Does product market competition affect a firm's investment horizon?

Abstract

This paper examines the effect of product market competition on a firm's investment horizon. Using a sample of US public firms, I find that intense competition induces firms to invest in the short-term. This result is robust to alternative measures of product market competition such as Herfindahl-Hirschman index, Hoberg and Phillips index. To address the potential endogeneity problem, I use exogenous reduction in the US tariff rates as a quasi-natural experiment. The findings show that firms invest in the short-term capital after a substantial tariff rate reduction that triggers fierce competition. This effect is more pronounced for firms with higher financial leverage, higher institutional ownership, short-term investors, higher profit uncertainty and firms operating in a substitute market.

Keywords: Firm investment horizon; Product market competition; Capital investment; Short-termism

1 Introduction

It has been theorised that firms should pursue long-term strategies to maximise their value. The long-term strategies such as investment in innovation, research and development are value-enhancing and improve long-term performance. However, there has been considerable empirical evidence supporting the concern that managers prioritise the short-term returns at the expense of long-term gains ((Narayanan, 1985), (Stein, 1989)). For example, around 80% of the surveyed executives admitted that they willingly sacrifice a positive NPV project to meet quarterly earnings expectation (Graham, Harvey, & Rajgopal, 2005). Especially, the pressure on the managers to achieve short-term gains has increased significantly since the global financial crisis (Barton, Bailey, & Zoffer, 2016). What induces firms to sacrifice long-term capital investment is of chief concern because this sacrifice might adversely affect firm survival and even threaten the long-term growth of the economy ((Hayes & Abernathy, 2007), (Porter, 1992), (Laverty, 1996)).

Literature has identified factors affecting a firm's investment horizon such as CEO stock options ((Martin, Wiseman, & Gomez-Mejia, 2016)), firm performance ((Souder, Reilly, Bromiley, & Mitchell, 2016)). A common point of these papers is to treat firms as isolation organisations; therefore, most of the identified determinants are firm-level related factors. In real business, firms compete with their rivals on the product market for their survival. Therefore, it is essential to incorporate environment-related factors such as product market competition when identifying factors affecting the capital investment horizon.

Literature has documented that product market competition has a significant impact on actions and strategies of firms. Frésard and Valta (2016) indicate that extant firms

decrease investment by 7.2% when they face higher entry threat. Xu (2012) finds that firms will lower their leverage ratios in response to an increase in import competition. However, the question of whether product market competition affects a firm's investment horizon has not been answered. To my best knowledge, this paper is the first study in the finance discipline to address this question.

There are two possible challenges that lead to limited empirical evidence of the relationship between product market competition and a firm's investment horizon. First, it is difficult to measure a firm's investment horizon. Second, the endogeneity concern has hindered the estimation of the causal effect between product market competition and investment horizon. This paper addresses these challenges.

The literature suggests two opposing views of how product market competition affects a firm's investment horizon. On the one hand, I expected that intense competition causes managers to invest in a short-term investment horizon. Xu (2012) posits that a higher level of competition increases the probability of lower market shares or profit margin of a firm, which adversely affect short-term performance. Therefore, the capital market pressure on short-term gains becomes mounting, which creates more incentives for managers to invest in the short-term horizon, especially when they face higher uncertainty about future firm's development. On the other hand, the literature shows that product market competition might serve as a governance discipline to alleviate agency problems, constrain managerial misbehaviour. Hence, managers have less incentives to focus on short-term performance. I expect not to observe the reduction in a firm's investment horizon in the competitive market.

Initially, I use the Herfindahl-Hirschman index (HHI), which is widely employed in the literature to proxy for the degree of competition, to test these hypotheses. The HHI is computed by the sum of squared market shares of an individual firm in a specific industry. Based on this proxy, the results show that intense competition induces firms to invest in the short-term horizon. The results are robust to alternative measures of competition such as C4-index, Hoberg and Phillips index (HP). Nonetheless, HHI is not a perfect proxy for product market competition due to several drawbacks such as no available data for private firms in Compustat. Besides, the literature documents that a firm can implement its strategies to impact on its business environment. Therefore, the potential endogeneity issue has distorted the causal link between product market competition and a firm's investment horizon. To address this endogeneity problem, I use substantial reductions in the US tariff rates as an exogenous shock to proxy for the degree of competition. This shock has been widely used in the literature.[1] The shock is identified as an event in an industry in which the largest tariff rate reduction is two times larger than the industry's average. Using annual 1992 – 2005 tariff rates data for US manufacturing industries, I obtain the similar results. These results are robust when I use different methods such as the Generalised Difference in Difference or Difference in Difference matching approach.

After showing the relationship between product market competition and a firm's investment horizon, the paper further investigates the possible channels to explain this result. First, I test whether institutional investors affect this link. Literature proposes two competing roles of institutional investors, including monitoring and short-termism roles (Callen & Fang, 2013). On the one hand, institutional investors work as a monitoring role through

[1] see (Frésard & Valta, 2016), (Valta, 2012), (Lin, Officer, & Zhan, 2015), (Abdoh & Varela, 2017)

participating in governance activities or gathering information, which to some extents impacts on managerial decisions (Shleifer & Vishny, 1997). They have more incentives to do so when they own substantial stakes over a long time. Therefore, serving as a monitoring role, institutional investors will reduce managerial incentives to invest in a short-term horizon. I expect that the reduction in a firm's investment horizon in response to intense competition is less pronounced for firms with high institutional ownership or firms dominated by long-term investors. In contrast, when institutional investors act as traders in the stock market, they are inclined to place more emphasis on short-term performance. Short-term earnings disappointments will cause large-scale selling by institutional investors, leading to misevaluation of the stock prices ((Porter, 1992), (Bushee, 1998)). Besides, institutional investors prefer to hold a large number of different equities to diversify risks. Empirical evidence shows that they are willing to liquidate their stakes in response to firms' earnings decline (Badrinath, Gay, & Kale, 1989). Therefore, serving as a short-termism role, institutional investors create more pressure for managers to meet short-term performance. As a result, managers have more incentives to focus on the short-term horizon. I expect that the reduction in a firm's investment horizon in response to intense competition is more pronounced for firms with high institutional ownership or firms with short-term investors. To test the competing hypotheses, I partition the whole sample one year before substantial tariff rate reduction into high and low institutional investors groups based on institutional ownership. The results show that firms with high institutional ownership reduce its investment horizon when they face intense competition. Similarly, firms dominated by short-term investors reduce its investment horizon in response to fierce competition. Conversely, I do not observe this behaviour in the low institutional ownership group or firms with long-term investors. Based on this

result, I speculate that the stock market pressure induces firms to boost short-term results by cutting capital investment in the long term. I define this is a "capital market pressure" channel.

Next, I test whether the link between product market competition and a firm' investment horizon varies according to financial constraints. A firm with the high financial constraints has fewer opportunities to obtain external financial resources to finance positive NPV project (Campello, 2006). Furthermore, these firms become more vulnerable once their rivals implement predatory strategies (Lin et al., 2015). An increased degree of competition makes these firms more difficult to access external fundings to invest in projects and maintain their positions in the market. Thus, I expect that the reduction in a firm's investment horizon in response to an increase in competitive pressure following substantial tariff rate declines is more pronounced for firms with the high financial constraint. To test this hypothesis, I split the whole sample one year before substantial tariff rate reduction into the high and low financial constraint groups. I use the White-Wu index and dividend payment to proxy for the financial constraints. Consistent with the conjecture, the results show that firms with the high financial constraints reduce the investment horizon more compared to firms with low financial constraints. I define this is a "predation risk" channel.

Following substantial tariff rates reductions, the increasing foreign goods and services penetrate the US domestic market, which impacts on firms' investment opportunities and profitabilities. Xu (2012) document the negative relation between intense competition and a firm's market share. Firms with higher future-profit-uncertainty suffer more pressure from the capital market to meet short-term performance. Therefore, I expect that firms

with high future-profit-uncertainty due to higher entry threat have more incentives to focus on short-term gains by investing in a short-term horizon. Following Frésard and Valta (2016), I use the volatility of return to proxy for future-profit-uncertainty. Then I split the whole sample one year before substantial tariff rate reduction into high and low future-profit-uncertainty based on the volatility. The results are consistent with my conjecture that when faced with intense competition, a firm with high future-profit-uncertainty reduces its investment horizon, while I do not observe this fact in the low future-profit-uncertainty group.

