NPM	35046	0.0299735	0.088947	-0.9992605	0.99183
NPM_L1	35046	0.0448693	0.063791	0	0.9719005
Log RA	35046	12.92353	2.074895	-4.60517	22.97837
LR	35046	0.8394863	0.5497522	-1.096743	48.31303
X_S	35046	0.0792823	0.2032332	0	1
TR	35046	0.2358019	0.234046	1.22E-08	0.999907

Table 2: Summary statistics for firms with profits in the preceding year in 2014

Variable	Obs.	Mean	Std. Dev.	Min	Max
Ave_worker	48768	81.1933	317.7053	1	26920
SR	48768	0.012608	0.1077665	-0.9901301	1
NPM	48768	0.0257504	0.0990028	-0.9901301	1
NPM_L1	48768	0.0472066	0.0718476	0	1
Log RA	48768	13.3415	2.103039	-4.60517	23.16582
LR	48768	0.6487735	0.2779515	-0.2050522	8.817388
X_S	48768	0.0814338	0.2075134	0	1
TR	48768	0.2094433	0.1920497	8.43E-09	0.9998667

In total we carry out nine regressions for non-financial firms with positive profits in the preceding year. Note that, almost all of the independent variables we used in the regression analysis have significant coefficients. The one-year lagged value of net profit margin (NPM_L1) has a positive significant impact on the saving rate for all of the nine different groupings at 1 percent level, controlling for the firm size, leverage rate, export share, and tangibility ratio. For example, one-percentage point increase in the preceding year's net profit margin in the cross section of all firms is associated with an increase of 0.27 percentage point in corporate saving rate. This effect fluctuates between 0.25 and 0.38 for manufacturing SMEs and manufacturing large firms, respectively. These values are somewhat higher than the coefficients estimated in Özmen et al. (2012), which are 0.09 for manufacturing SMEs and 0.23 for manufacturing large firms, using fixed-effects panel regression on ISE dataset for listed firms. This difference may be attributable to the standard results for omitted variable bias, which indicate that, at least in large samples, OLS level estimator is likely to be biased upwards (Bond, 2002). Standard results for omitted variables bias also indicate that fixed-effects estimator is biased downwards. Therefore, a candidate consistent estimator will lie between the OLS and fixed-effects estimates as mentioned by Bond (2002).

The coefficient of firm size proxied by the log of real assets is positive and significant at 1 percent level for all groups except for firms, which employ 250 or more workers. This is of no surprise considering that the size of the firm is already taken into account in this subgroup. Therefore, we can conclude that size of a firm has a positive impact on savings in Turkey. This result contradicts with international evidence on corporate saving behavior as detailed in Section 2, but it is in line with the findings of Özmen et al. (2012) for Turkey's listed firms. Bates and Henderson (1967) and Horioka and Terada-Hagiwara (2014) state that small firms tend to save more out of their income than do large companies because the former relies more heavily than the latter on savings as a source of finance, due to financial constraints they face. The results on Turkey are in the opposite direction maybe because all non-financial firms are financially constrained or they prefer to rely more on savings as a source of finance of future investments because of high borrowing costs.

Leverage ratio has a negative significant impact on the saving rate for all of the nine groupings at 1 percent level. As expected, Turkish indebted firms facing with a high interest burden tend to save less. The highest impact of leverage ratio on the saving rate is for large manufacturing firms, while it affects non-manufacturing SMEs the least. Probably because the former has the highest opportunity to borrow while the latter has the smallest.

The coefficient of export share (X_S) is positive and significant for SMEs while it is insignificant for large firms. These results apply both to manufacturing and non-manufacturing firms. Therefore, SMEs with greater export orientation seems to have international competitiveness, which allows them to make more profits, thus they save more. Our findings related to this variable are similar to Özmen et al. (2012). Their interpretation is that large firms may plausibly be assumed to act more globally, so they are export-oriented in competitive industries. The impact of export orientation on profitability, thus saving rate might be expected to be higher for SMEs.

