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Bullipe R. Chintha
Ravi Jagannathan
Sri S. Sridhar

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ABSTRACT

China's admission into the WTO in 2001 heralded a new era of globalization, increasing both import competition in domestic markets and foreign opportunities for US firms. In the aggregate, the average annual profitability of US public firms during the post globalization period (2003-2019) increased by 11.5% of the corresponding pre-globalization period (1984-2002) profitability. This increase in overall aggregate profitability was primarily driven by foreign profitability increasing by 47.4% for firms in the S&P 500 index, which are larger and have more intangible assets created by R&D and SG&A expenditures. In contrast, following globalization, the average aggregate domestic profitability of US firms remained flat, and firms employed more capital to generate sales. Firms with higher intangible assets benefited more from globalization.

Bullipe R. Chintha
Indian School of Business
bullipereddy_chintha@isb.edu

Sri S. Sridhar
Northwestern University
s-sridharan@kellogg.northwestern.edu

Ravi Jagannathan
Kellogg Graduate School of Management
Northwestern University
2211 Campus Drive
Evanston, IL 60208
and NBER
rjaganna@kellogg.northwestern.edu

I. Introduction

Prior literature has documented two empirical regularities that appear to be at odds, and yet, seem to co-exist over similar periods. First, globalization of trade increased significantly following China's admission to the World Trade Organization (WTO) in December 2001 due to reduction in barriers to international trade and investments.[1] For instance, US international trade – measured as the sum of export and import of goods and services as a percentage of US GDP – increased from an annual average of 20.3% during the pre-globalization period of 1984-2002 to an annual average of 27.4% during the post-globalization period 2003-2019.[2] One would expect trade liberalization to increase competition from greater imports from abroad,[3] thereby decreasing US firms' ability to charge higher prices in the domestic markets. Yet, the second empirical fact established in the literature is that markups of US firms have increased significantly during a somewhat similar period. For instance, De Loecker et al. (2020) find that the sales-weighted mark-ups charged by publicly traded firms in the US increased from 26% of marginal cost in 1984 to 61% of marginal cost in 2016. This increase in markups of US firms poses a puzzle, given the potentially increased import competition that globalization would yield.

To understand why these two apparently contradictory empirical patterns can co-exist, notice that globalization could have two opposing effects on US firms' profitability. First, globalization would enable lower-cost countries to sell their goods in the US domestic markets at more competitive prices; so, one would

[1] Baldwin (2016) mentions, "During the last 15 years, most WTO members massively lowered barriers to trade, investment, and services bilaterally, regionally, and unilaterally." According to Table 1 in Baldwin (2016) the World mean tariff rate in 2012 was 30% less than the mean rate in 2001 – and the tariff cuts varied from a high of 61% for the EU to 19% for Sub-Saharan Africa.

[2] We partition our sample period of 1984-2019 into two subperiods based on endogenous structural breaks. We use the terms "pre globalization period" or "pre regime shift" to refer to the period 1984-2002, and "post globalization period" or "post regime shift" to denote the period 2003-2019.

[3] See, for e.g., Melitz and Ottaviano (2008).

expect the profitability of US firms in domestic markets to decline due to increased import competition. Such expectations are consistent with the observations of Amiti et al. (2020), who find a significant decline in the price indices of the US manufacturing sector, especially for the industries that were more exposed to import competition.

Second, at the same time, it is also possible that US firms, with significant commercially valuable intangibles, are likely to derive a competitive advantage over their foreign rivals in foreign markets. Examples of such intangibles would include superior technologies, more appealing product characteristics, greater brand recognition, positive networking externalities (such as in social media and communication industries), cost advantages due to more efficient supply chains, etc. Further, many such intangibles are also likely to yield the US firms a scale advantage. American firms with such competitive advantages would be able to expand their profitable businesses abroad due to easier access to foreign markets following globalization. This latter effect is also consistent with De Loecker and Warzynski (2012), who find that markups increase for firms upon entering export markets. Firms in the S&P500 index are more likely to be firms with such competitive advantages, made possible by both significant intangibles and size-related economies of scale.[4]

It is not clear how globalization would affect the overall aggregate profitability of US firms given these two opposing forces: (a) increased import competition, with the potential for adversely affecting domestic profitability of US firms on the one hand; versus (b) greater export opportunities, leading to the prospect of

[4]S&P 500 Global describes S&P 500 index as consisting of "leading companies spanning all sectors of the U.S. Stock market" (see https://www.spglobal.com/spdji/en/documents/additional-material/sp-500-brochure.pdf). S&P 500 index firms are not only larger but spend significantly more on R&D than firms not in S&P 500 index (ex-S&P 500). In our sample of non-financial firms, the mean (median) sales of firms in S&P 500 index is 24 (65) times that of firms not in S&P 500 index (Table OA4 from Online Appendix). The mean R&D expenditure of firms in S&P 500 index is 38 times that of firms not in S&P 500 index.

increased foreign sales and foreign profitability on the other hand.[5] Therefore, we empirically examine whether US firms' profitability increased following globalization in the aggregate, and if so the extent to which the increased profitability is due to their domestic versus foreign operations. Further, our analysis seeks to understand the distinguishing attributes of US firms which yield beneficial or adversarial effects of globalization of trade.