Finally, I test whether firms operating in a substitute market behave differently from firms operating in a complement market in response to the intensity of competition. In a substitute market, firms face higher short-term profit pressure because firms and their rivals compete against each other for their market shares. The higher short-term profit pressure creates more incentives for managers to focus on short-term performance. Therefore, I expect that a firm operating in a substitute market reduce its investment horizon. In contrast, in a complement market, firms face less pressure, and managers have less incentives to invest in the short-term horizon. Following Bulow, Geanakoplos, and Klemperer (1985), I use the competitive strategy measure (CSM) to distinguish the substitute market and complement market. Then I split the whole sample one year before substantial tariff rate reduction into substitute and complement market groups based on the CSM. The results show that firms operating in the substitute market reduce their investment horizon, while I do not observe this behaviour for firms operating in the complement market.

The paper makes a certain contribution to literature in several ways. First, the study contributes to the understanding of the determinants of a firm's investment horizon. Very few papers have explored the factors affecting investment horizon. For example, Martin et al. (2016) indicate that CEO stock options affect investment horizon decision. Souder et al. (2016) point out the relationship between firm performance and a firm's investment horizon. These papers mainly focus on firm-related factors, suffering from an endogeneity issue. My study is distinct in two aspects. First, instead of emphasising on firm internal factors, I focus on the role of the firm's environment in making a firm's investment horizon decision. Second, to address the potential endogenous issue, I employ the US tariff rate changes as an exogenous shock to estimate the causal link between product market competition and a firm's investment horizon.

Moreover, the paper contributes to the literature on the relationship between product market competition and a firm's investment policy (Akdoğu & MacKay, 2012). Existing literature has documented that product market competition is an important factor affecting a firm's investment decision, including capital expenditure (Frésard & Valta, 2016), research and development (Gu, 2016). However, literature has paid less attention to the impact of product market competition on another investment outcome: time horizon, which has been addressed in this paper.

In addition, my study sheds light on the trend of overinvesting in the short-term in recent years. The removal of the barrier made by the US government in the past few decades has increased competition for US firms. My findings suggest that overinvesting in short-term capital could be partially attributable to intense competition faced by firms.

The paper is organised as follows. Section 2 develops the hypotheses. Section 3 discusses the databases. Section 4 reports the results as well as discusses how the endogeneity issue is addressed, while section 5 examines the potential channels. Section 6 concludes.

2 Hypothesis

H1: Intense competition increases the likelihood that managers invest in short-term investment horizon to meet short-term earnings targets.

Increasingly fierce competition adversely affects firm market share or profit margin (Xu, 2012). This has a negative impact on short-term performance. Poor short-term performance might be one of the factors that trigger a large scale of selling by institutional investors in response to short-term earning disappointment, which affects the misvaluation of the price (Bushee, 1998). Besides, several studies show that the likelihood of CEO turnover increases when they fail to meet the short-term earnings target. Therefore, under pressure to deliver short-term performance, especially in the competitive market, managers prioritise to invest in the short-term, boost short-term performance to meet market expectation, maintaining capital market credibility and investor confidence (Lin et al., 2015).

H2: Intense competition decreases the likelihood that managers invest in short-term investment horizon to meet short-term earnings goals.

Due to the agency problem between managers and shareholders, managerial self-interest leads managers to invest short-term projects despite shareholders' preference for long-term projects (Thakor, 2016). Laverty (1996) shows that managers use short-term per-

formance as a means to convey to investors that firm's assets are being managed to maximise value. Narayanan (1985) claims that managers have incentives to make decisions which yield short-term profits but are not the best interests from the shareholders' perspective. By doing so, they have more opportunities to move to a higher position, earn higher compensation, or build up their reputation and power. The literature points out that product market competition can serve as a governance mechanism to bond the interests of the managers with shareholders, which reduce the agency problems and constrain managerial misbehaviour. Furthermore, product market competition poses a threat to lose investment opportunities and market share to firms' rivals (Froot, Scharfstein, & Stein, 1993). Thus, excessively emphasise on short-term investment at the expense of long-term value might lead firms to be worse, which eventually leads firms to be out of the market. Therefore, intense competition force firms to follow the long-term strategies in order to survive in the market.

3 Data

My sample data consists of all firms in the Compustat database from 1991 to 2017. I exclude financial firms (firms with four digits SIC codes from 6000 to 6999), firm-year observations with negative book equities or negative total assets. The final data set includes 12,403 firms and 99,677 firm-year observations.

Following Souder et al. (2016), I use the asset durability (AD) to proxy for a firm's investment horizon, which is computed based on the expected useful life of a firms' property, plant, and equipment. According to the accounting rule, when a firm purchases an asset, managers need to estimate the useful life of that asset. Applying the straight-line

depreciation method, managers can work it out the depreciation cost over the useful life of the asset (Keating & Zimmerman, 1999). Based on this logic, Souder et al. (2016) calculate the expected assets' useful life as follows:

$$Assetdurability(AD) = \frac{GrossPPE}{Depreciation}$$

The *Gross PPE* represents the average purchased price of its assets, equaling the net PPE plus accumulated depreciation; meanwhile, *Depreciation* represents the depreciation expense reported in the firm's balance sheet. This formula provides the weighted average estimated useful life for a firm's assets, which represents a measure of the average investment horizon of a firm's assets (Souder et al., 2016). A higher value for asset durability implies that a firm is making a longer investment horizon. Following the accounting standard and previous studies, my sample only includes all US firms applying the straight-line depreciation method[2] and restrict the expected useful life of a firms' asset (Asset durability) between one and forty years.

Table 1 shows the average firm's investment horizon of 10.93 years and its median value of 9.52 years. However, a firm's investment horizon varies across industries. A setting time frame of 15 years would be a relatively long investment horizon in one industry, but it is a relatively short investment horizon in another industry (Souder et al., 2016). Therefore, I use a firm's relative asset durability (RAD) rather than a firm's asset durability (AD) to proxy for a firm's investment horizon in my all analyses. I calculate the relative asset durability as follows. First, for each industry (based on three-digit standard industrial classification

[2]In my sample, more than 80 per cent of total firms applied the straight-line depreciation method, the remaining firms used other depreciation methods.

(SIC) code), I compute the industry average's asset durability, and then RAD is defined as the difference between the firms' s asset durability and the average asset durability for its industry.

I use the Herfindahl – Hirschman index (HHI) to measure product market competition. HHI is calculated by the sum of squared market shares of an individual firm in a specific industry. The market share of a particular firm is the ratio of the firm net sale divided by the total sales of all firms in the same industry. Firms with negative sales or missing sale values are excluded before calculating HHI for each industry. I categorise industries based on three-digit SIC codes because it is not too narrow as well as too broad. The higher the HHI is, the lower the degree of competition is. The HHI is constructed every year. In addition to using the continuous HHI index, I also use a dummy variable for product market competition. I define a dummy variable DHHI, which equal one if the HHI is lower than median and zero otherwise. This dummy variable allows for an intuitive economic interpretation of coefficient estimates. Moreover, the dummy variable, as opposed to the continuous HHI value, should alleviate measurement problems, which are sometimes a concern of the HHI measure (Lin et al., 2015).

$$HHI_{i,j,t} = \sum_{n=1}^{N_j} (\frac{SALE_{i,t}}{TOTALSALE_{j,t}})^2$$

where : $HHI_{i,j,t}$ is the Herfindahl – Hirschman index, $SALE_{i,t}$: sale of firm i at year t; N_j: number of firms in the industry j. $TOTALSALE_{j,t}$: total sale of all firms in the industry j at year t.

Following Frésard and Valta (2016), Souder and Bromiley (2012), the control variables employed in this analysis include firm size, capital expenditure, cash, ROA. Firm sized is measured as the log of total assets. Capital expenditure is calculated by dividing a firm's capital expenditure by its total assets. Cash is computed by dividing cash by its total assets. ROA is computed by net income divided by its total assets. All control variables are lagged one year and I winsorised all continuous variables at the 1st and 99th percentiles to reduce the impact of the outliers.

[INSERT TABLE 1]

Table 1 presents summary statistics of firm characteristics. The average logarithm of the firm's total assets is 4.78, the average cash scaled by the total asset is 21 per cent. The average capital expenditure scaled by the total asset is 6 per cent. The average HHI is 0.16. ROA has an average of -0.11. Overall, the figure in this sample is quite comparable to the literature (Souder et al., 2016).

4 Empirical results

This section will examine the impact of product market competition on a firm's investment horizon. Following (Valta, 2012), the model is specified as follows:

$$\text{RAD}_{i,j,t} = \beta CHHI_{j,t-1} + \gamma' X_{i,t-1} + \alpha_t + \theta_i + \epsilon_{i,j,t} \quad (1)$$

$$\text{RAD}_{i,j,t} = \beta DHHI_{j,t-1} + \gamma' X_{i,t-1} + \alpha_t + \theta_i + \epsilon_{i,j,t} \quad (2)$$

where $RAD_{i,j,t}$, which proxies for a firm's investment horizon, represents the relative asset durability of firm i in industry j at year t. $CHHI_j$ in model 1 is the continuous variable, which is proxy for product market competition calculated by the sum of squared market shares of an individual firm in an industry j, then multiples with negative 1. Therefore, the high CHHI value implies the high degree of competition. DHHI is a dummy variable where DHHI equals 1 if a firm's HHI index is below median HHI of the year and zero otherwise. Therefore, DHHI which equals 1 represents competitive industries. The vector $X_{i,t-1}$ includes control variables such as size, performance, capital expenditure and cash to the total asset of firm i. In addition, firm fixed effect (θ_i), year fixed effect (α_t) are included in the specifications to capture unobservables variables. Standard cluster error is included.