Table 3: OLS regression results for firms with positive profits in the preceding year using 2013 data

	All firms	Large firms	SME	All Manuf.	Large Manuf.	Manuf SME	All Non-manuf.	Large Non-manuf.	Non-manuf. SME
NPM_L1	0.2732***	0.3335***	0.2718***	0.2586***	0.376***	0.2528***	0.2684***	0.2857***	0.2675***
	(0.008)	(0.0315)	(0.0083)	(0.0135)	(0.0406)	(0.0142)	(0.0101)	(0.0473)	(0.0104)
Log RA	0.0025***	-0.0018	0.0029***	0.0024***	-0.0008	0.0037***	0.0023***	-0.0004	0.0024***
	(0.0003)	(0.0015)	(0.0003)	(0.0004)	(0.0021)	(0.0005)	(0.0004)	(0.0023)	(0.0004)
LR	-0.0344***	-0.0542***	-0.0335***	-0.0545***	-0.0726***	-0.0537***	-0.0288***	-0.0511***	-0.0278***
	(0.001)	(0.0045)	(0.001)	(0.0019)	(0.0068)	(0.0019)	(0.0011)	(0.0062)	(0.0012)
X_S	0.0109***	0.0073	0.0116***	0.006**	0.0128	0.0063**	0.0148***	0.0372	0.0138***
	(0.0025)	(0.009)	(0.0026)	(0.003)	(0.0089)	(0.0031)	(0.0045)	(0.0232)	(0.0046)
TR	0.0078***	0.0326***	0.0056**	0.018***	0.0212*	0.0145***	0.0035	0.0543***	0.0013
	(0.0025)	(0.011)	(0.0026)	(0.0036)	(0.0127)	(0.0038)	(0.0036)	(0.0181)	(0.0036)
Constant	0	0.0705***	-0.0062	0.0166***	0.0616*	0.0015	0.0029	0.0477	-0.0038
	(0.0035)	(0.0228)	(0.0038)	(0.0054)	(0.033)	(0.0061)	(0.0046)	(0.034)	(0.0049)
Obs.	35046	1535	33511	14576	791	13785	20470	744	19726
R-sq.	0.0788	0.1587	0.0761	0.105	0.2221	0.1022	0.0693	0.1441	0.0666

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

Note: Standard errors in parentheses.

Table 4: OLS regression results for firms with losses in the preceding year using 2013 data

	All firms	Large firms	SME	All Manuf.	Large Manuf.	Manuf SME	All Non-manuf.	Large Non-manuf.	Non-manuf. SME
NPM_L1	-0.2731***	-0.2683***	-0.2733***	-0.3132***	-0.4402***	-0.3082***	-0.261***	-0.2011**	-0.2631***
	(0.0130)	(0.0610)	(0.0133)	(0.0203)	(0.0900)	(0.0209)	(0.0167)	(0.0821)	(0.0171)
Log RA	0.0010	-0.0029	0.0015	-0.002	0.0030	-0.0026	0.003*	-0.0072	0.0038**
	(0.0012)	(0.0056)	(0.0013)	(0.0018)	(0.0090)	(0.0020)	(0.0015)	(0.0076)	(0.0017)
LR	-0.0161***	-0.0085	-0.0163***	-0.04224***	-0.0397**	-0.0426***	-0.0136***	-0.0037	-0.0138***
	(0.0014)	(0.0077)	(0.0015)	(0.0042)	(0.0206)	(0.0043)	(0.0016)	(0.0092)	(0.0016)
X_S	0.0323***	0.0505	0.0318***	0.0156	-0.0006	0.0159	0.055***	0.1637*	0.0523***
	(0.0105)	(0.0377)	(0.0109)	(0.0130)	(0.0403)	(0.0136)	(0.0166)	(0.0870)	(0.0170)
TR	0.0118	0.0026	0.0108	0.0078	-0.0028	0.0101	0.0206	0.0020	0.0185
	(0.0104)	(0.0427)	(0.0108)	(0.0159)	(0.0553)	(0.0168)	(0.0135)	(0.0639)	(0.0140)
Constant	0.0103	0.0545	0.0049	0.0758***	-0.0069	0.084***	-0.0184	0.1155	-0.0275
	(0.0144)	(0.0847)	(0.0156)	(0.0225)	(0.1432)	(0.0249)	(0.0187)	(0.1132)	(0.0199)
Obs.	5788	272	5516	2111	114	1997	3677	158	3519
R-sq.	0.0817	0.0779	0.082	0.1285	0.1919	0.1268	0.0734	0.0619	0.0748

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

Note: Standard errors in parentheses.