The variable of interest is the marginal effect of product market competition on a firm's investment horizon (β). The expectation is that β is less than 0 if firms operating in competitive industries suffer more pressure from the investor's expectation. Therefore, firms have the incentive to cut long-term investment to focus on short-term performance. Conversely, if β is greater than 0, product market competition acts as a market discipline that helps to alleviate the agency problem and constrain managerial misbehaviour.

[INSERT TABLE 2]

Table 2 presents the coefficient estimates from specification (1) and (2). In column (1) and (3), I use CHHI to proxy for product market competition. Column (1) represents the coefficient of HHI when regressing a relative asset durability on product market competition without control variables, except for firm fixed effect and year fixed effect. The results show that the coefficient of β is negative and significant. It implies that the company will reduce

a firm's investment horizon when it faces with intense competition. In column (3), I add the control variables such as size, performance, cash, capital expenditure. The coefficient of β is still negative and significant.

Instead of using continuous HHI value, I use a dummy variable for HHI in column (2) and (4). I obtain the similar results. In addition to using a firm's RAD, I use a firm' s AD as a dependent variable. The results in column (5) and (6) show that the coefficient estimates on CHHI or DHHI remain negative and economically significant.The finding from column (6) shows that on average, firms in competitive industries reduce 23.4% its investment horizon compared to firms in concentrated industries. For the sample average asset durability of 10.93 years, this coefficient translates to a difference in investment horizon between competitive and concentrated industries of 2.56 years.

The estimated coefficient on ROA is positive and strongly significant in all four columns, implying the positive relation between firm performance and a firm's investment horizon. In addition, I observe a negatively significant coefficient on firm size. All of these results are consistent with Souder and Bromiley (2012). The coefficients on cash ratio and capital expenditure ratio are estimated to be positive and significant in all regressions.

Alternative measures of product market competition

[INSERT TABLE 3]

Table 3 presents the robustness results that use the alternative measures of product market competition. First, I use the C4-index that measures the market share held by the four largest firms in each industry. Similar to previous analysis, the dummy variable

D_competition of 1 implies a high degree of competition and 0 otherwise. In column (1) and (2) of Table 3, the coefficients of D_competition are negative and significant, which is consistent with the main finding. In addition, I use Hoberg-Phillips (HP) index to proxy for product market competition.[3] The idea of this measure is to classify industry based on text-based analysis of firm 10-K product descriptions (Hoberg, Phillips, & Prabhala, 2014). I calculate HP index in the same way as HHI index. In column (3) and (4) of Table 3, the coefficients of D_competition are also negative and significant, which lends support to the main result.

Overall, the main finding that high degree of competition leads a firm to decrease its investment horizon is robust to alternative measures of product market competition.

Endogeneity of product market competition

The findings so far indicate that firms operating in high degree of competitive environment will reduce its investment horizon compared to firms operating in concentrated industries. A potential endogeneity of product market competition, however, might jeopardy the established causal link. The literature documents that firms can use their strategies to affect the degree of competition. Bolton and Scharfstein (1990) claim that cash-rich firms utilise aggressive strategies to drive their rivals out of business, which affect the structure of the market. Cestone (1999) indicates potential channels through which firms' financial policy affect the product market. Therefore, to address this potential endogeneity issue, I use substantial reductions in the US tariff rate as an exogenous shock to proxy for product market competition.

[3]Data is downloaded from Hoberg-Phillips website http://hobergphillips.usc.edu/industryconcen.htm

According to Anderson and Van Wincoop (2004), import tariff rates account for a large portion of trade costs. Therefore, the reduction of import tariffs enables foreign goods and services to become relatively cheaper than domestic goods and services, which increases in the competitive pressure of domestic firms (Tybout, 2003). US tariff policy is designed by US authorities; thus, any substantial tariff reduction can be treated as an exogenous shock to US domestic firms. This approach is applied in several recent studies.[4] Following the literature, I identify substantial reductions of import tariff rates as follows.

First, I use the US import tariff data retrieved from Peter Schott's website. Due to the limitation of available data, the sample period employed in this paper is from 1992 to 2005, including 137 manufacturing industries (three-digit SIC codes from 200 – 399). The annual tariff rate is calculated by the ad valorem tariff rate as the duties collected by US Customs divided by the Free–On–Board custom value of imports for each industry-year. Next, I calculate tariff rate reductions in each industry for each year, the largest tariff rate reduction, and an average tariff rate reduction in each industry. Then I define an event in an industry if the largest tariff rate reduction is two times larger than the industry's average. Besides, I exclude tariff reduction followed by an equivalently significant increase in tariffs rate over the next two consecutive years in order to make sure that there is no transitory in the tariff rate reduction. I also exclude the tariff rate being less than 1% . After merging the tariff data with firm-level accounting data from Compustat, the final sample has 60 events identified in 60 distinct three-digit SIC code industries.

[INSERT FIGURE 1]

[4]see (Frésard & Valta, 2016), (Valta, 2012), (Lin et al., 2015), (Abdoh & Varela, 2017)

Figure 1 shows the distribution of these events during the sample period of 1992 - 2005. Most of the largest tariff rate reductions occurred in 1995 (coinciding with the creation of NAFTA). Besides these years, it is noted that there are also some substantial tariff rate reductions scattered during the sample period.

To investigate how firms respond to the increase in the threat of foreign products, I first define treatment firms as firms in the industries experiencing substantial import tariff rate reductions. Control firms are those firms in the industries that do not experience substantial import tariff rate reductions. Then, I compare the behaviour of both treatment and control firms around the time of each tariff rate reduction. Following Gormley and Matsa (2011), I create a cohort of treatment and control firms using firm-year observations for the five years before and the five years after the event, where the event is identified by a substantial tariff rate reduction in each year. Firms are not necessarily required to have the full ten years around the event to be included in the sample.[5] Next, I gather the data across cohorts and estimate the average treatment effect. I use the generalised difference in difference model to estimate the link. The specification is as follows:

$$\text{RAD}_{i,j,c,t} = \beta TREATED\_POST_{j,c,t} + \gamma' X_{i,c,t-1} + \alpha_{t,c} + \theta_{i,c} + \epsilon_{i,j,t} \quad (3)$$

where $\text{RAD}_{i,j,c,t}$ is the relative asset durability for firm i in industry j, cohort c, and year t. TREATED_POST variable is the interaction of TREAT and POST variables. TREAT is an indicator equaling 1 if industry j experiences a substantial reduction in tariff rate in year t and 0 otherwise. POST is an indicator equaling 1 in the period of after tariff rate reduction. The TREAT and POST variables are not reported because they are

[5] I obtain the similar results when I employ the sample of the three years before and the three years after each event

subsumed by cohort-firm fixed effect and cohort-year fixed effect. The vector $X_{i,t-1}$ includes control variables such as size, performance, capital expenditure and cash of firm i. Size is the log of totals assets; meanwhile others variables are scaled by firm's total assets. $\theta_{i,c}$ is the firm cohort fixed effects which control for other invariant firm characteristics; meanwhile, $\alpha_{t,c}$ is the year-cohort fixed effects controlling for any secular time trends.[6] Besides, standard cluster errors is included. Adding control variables is essential in all specifications; however, "bad" control variables can lead to biased results (Roberts & Whited, 2013). Therefore, to robust the results, I use two different specifications in every setting, one specification without control variables and the other with control variables.

[INSERT TABLE 4]

Table 4 represents the coefficient of the regression of relative asset durability on the TREATED_POST. Column (1) represents the results without control variables, and column (2) represents results with control variables. The findings from column (1) table 4 show that firms facing fierce competition will reduce its investment horizon, which is in line with previous findings. The results are similar when adding more control variables (Column 2). In column (3) and (4) table 4, I use AD instead of RAD to proxy for a firm's investment horizon. I still observe the negative and significant coefficient of TREATED_POST.

Robustness results

Using Difference in Difference matching approach

[6]Instead of using the firm cohort fixed effects and year cohort fixed effects, I use the firm fixed effect and year fixed effect. I obtain similar results. Following Gormley and Matsa (2011), the firm and year fixed effects are allowed to vary by cohort because this approach is more conservative than using simple fixed effects.

In this section, following Frésard and Valta (2016), Lin et al. (2015), I use the difference-in-difference matching framework to explore the firms' behaviour in response to import competition. This approach ensures that cross-sectional differences between firms do not drive the impact of substantial tariff rate reductions on a firm's investment horizon. Similar to the previous section, firms operating in the industries that experienced a substantial decrease in the tariff rate in a given year is considered as treatment firms. To ensure control firms that have similar characteristics to the treatment firms before the event, I construct a sample of control firms as follows. First, for each treatment firm, I choose the nearest neighbour from the group of all firms operating in the different three-digit SIC code industries during the same year. The dimensions which are used to match include size, Tobin's Q, long-term debt, cash and cash flow.[7] After excluding firm-year observations with missing values, observations with negative assets, sale, capital expenditure, and observations with sale growth larger than 50%, my final sample composed of 941 treated firms and 941 matched firms.

[INSERT TABLE 5]

Table 5 reports the summary statistics for all treated and control firms in the year before the tariff rate reduction. The results show that the characteristics of control groups are quite similar to those of the treated groups. The results from equality of means tests indicate that the differences in the distribution of each matching variable between the two groups are not statistically significant.

[7]These variables are calculated as follows: Size is measured as logarithm of total assets, Tobin's Q is calculated as total assets minus common equity plus the market value of equity divided by total assets, Long-term debt is calculated as long-term debt divided by total assets. Cash is computed as cash divided by total assets. Cash flow is measured as cash flow divided by total assets.

The specification is as follows:

$$\text{RAD}_{i,j,t} = \beta TREATED\_POST_{j,t} + \gamma' X_{i,t-1} + \alpha_t + \theta_i + \epsilon_{i,j,t} \quad (3)$$

[INSERT TABLE 6]

Table 6 reports the results of the specification (3). Column (1) includes only firm fixed effect and year fixed effect; meanwhile, column (2) adds more control variables. In both columns, the coefficients of interest are always negative and significant. In column (2), the coefficient of interest is -0.325, which implies that from the one year before to one year after the tariff cut, the relative asset durability of treated firms declines by 32.5 per cent compared to that of control firms. This effect is economically large. In unreported results, I extend the sample to include two years and three years before and after the tariff cut, respectively. The coefficients on the TREATED_POST are still negative and significant.

5 Channels exploration

The empirical evidence shows the negative impact of product market competition on a firm's investment horizon. In this section, I will explore the potential channels through which product market competition affects a firm's investment horizon.

1. Institutional investor

1.1 Institutional ownership

I investigate whether institutional investors affect the link between product market competition and a firm's investment horizon. The literature mentions two opposing views of

institutional investors, including monitoring and short-termism roles (Callen & Fang, 2013). On the one hand, institutional investors work as a monitoring role through participating in governance activities or gathering information, which to some extents impacts on managerial decisions (Shleifer & Vishny, 1997). They have more incentives to do so when they own substantial stakes over a long time. Therefore, serving as a monitoring role, institutional investors will reduce managerial incentives to invest in a short-term horizon. In this context, I expect that the reduction in the investment horizon in response to higher competitive pressures will be less pronounced in firms with high institutional ownership. On the other hand, when institutional investors act as traders in the stock market, they are inclined to place more emphasis on short-term performance. This induces managers to invest in a short-term horizon to meet short-term performance; otherwise, short-term earnings disappointments will cause large-scale selling by institutional investors, leading to misevaluation of the stock prices (Porter, 1992), (Bushee, 1998). Besides, institutional investors prefer to hold a large number of different equities to diversify risks. Empirical evidence shows that they are willing to liquidate their stakes in response to firms' earnings decline (Badrinath et al., 1989). Therefore, I expect that the reduction in the investment horizon in response to intense competition is more pronounced in firms with high institutional ownership.

To test these hypotheses, I partition the whole sample one year before the substantial tariff rate reduction into high and low institutional ownership groups. Institutional ownership is calculated by total shares held by institutional investors divided by total shares outstanding [8].

[INSERT TABLE 7]

[8]The data on institutional ownership is retrieved from the Thomson Reuters 13F database

Table 7 reports the results. Although the coefficients for both groups are negative, the coefficients for the high institutional ownership group (-0.372) are strongly significant (p-value of 0.000) and higher than their counterparts (-0.187) regarding economic magnitude. On the contrary, the coefficients for the low institutional ownership group is insignificant (p-value of 0.397). These results suggest that the short-term focus of institutional investors encourages managers to focus more on short-term performance, which lends support for the role of institutional investors as "short-termism".

Overall, the evidence documented in this section suggests that the increase in the degree of competition due to tariff rate reductions more negatively affects a firm's investment horizon if they have higher institutional ownership compared to their peers.

1.2 Institutional investor horizon

I further investigate whether institutional investor horizon impacts the link between product market competition and a firm's investment horizon. Gaspar, Massa, and Matos (2005) document the relationship between investor horizon and corporate governance. The authors argue that short-term investors have less incentives to monitor firm managers because they are likely to quit these firms before reaping the benefits from the monitoring role. Therefore, I hypothesise that the reduction in a firm's investment horizon in response to fierce competition is more pronounced for firms dominated by short-term investors.

To test this hypothesis, following (Gaspar et al., 2005), I construct investor turnover index to proxy for investor horizon. Gaspar et al. (2005) claim that short-term investors re-balance their portfolios frequently, while long-term investors maintain their investment for

a longer time. Based on this idea, I calculate the frequency of re-balancing a portfolio that each institutional investor implements, and I denote this measure as "churn rate" (CR).

$$CR_{i,t} = \frac{\sum_{j=1}^{Q} |N_{j,i,t}P_{j,t} - N_{j,i,t-1}P_{j,t-1} - N_{j,i,t-1}\Delta P_{j,t}|}{\sum_{j=1}^{Q} \frac{N_{j,i,t}P_{j,t} + N_{j,i,t-1}P_{j,t-1}}{2}}$$

where $P_{j,t}$ is the price of firm j at time t, $N_{j,i,t}$ is the number of shares of firm j that each institutional investor i holds at time t, Q is the number of companies that each institutional investor invests.

Then, I build a measure of investor turnover as follows:

$$Turnover_k = \sum_{i=1}^{S} w_{k,i,t}(\frac{1}{4}\sum_{r=1}^{4} CR_{i,t-r+1})$$

where S is the number of institutional investors in firm k, $w_{k,i,t}$ represents the ownership percentage of institutional investor i in firm k at time t.

[INSERT TABLE 8]

Table 8 report the regression results. Consistent with my conjecture, the coefficient for short-term investors are negative and significant. Meanwhile, the coefficient for long-term investors is positive but insignificant. These results imply that the short-term focus of short-term investor horizons incentivise firm managers to emphasis on short-term performance.

2. Financial contraints

Product market competition affects firms' behaviour differently depending on its financial constraints. Financially constraint firms are confronted with major challenges once

their competitors apply aggressive strategies. Additionally, these firms also face restrictions on obtaining external finance resources, which might lead to lower ability of reaping good investment opportunities. Thus, firms with the higher financial constraint seem to be more influenced by the increased degree of competition. In this regard, I expect that the reduction in a firm's investment horizon in response to an increase in competitive pressure following substantial tariff rate declines is more pronounced for firms with the high financial constraints.

To test this hypothesis, I split the whole sample one year before substantial tariff rate reductions into the high and low financial constraint groups based on the White-Wu index (Whited & Wu, 2006). The index is constructed as follows:

$$WW_{i,t} = -0.091\ CF_{i,t} - 0.062\ DIV_{i,t} + 0.021\ LEV_{i,t} - 0.044\ Log(AT_{i,t}) + 0.012\ ISG_{i,t} - 0.035\ SG_{i,t}$$

where $CF_{i,t}$ is the ratio of operating cash flow to total assets. $DIV_{i,t}$ is an indicator that equals one if the firm pays cash dividends in year t and zero otherwise. $LEV_{i,t}$ is the ratio of total debt to total assets. $Log(AT_{i,t})$ is the natural log of total assets. $ISG_{i,t}$ is industry sales growth, which is the three-digit SIC industry sale growth that the firm belongs to. $SG_{i,t}$ is firm's sale growth. I define a firm as high financial constraints if its White-Wu index is higher than the median.

[INSERT TABLE 9]

Column (1) - (4) in Table 9 represents the results splitted by the level of the White-Wu index. I find that firms in the high White-Wu index group decrease their investment

horizon to a larger extent than firms in the low White-Wu index group. For example, the coefficient of TREATED_POST in the high financial constraints subsample is -0.247 (p-value of 0.013), while the corresponding coefficient in low financial constraints subsample is -0.122 (p-value of 0.253).