The coefficient of tangibility rate (TANR) is positive and significant for all groups except for non-manufacturing SMEs. This finding is in contradiction with the expectation of negative relationship between saving rate and tangibility rate. Indeed, firms with a low tangibility rate are expected to save more to finance further investments for two reasons: First, they have more room for fixed investment. Second, they face a higher cost of external financing considering that intangible capital is more difficult to pledge as collateral. This variable will be scrutinized further while analyzing the results for 2014. The constant term is significant for large non-financial firms, especially for the manufacturing ones. Based on the economic implication of the constant, it is possible to state that on average, the large firms in the 2013 sample save 7 per cent of their net sales even when their profits are zero once we control for the other firm-specific variables.

The results in Table 4 indicate that for non-financial firms which register losses in the preceding year, there is a negative cross-sectional relationship between the saving rate and the one-year lagged net profit margin as we observe in the graphical counterpart in Figure 2(a). After controlling for the firm size, leverage rate, export share, and tangibility ratio, a one percentage point increase in the one-year lagged value of net profit margin (NPM_L1) leads to a 0.27 percentage point decrease in the saving rate. Interestingly, this effect is the same in magnitude but in reverse direction of the effect for non-financial firms with profits in the preceding year. The effect on manufacturing firms is larger such that the coefficient of NPM_L1 is the highest for large manufacturing firms with (-0.44) while it is the lowest for non-manufacturing large firms (0.2).

Unlike the case for firms with profits in the preceding year, the log of real assets and tangibility ratio have no significant impact on the saving rate for firms which declare loss for the preceding year. The leverage ratio still has a negative significant impact on the saving rate for manufacturing firms of all sizes and non-manufacturing SMEs. For firms with loss in the preceding year, the coefficient of export share (X_S) is positive and significant in case of non-manufacturing SMEs. The coefficient of these firms is also decisive in X_S for the group which covers both types of firms.

Tables 5 and 6 show the regression results corresponding to the year 2014 for firms which announce profits and losses in the preceding year, respectively. These two tables confirm the results for the year 2013 that the saving behavior of firms depends whether the preceding year marks profit or loss. The positive and significant coefficient for one-year lagged value of net profit margin (NPM_L1) implies that among the non-financial firms that have profits in the preceding year, the ones with higher profits save more (Table 5). In contrast, the negative cross-sectional relationship between the saving rate and the one-year lagged net profit margin in Table 6 shows that among the firms which register losses in the preceding year, the firms with higher loss saves more out of its sales.

In case of the firms with profits in the preceding year (Table 5), the one-year lagged value of net profit margin (NPM_L1) has a positive significant impact on the saving rate for all of the nine different groupings at 1 percent level. The coefficients are smaller in 2014 compared to those for 2013. For example, for the group that covers all firms, a one percentage point increase in NPM_L1 leads to 0.13 percentage point increase in the saving rate in 2014, while it is 0.27 in 2013, holding other variables constant.

Table 5: OLS regression results for firms with profits in the preceding year using 2014 data

	All firms	Large firms	SME	All Manuf.	Large Manuf.	Manuf SME	All Non-manuf.	Large Non-manuf.	Non-manuf. SME
NPM_L1	0.1316***	0.147***	0.13***	0.1025***	0.117***	0.1007***	0.143***	0.1709***	0.1414***
	(0.0068)	(0.028)	(0.0071)	(0.0115=	(0.0389)	(0.012)	(0.0086)	(0.0402)	(0.0089)
Log RA	0.0043***	0.0043***	0.0045***	0.0052***	0.006***	0.0056***	0.0038***	0.0029	0.004***
	(0.0003)	(0.0013)	(0.0003)	(0.0004)	(0.0019)	(0.0005)	(0.0004)	(0.0019)	(0.0004)
LR	-0.089***	-0.1046***	-0.0886***	-0.0975***	-0.1143***	-0.0971***	-0.0849***	-0.0951***	-0.0847***
	(0.0018)	(0.0097)	(0.0018)	(0.0028)	(0.0118)	(0.0029)	(0.0023)	(0.015)	(0.0023)
X_S	0.001	-0.0025	0.0014	-0.0058**	-0.0045	-0.0054*	0.0102***	-0.0244	0.0107***
	(0.0023)	(0.0081)	(0.0024)	(0.0028)	(0.0081)	(0.003)	(0.0039)	(0.0206)	(0.004)
TR	-0.0453***	-0.0332***	-0.0471***	-0.0429***	-0.0545***	-0.0446***	-0.0467***	-0.0205	-0.0492***
	(0.0029)	(0.0128)	(0.0031)	(0.0046)	(0.0181)	(0.0049)	(0.0038)	(0.018)	(0.004)
Constant	0.0163***	0.0172	0.0134***	0.0107*	0.0013	0.0056	0.02***	-0.0273	0.0176***
	(0.0035)	(0.021)	(0.0037)	(0.0056)	(0.0326)	(0.0062)	(0.0045)	(0.0296)	(0.0048)
Obs.	48768	2466	46302	20093	1131	18962	28675	1335	27340
R-sq.	0.0742	0.0968	0.0726	0.0876	0.1365	0.0838	0.0677	0.0749	0.0674

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

Note: Standard errors in parentheses.

Table 6: OLS regression results for firms with losses in the preceding year using 2014 data

	All firms	Large firms	SME	All Manuf.	Large Manuf.	Manuf SME	All Non-manuf.	Large Non-manuf.	Non-manuf. SME
NPM_L1	-0.3289***	-0.4818***	-0.321***	-0.3628***	-0.480***	-0.3562***	-0.3267***	-0.4826***	-0.3184***
	(0.0095)	(0.0321)	(0.0100)	(0.0167)	(0.0484)	(0.0177)	(0.0117)	(0.0440)	(0.0122)
Log RA	0.0081***	0.0068**	0.0082***	0.0047***	-0.0004	0.0047***	0.0091***	0.0086**	0.0089***
	(0.0008)	(0.0029)	(0.0010)	(0.0014)	(0.0048)	(0.0017)	(0.0011)	(0.0040)	(0.0012)
LR	-0.0039***	-0.0498***	-0..0036***	-0.0578***	-0.0716***	-0.0572***	-0.0031***	-0.0488***	-0.0029***
	(0.0007)	(0.0085)	(0.0007)	(0.0058)	(0.0269)	(0.0061)	(0.0008)	(0.0101)	(0.0008)
X_S	0.0339***	0.0244	0..0361***	0.0331***	0.0188	0.0349***	0.036***	0.0375	0.0369***
	(0.0082)	(0.0189)	(0.0088)	(0.0107)	(0.0200)	(0.0118)	(0.0124)	(0.0391)	(0.0130)
TR	-0.0384***	-0.0072	-0.0412***	-0.0305*	-0.0507	-0.0278	-0.0419***	0.0067	-0.0451***
	(0.0089)	(0.0250)	(0.0096)	(0.0164)	(0.0376)	(0.0182)	(0.0108)	(0.0343)	(0.0115)
Constant	-0.0999***	-0.0672	-0.0994***	-0.0111	0.0876	-0.0125	-0.1126***	-0.1021	-0.1086***
	(0.0107)	(0.0463)	(0.0121)	(0.0187)	(0.0844)	(0.0221)	(0.0135)	(0.0615)	(0.0149)
Obs.	9649	764	8885	3417	348	3069	6232	416	5816
R-sq.	0.115	0.2588	0.1088	0.1347	0.229	0.1302	0.1162	0.278	0.1093

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

Note: Standard errors in parentheses.