In addition to the White-Wu index, I use a dividend dummy variable to proxy for the financial constraints firms. Financially constrained firms are less likely to pay dividend ((Denis & Sibilkov, 2009), (Fazzari, Hubbard, & Petersen, 1987)). Therefore, I construct a dummy variable, DIVIDEND, which equals one if a firm pays dividends in year t-1, and zero for firms without paying a dividend in year t-1. Columns (5) to (8) in Table 9 report the results partitioned by DIVIDEND. The results show that firms without paying dividend reduce its investment horizon in response to the increased entry threat of foreign products. The coefficient of TREATED_POST in the high financial constraints subsample is –0.297 (p-value of 0.003). In contrast, the coefficients of TREATED_POST for the financially unconstrained group are positive and significant, implying that these firms increase their investment horizon even they face higher competition.

Overall, the evidence in this section documents that substantial reductions in tariff rates impose more threat to high financially constrained firms which have more limited to access to external finance. Therefore, these firms face the higher probability of foregoing the positive NPV projects as well as severe challenges from foreign rivals. To deal with the future uncertainty induced by tariff rate reduction, financially constrained firms have more incentives to reduce its investment horizon. The findings lend support to this argument by showing that financially constrained firms reduce more their investment horizon after the

substantial reduction in tariff rates. Financial constraints seem to be one underlying channel through which import competition affects a firm's investment horizon.

3. Profit uncertainty

In this section, I examine the manger's behaviour in response to uncertainty about firms' future profits driven by the tariff rate reduction. Existing research documents that the intense competition contributes to an increase in the risk of the firm's expected profits (Frésard & Valta, 2016). The substantial tariff rate reductions might generate competitive advantages for foreign companies. Lower price for foreign products due to lower imported tariff rate can be a factor in which consumers shift their demands to the foreign products, which might affect the prospect of future profits of domestic firms. Irvine and Pontiff (2008)' model shows a negative correlation between the degree of competition and firm-level profit volatility. The uncertainty about the firm's future profit leads to higher pressure on short-term performance. As a result, managers have more incentives to focus on short-term values by cutting the long-term investment. Therefore, I expect that firms with high future-profit-uncertainty driven from intense competition reduce investment horizon more than firm with low future-profit-uncertainty. Following Frésard and Valta (2016), I use the volatility of return[9] to proxy for future uncertainty. To test this hypothesis, I split the whole sample one year before substantial tariff rate reductions into high-profit uncertainty group and low-profit uncertainty group based on the volatility of return index.

[INSERT TABLE 10]

[9]estimated using weekly returns

Table 10 reports the results. The coefficient estimates for high profit-uncertainty groups are negative (-0.229) and significant (p-value of 0.019), suggesting that firms reduce its investment horizon when they face higher uncertainty. In contrast, the coefficients for the low profit-uncertainty group is insignificant (p-value of 0.304). These results suggest that the high uncertainty of future profits due to the larger entry threat induce managers to focus more on short-term performance.

Overall, the evidence reported in this section suggests that firms will reduce the investment horizon in response to the higher uncertainty of future profits derived from the large tariff rate reduction.

4. Substitute and complement market

Firms operating in a substitute market behave differently from firms operating in a complement market in response to the intensity of competition. A substitute market is characterised by the negative correlation between the incumbent firm's profits and its rivals' profits. In contrast, in a complement market, the firm's profits will increase as its competitors produce and sell more. Therefore, firms in the substitute market face more pressure to meet the short-term performance than their counterparts. This effect is more exposure to change in the degree of competition. Thus, I hypothesise that firms in a substitute market will reduce its investment horizon more when they face the higher degree of competition.

Following Bulow et al. (1985), I use the competitive strategy measure (CSM) to distinguish the substitute market and complement market, and this measure is computed as follows.

$$CSM_i = corr[\frac{\Delta \pi_i}{\Delta S_i}, \Delta S_{-i}]$$

where $\Delta\pi_i$ represents the differences between firm i' s profit between two periods, ΔS_i is the differences between firm i' s sale between two periods, ΔS_{-i} is change in combined sales of other firms operating in the same industry as firm i.

For a given firm in each quarter[10], I calculate the ratio of the change in its profits to the change in its sales, and the changes in its rivals' sales. Then, I run the correlation between the two arrays using rolling windows during the past five years. After calculating CSM for each firm, I take the average of all firms' CSM in each industry to aggregate at the industry level. If the industry's CSM is positive, I define as a complement market, and if the industry's CSM is negative, I define as a substitute market. To test the hypothesis, I split the whole sample one year before substantial tariff rate reduction into the substitute market and complement market based on CSM.

[INSERT TABLE 11]

Table 11 reports the results. A reduction in a firm's investment horizon in response to intense competition is only observed in the substitute market. The coefficient estimate is -0.234 and significant (p-value of 0.049). In contrast, the coefficients for firms in a complement market is negative but insignificant (p-value of 0.418). These findings suggest that higher pressure on the market share in the substitute market induces managers to focus more on short-term performance by investing in the short-term horizon.

[10]Following Chod and Lyandres (2011), I use quarterly data

6 Conclusion

This paper investigates how an increase in competition affects firms' capital investment horizon. I expect that intense competition puts more pressure on managers to well perform in the short-term. Therefore, managers have more incentives to invest more capital in the short-term. To test this hypothesis, I initially use the Herfindahl-Hirschman index (HHI) to proxy for product market competition. The result shows that intense product market competition induce firms to invest in the short-term horizon. This finding is robust to alternative measures of product market competition such as Herfindahl-Hirschman index, Hoberg and Phillips index. However, it has been concerned about the endogeneity problem which distorted the casual link between product market competition and firms' investment horizon. To address this issue, I use the import tariff rate reduction as an exogenous shock to proxy for competition. I obtain the similar findings. The result is robust to various methods such as the generalised difference in difference or Difference in difference matching approach.

The paper also investigates the channels through which intense competition affects firms' capital investment horizon. The results show that a firm with high financial constraint, high institutional ownership or a firm dominated by short-term investors are more exposed to the increase in the degree of competition compared to their counterparts. Besides, I also find that firms with high profit-uncertainty or firms operating in a substitute market reduce their investment horizon, while I do not observe the effect for firms with low profit-uncertainty or firms operating in a complementary market. All of the above evidence shows that "capital market pressure" incentivises managers to reduce its investment horizon, achieving well short-term performance.

References

Abdoh, H., & Varela, O. (2017). Product market competition, idiosyncratic and systematic volatility. *Journal of Corporate Finance*, *43*, 500–513.

Akdoğu, E., & MacKay, P. (2012). Product markets and corporate investment: Theory and evidence. *Journal of Banking & Finance*, *36*(2), 439–453.

Anderson, J. E., & Van Wincoop, E. (2004). Trade costs. *Journal of Economic literature*, *42*(3), 691–751.

Badrinath, S. G., Gay, G. D., & Kale, J. R. (1989). Patterns of institutional investment, prudence, and the managerial" safety-net" hypothesis. *Journal of Risk and Insurance*, 605–629.

Barton, D., Bailey, J., & Zoffer, J. (2016). Rising to the challenge of short-termism. *Focusing Capital on the Long-term*.

Bolton, P., & Scharfstein, D. S. (1990). A theory of predation based on agency problems in financial contracting. *The American economic review*, 93–106.

Bulow, J. I., Geanakoplos, J. D., & Klemperer, P. D. (1985). Multimarket oligopoly: Strategic substitutes and complements. *Journal of Political economy*, *93*(3), 488–511.

Bushee, B. J. (1998). The influence of institutional investors on myopic r&d investment behavior. *Accounting review*, 305–333.

Callen, J. L., & Fang, X. (2013). Institutional investor stability and crash risk: Monitoring versus short-termism? *Journal of Banking & Finance*, *37*(8), 3047–3063.

Campello, M. (2006). Debt financing: Does it boost or hurt firm performance in product markets? *Journal of Financial Economics*, *82*(1), 135–172.

Cestone, G. (1999). Corporate financing and product market competition: An overview. *Giornale degli Economisti e Annali di Economia*, 269–300.

Chod, J., & Lyandres, E. (2011). Strategic ipos and product market competition. *Journal of Financial Economics*, *100*(1), 45–67.

Denis, D. J., & Sibilkov, V. (2009). Financial constraints, investment, and the value of cash holdings. *The Review of Financial Studies*, *23*(1), 247–269.

Fazzari, S., Hubbard, R. G., & Petersen, B. C. (1987). *Financing constraints and corporate investment.* National Bureau of Economic Research Cambridge, Mass., USA.

Frésard, L., & Valta, P. (2016). How does corporate investment respond to increased entry threat? *The Review of Corporate Finance Studies*, *5*(1), 1–35.

Froot, K. A., Scharfstein, D. S., & Stein, J. C. (1993). Risk management: Coordinating corporate investment and financing policies. *the Journal of Finance*, *48*(5), 1629–1658.