Among the other independent variables, the coefficients of size proxied by the log of real assets are positive and significant for all groups except for non-manufacturing firms which employ more than or equal to 250 workers (Table 5). Leverage ratio has a negative significant impact on the saving rate for all of the nine groupings at 1 percent level as it is the case in 2013, but the estimated coefficients are more than double those of 2013. For the group that covers all firms, a one percentage point increase in leverage ratio leads to 0.089 percentage point decrease in the saving rate in 2014, while this coefficient is 0.034 for 2013 data. The same debt level causes Turkish non-financial firms to save less in 2014 than in 2013. The highest impact of leverage ratio on the saving rate is for large manufacturing firms, while it affects non-manufacturing SMEs the least. This behavior is the same as in 2013.

In the regression analysis for 2014, the sign of the coefficient of export share (X_S) is positive and significant for non-manufacturing SMEs as it is the case for all types of SMEs in 2013. However, it is negative and significant for manufacturing SMEs. Therefore, for manufacturing SMEs, it can be stated that exporting ones have more chance to access external finance, which reduces the need for internal funds, thus they save less in 2014.

Unlike the regression results for 2013, in the analysis with 2014 data, the coefficient of tangibility rate (TANR) is significant and negative as expected. The reason for this discrepancy may be related to the definition of the variable as the ratio of tangible assets to total assets. Tangible assets and total assets values are directly extracted from the balance sheets of firms and total assets are not the sum of tangible and intangible assets, but the combined amount of a company's fixed assets and current assets as recorded in the company's balance sheet. Therefore, assets other than intangible ones may affect the tangibility ratio resulting in coefficients with unexpected sign for 2013. Therefore, in 2014, firms with a low tangibility rate save more to finance further investments either because they have more room for fixed investment or because they face a higher cost of external financing considering that intangible capital is more difficult to pledge as collateral.

The results in Table 6 for non-financial firms which register losses in the preceding year, indicate that as in 2013, there is a negative cross-sectional relationship between the saving rate and the one-year lagged net profit margin. The coefficients are higher in absolute terms for 2014 compared to that for 2013, reaching -0.48 for large firms in both manufacturing and non-manufacturing sectors.

Finally, comparing the regression results of the years 2013 and 2014 for the firms which declare profits in the preceding year, reveals two conclusions. On the one hand, the positive impact of previous year's net profit margin on current year's saving rate is higher in 2013. On the other hand, negative impact of leverage ratio on the saving rate is higher in 2014. These results are reasonable once we take into account the deterioration of economic outlook in Turkey from 2013 to 2014. This deterioration presumably reduces the demand for savings out of previous year's profits in preparation for profitable investment opportunities.

5 Conclusions

Following financial accounting principles, we propose a method to calculate undistributed profits using only the information in the balance sheet of firms as explained in the Methodology and the Dataset section. Using this method, we can obtain saving rates of a larger number of firms in Turkey than those listed in ISE, since TurkStat compiles Balance Sheet and Income Statement of all non-financial firms in Turkey. We are able to estimate firm level determinants of corporate savings by making cross-sectional regressions using the data of all non-financial firms, which we obtain for 2013 and 2014. Furthermore, comparing the cross sectional analysis for the years 2013 and 2014, allows us to deduct the effects of macroeconomic environment on corporate saving rate. Therefore, even in the absence of formal data on corporate saving rate, we are able to analyze the saving behavior of non-financial firms in Turkey.

In line with the results of empirical literature, which indicate that the rate of saving is determined mainly by the level of profits in the preceding year, we find that saving rate increases as net profit margin increases, but only for firms, which obtain profits in the preceding year. For the firms, which declare loss in the preceding year, our results show that saving rate increases as the lagged value of net profit margin decreases. This seems intuitive, because a firm with higher loss in the preceding year is not expected to distribute dividend this year, thus saves more out of profits of the current year. International evidence on other firm level determinants of corporate savings indicate that in general small firms tend to save more out of their income than do large companies because they rely more heavily than large concerns on savings as a source of finance. Our results imply that the reverse is valid for Turkish non-financial firms since as firm size in terms of real assets grow, corporate savings increase. The rest of the firm-level determinants are found to have similar effects with the previous empirical analyses, e.g. leverage ratio has a negative impact on the saving rate and the positive impact of export orientation is higher for SMEs; except for the positive impact of tangibility ratio in 2013.

Finally, the results of econometric analysis using firm level data allows us make some preliminary assessments about the effects of macroeconomic factors on the corporate savings. The comparison of summary statistics of the firm-level data of non-financial firms with positive profits for the years 2013 and 2014, show that the mean saving rate, defined as undistributed profits to total sales, decreases from 1.8 per cent in 2013 to 1.3 per cent in 2014 while the mean of net profit margin decreases from 3 per cent to 2.6 per cent. These results are in concordance with the deterioration of economic outlook in Turkey from 2013 to 2014, reflecting itself in the fall of the GDP growth rate from 8.5 to 5.2 per cent. Nevertheless, a thorough econometric analysis can be done to shed light on macroeconomic determinants of the corporate saving rate in Turkey using panel data tools, as soon as balance sheets of non-financial firms are provided by TurkStat for a wider time span.

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Appendix: The Construction of Datasets

Using balance sheet and income statement data of almost 64,000 non-financial firms in Turkey, we first filter each of the items needed to calculate dependent and independent variables separately. All items are extracted from the balance sheet, except for domestic and foreign net sales. These two series are taken from the income statement of the firms. We take "shareholders' equity" variable as the reference item, because it has the widest coverage among all. Accordingly, we delete the data for each item if the corresponding firm does not have "shareholders' equity" data. We end up with data for 63,906 non-financial firms, which have "shareholders' equity" data in 2013. However, some of these 63,906 non-financial firms do not have data on other items. Therefore, in the second step we drop firms with missing data on items except for the ones we consider intuitive that a firm may not have data on. We assign value "0" to these items, e.g. debt data. We assume that the firm does not fill this item, because it does not have debt. This applies also to "domestic net sales" and "foreign net sales" data, assuming that the firm only exports and does not export at all, respectively. Similarly, we assume that the firm does not have retained earnings, legal reserves, or net profits for the corresponding year, if they are not entered in the balance sheet. So, we assign value "0" to any of the related six items if there is no data, while calculating undistributed profits using Equation 4.

Thirdly, we calculate the dependent and independent variables for each non-financial firm using the dataset we construct. However, some of these variables cannot be calculated since they have either improper or missing data. Once we drop them, we end up with data for 47,633 non-financial firms. Furthermore, we delete the firms for which net profit margin and saving rate are found to be either smaller than minus one or greater than one.[9] Because net profit margin (NPM), which is the ratio of net profits to net sales, should be in the range of -1 and 1. The same is valid for the saving rate, which is the ratio of undistributed profits to net sales, by definition. Similarly, we eliminate the firms which have negative or greater than one tangibility rate value, considering that it is defined as the ratio of tangible assets to total assets and should take a value between zero and one.[10] After cleaning the 2013 dataset by eliminating the firms which reported unusual data in their balance sheets or income statements, we end up with 40,834 observations out of 47,633.

While preparing the dataset for 2014, we follow the same procedure. We end up with data for 63,906 non-financial firms, which have "shareholders' equity" data in 2014, as it is the case in 2013. Once we drop the variables, which cannot be calculated since they have either improper or missing data, we end up with data for 60225 non-financial firms. Considering that saving rate cannot be greater than 1, or smaller than -1, we deleted 915 observations. Similarly, net profit margin (NPM), which is the ratio of net profits to net sales, cannot be greater than 1, or smaller than -1, we deleted 247 observations for the current year in the dataset for 2014. By the same token, 614 observations are dropped

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[9]726 observations have unusual net profit margin data for the current year and 483 observations for the preceding year in the dataset for 2013. 179 observations with unusual saving rate data for 2013 are dropped as well.

[10]23 observations have tangibility rate smaller than 0 and 5388 observations have tangibility rate greater than 1 in 2013.

for the preceding year. Finally, we eliminated 32 firms with tangibility rate value greater than one. Unlike the data for 2013, no observations have negative tangibility rate value in the 2014 dataset. We end up with 58417 observations out of 60225 by eliminating the firms which have unusual data in their balance sheets.