Gaspar, J.-M., Massa, M., & Matos, P. (2005). Shareholder investment horizons and the market for corporate control. *Journal of financial economics*, *76*(1), 135–165.

Gormley, T. A., & Matsa, D. A. (2011). Growing out of trouble? corporate responses to liability risk. *The Review of Financial Studies*, *24*(8), 2781–2821.

Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of accounting and economics*, *40*(1-3), 3–73.

Gu, L. (2016). Product market competition, r&d investment, and stock returns. *Journal of Financial Economics*, *119*(2), 441–455.

Hayes, R. H., & Abernathy, W. J. (2007). Managing our way to economic decline. *Harvard business review*, *85*(7-8).

Hoberg, G., Phillips, G., & Prabhala, N. (2014). Product market threats, payouts, and financial flexibility. *The Journal of Finance*, *69*(1), 293–324.

Irvine, P. J., & Pontiff, J. (2008). Idiosyncratic return volatility, cash flows, and product market competition. *The Review of Financial Studies*, *22*(3), 1149–1177.

Keating, A. S., & Zimmerman, J. L. (1999). Depreciation-policy changes: tax, earnings management, and investment opportunity incentives. *Journal of Accounting and Economics*, *28*(3), 359–389.

Laverty, K. J. (1996). Economic "short-termism": The debate, the unresolved issues, and the implications for management practice and research. *Academy of Management Review*, *21*(3), 825–860.

Lin, C., Officer, M., & Zhan, X. (2015). Does competition affect earnings management? evidence from a natural experiment.

Martin, G. P., Wiseman, R. M., & Gomez-Mejia, L. R. (2016). Going short-term or long-term? ceo stock options and temporal orientation in the presence of slack. *Strategic Management Journal*, *37*(12), 2463–2480.

Narayanan, M. (1985). Managerial incentives for short-term results. *The Journal of Finance*, *40*(5), 1469–1484.

Porter, M. E. (1992). Capital disadvantage: America's failing capital investment system. *Harvard business review*, *70*(5), 65–82.

Roberts, M. R., & Whited, T. M. (2013). Endogeneity in empirical corporate finance1. In *Handbook of the economics of finance* (Vol. 2, pp. 493–572). Elsevier.

Shleifer, A., & Vishny, R. W. (1997). A survey of corporate governance. *The journal of finance*, *52*(2), 737–783.

Souder, D., & Bromiley, P. (2012). Explaining temporal orientation: Evidence from the durability of firms' capital investments. *Strategic Management Journal*, *33*(5), 550–569.

Souder, D., Reilly, G., Bromiley, P., & Mitchell, S. (2016). A behavioral understanding of investment horizon and firm performance. *Organization Science*, *27*(5), 1202–1218.

Stein, J. C. (1989). Efficient captial markets, inefficeint firms: a model of myopic corporate behavior. *The Quarterly Journal of Economics*, 655–669.

Thakor, R. T. (2016). A theory of efficient short-termism.

Tybout, J. (2003). *'plant-and firm-level evidence on the'new'trade theories' in e. kwan choi and james harrigan, ed., handbook of international trade.* Oxford: Basil-Blackwell.

Valta, P. (2012). Competition and the cost of debt. *Journal of Financial Economics*, *105*(3), 661–682.

Whited, T. M., & Wu, G. (2006). Financial constraints risk. *The Review of Financial Studies*, *19*(2), 531–559.

Xu, J. (2012). Profitability and capital structure: Evidence from import penetration. *Journal of Financial Economics*, *106*(2), 427–446.

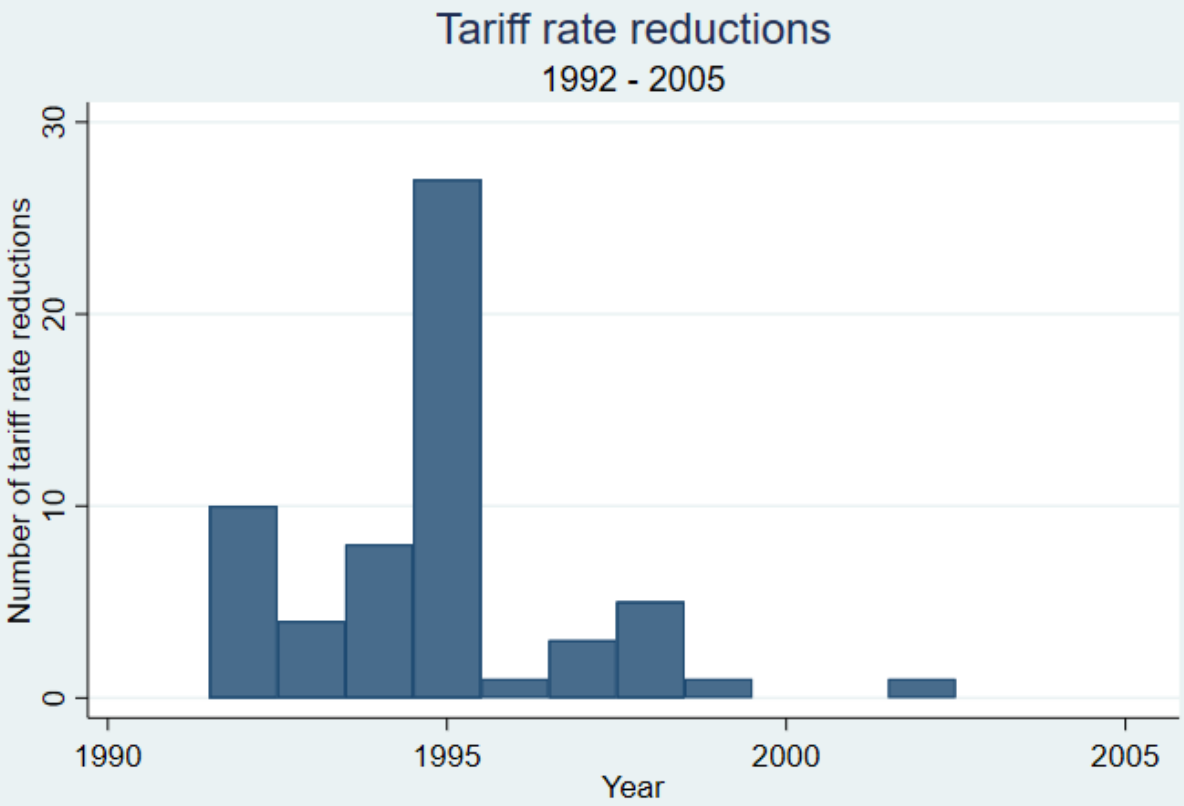

Figure 1: Tariff rate reductions

Table 1: Descriptive Statistics

This table presents summary statistics of firm characteristics. Asset durability (AD) is calculated as gross PPE divided by depreciation. Relative asset durability (RAD) is the difference between a firm's asset durability and its industry's average asset durability. Firm size is measured as the log of total assets. Capex/Total Asset is calculated by dividing a firm's capital expenditure by its total assets. Cash/Total Asset is computed by dividing cash by its total assets. ROA is computed by net income divided by its total assets. The HHI is calculated by the sum of squared market shares of an individual firm in a specific industry. The market share of a particular firm is the ratio of the firm net sale divided by the total sales of all firms in the same industry. CHHI is the continuous variable calculated by multipling HHI with negative 1. Therefore, the high CHHI value implies the high degree of competition.

	Obs	Mean	Stdev	p25	Median	p75
Asset Durability	99,677	10.93	6.72	5.84	9.52	14.48
Relative Asset Durability	99,677	0.10	5.52	-3.53	-0.81	2.68
Size	99,677	4.78	2.40	3.16	4.79	6.45
ROA	99,677	-0.11	0.90	-0.03	0.10	0.16
Cash/Total Asset	99,677	0.21	0.25	0.03	0.11	0.32
CHHI	99,677	-0.16	0.14	-0.20	-0.10	-0.06
Capex/Total Asset	99,677	0.06	0.07	0.02	0.04	0.07

Table 2: The impact of competition on a firm's investment horizon

This table represents coefficients from regression of relative asset durability on the product market competition. Asset durability (AD) is calculated as gross PPE divided by depreciation. Relative asset durability (RAD) is the difference between a firm's asset durability and its industry's average asset durability. The HHI is calculated by the sum of squared market shares of an individual firm in a specific industry. The market share of a particular firm is the ratio of the firm net sale divided by the total sales of all firms in the same industry. CHHI is the continuous variable calculated by multipling HHI with negative 1. Therefore, the high CHHI value implies the high degree of competition. DHHI is a dummy variable where DHHI equals 1 if a firm's HHI index is below median HHI of the year and zero otherwise. Firm sized is measured as the log of total assets. Capital expenditure is calculated by dividing a firm's capital expenditure by its total assets. Cash is computed by dividing cash by its total assets. ROA is computed by net income divided by its total assets. All control variables are lagged one year and I winsorised all continuous variables at the 1st and 99th percentiles. Standard cluster error is included.

	(1)	(2)	(3)	(4)	(5)	(6)
	RAD	RAD	RAD	RAD	AD	AD
CHHI	-1.026***		-0.640***		-1.275***	
	(0.000)		(0.001)		(0.000)	
DHHI		-0.191***		-0.146***		-0.234***
		(0.001)		(0.009)		(0.000)
Size			-1.184***	-1.185***	-1.195***	-1.199***
			(0.000)	(0.000)	(0.000)	(0.000)
ROA			0.405***	0.406***	0.413***	0.415***
			(0.000)	(0.000)	(0.000)	(0.000)
Cash/Total Asset			2.156***	2.159***	2.028***	2.032***
			(0.000)	(0.000)	(0.000)	(0.000)
Capex/Total Asset			1.709***	1.707***	1.519***	1.514***
			(0.000)	(0.000)	(0.000)	(0.000)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	99677	99677	99677	99677	99677	99677
Adjusted R^2	0.528	0.528	0.552	0.552	0.686	0.686

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: The impact of competition on a firm's investment horizon - alternative measures

This table represents coefficients from regression of relative asset durability on the product market competition. Asset durability (AD) is calculated as gross PPE divided by depreciation. Relative asset durability (RAD) is the difference between a firm's asset durability and its industry's average asset durability. Columns 1 and 2 use C4-index instead of HHI to proxy for product market competition. The C4-index measures the market share held by the four largest firms in each industry. Columns 3 and 4 use Hoberg and Phillips (HP) index, which classifies industy based on text-based analysis of firm 10-K product descriptions D_competition is a dummy variable where D_competition equals 1 if a firm's C4 index or a firm's HP index is below its median distribution of the year and zero otherwise. Capital expenditure is calculated by dividing a firm's capital expenditure by its total assets. Cash is computed by dividing cash by its total assets. ROA is computed by net income divided by its total assets. All control variables are lagged one year and I winsorised all continuous variables at the 1st and 99th percentiles. The sample period is from 1991 to 2017 for columns 1–2 and from 1996 to 2005 for columns 3–4 due to data availability. Standard cluster error is included.

	C4-index		HP-index	
	(1)	(2)	(3)	(4)
	RAD	RAD	RAD	RAD
D_competition	-0.085**	-0.071*	-0.217***	-0.090**
	(0.024)	(0.053)	(0.000)	(0.033)
Size		-1.188***		-1.633***
		(0.000)		(0.000)
ROA		0.405***		1.572***
		(0.000)		(0.000)
Cash/Total Asset		2.161***		2.639***
		(0.000)		(0.000)
Capex/Total Asset		1.691***		2.926***
		(0.000)		(0.000)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	99639	99639	59012	59012
Adjusted R^2	0.528	0.552	0.583	0.611

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: The impact of competition on a firm's investment horizon - Generalised Difference in Difference

This table represents coefficients from regression of relative asset durability on the reductions in import tariff. TREATED_POST variable is the interaction of TREAT and POST variables. TREAT is an indicator equaling 1 if industry j experiences a substantial reduction in tariff rate in year t and 0 otherwise. POST is an indicator equaling 1 in the period of after tariff rate reduction. Asset durability (AD) is calculated as gross PPE divided by depreciation. Relative asset durability (RAD) is the difference between a firm's asset durability and its industry's average asset durability. Firm sized is measured as the log of total assets. Capital expenditure is calculated by dividing a firm's capital expenditure by its total assets. Cash is computed by dividing cash by its total assets. ROA is computed by net income divided by its total assets. All control variables are lagged one year and I winsorised all continuous variables at the 1st and 99th percentiles The data include firm-year observations in the 5 year before and 5 years after each event. Standard cluster error is included.

	(1)	(2)	(3)	(4)
	RAD	RAD	AD	AD
TREATED_POST	-0.161**	-0.188**	-0.210***	-0.242***
	(0.035)	(0.016)	(0.006)	(0.002)
Size		-1.341***		-1.344***
		(0.000)		(0.000)
ROA		0.915***		0.930***
		(0.000)		(0.000)
Cash/Total Asset		2.980***		2.938***
		(0.000)		(0.000)
Capex/Total asset		3.825***		3.905***
		(0.000)		(0.000)
Firm-cohort FE	Yes	Yes	Yes	Yes
Year-cohort FE	Yes	Yes	Yes	Yes
Observations	186289	165287	186289	165287
Adjusted R^2	0.595	0.631	0.683	0.712

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Descriptive Statistics

Table 5 reports the summary statistics for all treated and control firms in the year before the tariff rate reduction. Asset durability (AD) is calculated as gross PPE divided by depreciation. Relative asset durability (RAD) is the difference between a firm's asset durability and its industry's average asset durability. Size is measured as logarithm of total assets, Tobin's Q is calculated as total assets minus common equity plus the market value of equity divided by total assets. Long-term debt is measured as long-term debt divided by total assets. Cash is measured as cash divided by total assets. Cash flow is measured as cash flow divided by total assets.

	Obs	Treatment	Control	DIFF	t-stat
Relatively Asset Durability	868.00	0.13	-0.07	0.20	0.79
Tobin'Q	868.00	2.11	2.17	-0.06	-0.60
Size	868.00	4.14	4.17	-0.03	-0.34
Cash flow/Total Asset	868.00	-0.02	-0.03	0.01	0.53
Cash/Total Asset	868.00	0.16	0.16	-0.00	-0.26
Long-term debt	868.00	0.14	0.14	-0.01	-0.56

Table 6: The impact of competition on a firm's investment horizon - Difference in Difference matching method

This table represents coefficients from regression of relative asset durability on the reductions in import tariff. TREATED_POST variable is the interaction of TREAT and POST variables. TREAT is an indicator equaling 1 if industry j experiences a substantial reduction in tariff rate in year t and 0 otherwise. POST is an indicator equaling 1 in the period of after tariff rate reduction. Asset durability (AD) is calculated as gross PPE divided by depreciation. Relative asset durability (RAD) is the difference between a firm's asset durability and its industry's average asset durability. Firm sized is measured as the log of total assets. Capital expenditure is calculated by dividing a firm's capital expenditure by its total assets. Cash is computed by dividing cash by its total assets. ROA is computed by net income divided by its total assets. Matching variables include size (logarithm of total assets), Tobin's Q (total assets minus common equity plus the market value of equity divided by total assets), long-term debt (long-term debt divided by total assets), cash (cash divided by total assets), cash flow (cash flow divided by total assets). All control variables are lagged one year and I winsorised all continuous variables at the 1st and 99th percentiles. Standard cluster error is included.

	(1)	(2)	(3)	(4)
	RAD	RAD	AD	AD
TREATED_POST	-0.335**	-0.325**	-0.318**	-0.307**
	(0.031)	(0.037)	(0.037)	(0.046)
Size		-0.486*		-0.401
		(0.054)		(0.106)
ROA		0.766*		0.672
		(0.086)		(0.132)
Cash/Total Asset		1.138		1.300*
		(0.126)		(0.077)
Capex/Total Asset		4.334**		4.611***
		(0.011)		(0.006)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	3407	3407	3407	3407
Adjusted R^2	0.725	0.727	0.784	0.785

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: The impact of competition on a firm's investment horizon - Partitioned by institutional ownership

This table represents coefficients from regression of relative asset durability on the reductions in import tariff. TREATED_POST variable is the interaction of TREAT and POST variables. TREAT is an indicator equaling 1 if industry j experiences a substantial reduction in tariff rate in year t and 0 otherwise. POST is an indicator equaling 1 in the period of after tariff rate reduction. Asset durability (AD) is calculated as gross PPE divided by depreciation. Relative asset durability (RAD) is the difference between a firm's asset durability and its industry's average asset durability. Firm sized is measured as the log of total assets. Capital expenditure is calculated by dividing a firm's capital expenditure by its total assets. Cash is computed by dividing cash by its total assets. ROA is computed by net income divided by its total assets. Institutional ownership is calculated by total shares held by institutional investors divided by total shares outstanding. All control variables are lagged one year and I winsorised all continuous variables at the 1st and 99th percentiles. The data include firm-year observations in the 5 year before and 5 years after each event. Standard cluster error is included.

	(1)	(2)	(3)	(4)
	Low	Low	High	High
TREATED_POST	-0.353	-0.187	-0.350***	-0.372***
	(0.119)	(0.397)	(0.001)	(0.000)
Size		-1.776***		-1.039***
		(0.000)		(0.000)
ROA		1.850***		1.491***
		(0.000)		(0.000)
Cash/Total Asset		4.019***		3.757***
		(0.000)		(0.000)
Capex/Total Asset		6.120***		6.177***
		(0.000)		(0.000)
Firm-cohort FE	Yes	Yes	Yes	Yes
Year-cohort FE	Yes	Yes	Yes	Yes
Observations	16879	16879	44584	44584
Adjusted R^2	0.622	0.654	0.642	0.658

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: The impact of competition on a firm's investment horizon - Partitioned by institutional investor horizon

This table represents coefficients from regression of relative asset durability on the reductions in import tariff. TREATED_POST variable is the interaction of TREAT and POST variables. TREAT is an indicator equaling 1 if industry j experiences a substantial reduction in tariff rate in year t and 0 otherwise. POST is an indicator equaling 1 in the period of after tariff rate reduction. Asset durability (AD) is calculated as gross PPE divided by depreciation. Relative asset durability (RAD) is the difference between a firm's asset durability and its industry's average asset durability. Firm sized is measured as the log of total assets. Capital expenditure is calculated by dividing a firm's capital expenditure by its total assets. Cash is computed by dividing cash by its total assets. ROA is computed by net income divided by its total assets. Institutional investor horizon calcultion is described in section 5.1.2. All control variables are lagged one year and I winsorised all continuous variables at the 1st and 99th percentiles. The data include firm-year observations in the 5 year before and 5 years after each event. Standard cluster error is included.

	(1)	(2)	(3)	(4)
	Long-term	Long-term	Short-term	Short-term
TREATED_POST	-0.004	0.037	-0.819***	-0.796***
	(0.978)	(0.775)	(0.000)	(0.000)
Size		-1.383***		-1.286***
		(0.000)		(0.000)
ROA		1.512***		1.626***
		(0.000)		(0.000)
Cash/Total Asset		4.504***		3.561***
		(0.000)		(0.000)
Capex/Total Asset		6.614***		5.954***
		(0.000)		(0.000)
Firm-cohort FE	Yes	Yes	Yes	Yes
Year-cohort FE	Yes	Yes	Yes	Yes
Observations	31294	31294	28695	28695
Adjusted R^2	0.657	0.678	0.610	0.633

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: The impact of competition on a firm's investment horizon - Partitioned by Financial constraints

This table represents coefficients from regression of relative asset durability on the reductions in import tariff. TREATED_POST variable is the interaction of TREAT and POST variables. TREAT is an indicator equaling 1 if industry j experiences a substantial reduction in tariff rate in year t and 0 otherwise. POST is an indicator equaling 1 in the period of after tariff rate reduction. Asset durability (AD) is calculated as gross PPE divided by depreciation. Relative asset durability (RAD) is the difference between a firm's asset durability and its industry's average asset durability. Firm sized is measured as the log of total assets. Capital expenditure is calculated by dividing a firm's capital expenditure by its total assets. Cash is computed by dividing cash by its total assets. ROA is computed by net income divided by its total assets. Financial constraint is measured by the Whited-Wu index, and dividend_dummmy. The Whited-Wu index is constructed as follows: WWi,t=-0.091CFi,t - 0.062DIVi,t + 0.021LEVi,t - 0.044Log(ATi,t) + 0.012ISGi,t - 0.035SGi,t where CFi,t is the ratio of operating cash flow to total assets. DIVi,t is an indicator that equals one if the firm pays cash dividends in year t and zero otherwise. LEVi,t is the ratio of total debt to total assets. Log(ATi,t) is the natural log of total assets. ISGi,t is industry sales growth, which is the three-digit SIC industry sale growth that the firm belongs to. SGi,t is firm's sale growth. I define a firm as high financial constraints if its White-Wu index is higher than the median. Dividend_dummy is an indicator equalling 1 if firms pay dividend one year before substantial tariff rate reduction and 0 otherwise. All control variables are lagged one year and I winsorised all continuous variables at the 1st and 99th percentiles. The data include firm-year observations in the 5 year before and 5 years after each event. Standard cluster error is included.

	White-Wu index				Dividend			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Low	Low	High	High	Yes	Yes	No	No
TREATED_POST	-0.082	-0.122	-0.190*	-0.247**	0.216**	0.210**	-0.201*	-0.297***
	(0.452)	(0.253)	(0.062)	(0.013)	(0.037)	(0.038)	(0.054)	(0.003)
Size		-1.075***		-1.395***		-1.761***		-1.333***
		(0.000)		(0.000)		(0.000)		(0.000)
ROA		1.347***		1.066***		1.222***		0.924***
		(0.000)		(0.000)		(0.000)		(0.000)
Cash/Total Asset		3.776***		2.992***		4.464***		2.810***
		(0.000)		(0.000)		(0.000)		(0.000)
Capex/Total Asset		8.686***		4.324***		10.094***		3.714***
		(0.000)		(0.000)		(0.000)		(0.000)
Firm-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	34674	34674	84471	84471	35321	35321	107817	107817
Adjusted R^2	0.641	0.661	0.588	0.610	0.659	0.683	0.585	0.606

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10: The impact of competition on a firm's investment horizon - Partitioned by profit uncertainty

This table represents coefficients from regression of relative asset durability on the reductions in import tariff. TREATED_POST variable is the interaction of TREAT and POST variables. TREAT is an indicator equaling 1 if industry j experiences a substantial reduction in tariff rate in year t and 0 otherwise. POST is an indicator equaling 1 in the period of after tariff rate reduction. Asset durability (AD) is calculated as gross PPE divided by depreciation. Relative asset durability (RAD) is the difference between a firm's asset durability and its industry's average asset durability. Firm sized is measured as the log of total assets. Capital expenditure is calculated by dividing a firm's capital expenditure by its total assets. Cash is computed by dividing cash by its total assets. ROA is computed by net income divided by its total assets. Profit uncertainty is measured based on the volatility of return using weekly data. All control variables are lagged one year and I winsorised all continuous variables at the 1st and 99th percentiles. The data include firm-year observations in the 5 year before and 5 years after each event. Standard cluster error is included.

	Profit uncertainty			
	(1)	(2)	(3)	(4)
	Low	Low	High	High
TREATED_POST	-0.105	-0.109	-0.180*	-0.229**
	(0.330)	(0.304)	(0.072)	(0.019)
Size		-1.270***		-1.210***
		(0.000)		(0.000)
ROA		1.802***		1.662***
		(0.000)		(0.000)
Cash/Total Asset		4.913***		2.898***
		(0.000)		(0.000)
Capex/Total Asset		10.633***		4.846***
		(0.000)		(0.000)
Firm-cohort FE	Yes	Yes	Yes	Yes
Year-cohort FE	Yes	Yes	Yes	Yes
Observations	31976	31976	78926	78926
Adjusted R^2	0.675	0.695	0.597	0.617

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: The impact of competition on a firm's investment horizon - Partitioned according to substitution and complement market

This table represents coefficients from regression of relative asset durability on the reductions in import tariff. TREATED_POST variable is the interaction of TREAT and POST variables. TREAT is an indicator equaling 1 if industry j experiences a substantial reduction in tariff rate in year t and 0 otherwise. POST is an indicator equaling 1 in the period of after tariff rate reduction. Asset durability (AD) is calculated as gross PPE divided by depreciation. Relative asset durability (RAD) is the difference between a firm's asset durability and its industry's average asset durability. Firm sized is measured as the log of total assets. Cash is computed by dividing cash by its total assets. ROA is computed by net income divided by its total assets. I use competitive strategy measure (CSM) to distinguish the substittution market and complement market and this measure is computed as follows. First, for a given firm in each quarter, I calculate the ratio of the change in its profits to the change in its sales, and the changes in its rivals' sales. Then, I run the correlation between the two arrays using rolling windows during the past five years. After calculating CSM for each firm, I take the average of all firms' CSM in each industry to aggregate at the SIC industry level. If the industry's CSM is positive, I define as a complement market, and if the industry's CSM is negative, I define as a substitute market. All control variables are lagged one year and I winsorised all continuous variables at the 1st and 99th percentiles The data include firm-year observations in the 5 year before and 5 years after each event. Standard cluster error is included.

	Subsitution - Complement market			
	(1) Substitution	(2) Substitution	(3) Complement	(4) Complement
TREATED_POST	-0.240*	-0.234**	0.019	-0.083
	(0.051)	(0.049)	(0.859)	(0.418)
Size		-1.323***		-1.378***
		(0.000)		(0.000)
ROA		0.987***		1.011***
		(0.000)		(0.000)
Cash/Total Asset		2.504***		2.868***
		(0.000)		(0.000)
Firm-cohort FE	Yes	Yes	Yes	Yes
Year-cohort FE	Yes	Yes	Yes	Yes
Observations	64507	64507	68946	68946
Adjusted R^2	0.597	0.615	0.608	0.627

p-values in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$