We use the ratio of Earnings Before Interest and Taxes (EBIT) to sales – referred to as the EBIT margin (*EBITM*) – as the primary measure of profitability to examine the effect of globalization on the profitability of US firms. Our use of EBITM instead of Gross Margin Ratio (= Gross Margin divided by Sales, where Gross Margin is defined as Sales minus Cost of Goods Sold (COGS)) is motivated by the observation that for a firm to survive (and flourish) in the long run, it will have to recover all expenses, including Selling and General Administrative (SG&A) and Research and Development (R&D) expenses, and not just COGS.[6] Further, *EBITM* is closely related to the Lerner index, a widely used measure of market power (Aghion et al., 2005; Lee et al., 2021).

We examine all publicly listed non-financial firms in the US (US firms) from 1984, (the first year for which disclosure of their results from foreign operations was mandated by the Securities & Exchange Commission (SEC)) until 2019, the year before the start of the COVID pandemic. Panel B of Appendix B illustrates the economic significance of our sample firms: for instance, aggregate sales to US GDP ratio for all US firms and S&P 500 firms were 64.6% and 45%, respectively,

[5]We use the word "aggregate" to mean aggregating the value of a given variable over all the firms in a given set for a given year.

[6]Cost of goods sold captures only and all production related costs in the case of a manufacturing firm, and only purchase (and related) costs of merchandize in the case of a trading firm. Therefore, the gross margin excludes SG&A expenses and R&D expenses. In contrast, EBIT is reduced by SG&A and R&D expenses and hence, the *EBIT* measure better reflects all costs of running a firm. Further, the *EBITM* measure is not affected by a firm's capital structure (i.e., debt versus equity financing) decisions and consequent tax implications.

during post globalization period of 2003-2019 (with similar values of 66.2% and 44.5%, respectively, during pre-globalization period of 1984-2002), suggesting that our sample firms represent a significant portion of the country's economic activity both during pre and post globalization.

First, we find that the time series of aggregate *foreign EBIT margin* (*F_EBITM*), the ratio of *foreign EBIT* to *total EBIT*, and the ratio of *foreign sales* to *total sales* of US firms exhibit endogenous structural breaks during the period 2001-2004, largely coinciding with the time when China entered the WTO, signifying a new regime of increased globalization of trade. Next, Table 2 finds that the aggregate EBIT margin (*EBITM*) of US firms increased significantly from an average of 9.6% during the pre-globalization period of 1984-2002 to 10.7% during the post-globalization period of 2003-2019.

While the increase in *EBITM* across the regime shift periods is consistent with the findings in the prior literature (e.g., De Loecker et al. (2020)), we find that it is almost entirely driven by increase in *mean foreign EBIT margin* (*F_EBITM*) across the regime shift periods. The *F_EBITM* of US firms increased significantly from an average of 10.3% during pre-globalization period to 13.8% during post-globalization period. In contrast, the EBIT margin from *domestic* operations (*D_EBITM*) decreased (though not statistically significant) from an average of 9.5% during pre to 9.4% during post globalization regime, which is consistent with the view that the impact of increased import competition in the US markets following globalization would have made it more challenging for US firms to increase their profitability in domestic markets.

We use a variety of other tests to confirm our main theme that it is the *foreign EBIT margin* that has contributed to higher overall *EBIT margin* following globalization, especially for bigger firms with more intangible assets. A difference-

in-difference test based on a structural break in 2002 due to globalization also finds a significant increase in aggregate *foreign EBIT margin*, but only for S&P 500 index firms. Further, Figure 1 provides a visual representation of the contrasting trends between *foreign* and *domestic EBITMs*. Figure 1 presents plots of the time series of 3-year moving average of foreign and domestic *EBITMs*. Notice that the foreign *EBITM* has a rising trend whereas corresponding domestic *EBITM* is flat following globalization.

< Insert Figure 1 >

It is also important to note that foreign sales as a percentage of total sales, $FSALEpct$, has increased significantly by 50.3% on an average during the post globalization regime over the pre globalization regime. In other words, US firms experienced not only increase in their foreign profitability, but also greater foreign sales following globalization. Given our finding that the foreign operations of US firms' was the primary driver of their increased profitability following globalization, we next proceed to understand what factors contributed to increased foreign profitability.

Conventional wisdom is that firms with valuable intangible assets including knowhow and brands which provide a scale advantage when new markets open and trade barriers fall will benefit more from globalization. We, therefore, examine the role of intangibles in determining the impact of globalization on firm profitability in multiple ways. We measure *intangible-intensity* in two ways.[7] The first one is based on the ratio of R&D expenditures to sales. The second measure is the sum of capitalized (and appropriately depreciated) values of R&D costs (yielding knowledge capital), a fraction of Selling, General and Administrative (SG&A)

[7]Section IV discusses in detail our two measures for "intangible intensity" and how intangible intensity is associated with greater foreign sales and improved foreign profitability, F_EBITM.

expenditures (helping firms build organizational capital), and book intangibles expressed as a percentage of its total sales.[8] Creation and sustaining of intangible assets such as patents and brands often require large investments. Further, larger firms are in a better position to use intangible assets to exploit economies of scale opportunities when new markets open. This view is consistent with (Bernard et al., 2003, 2007, 2012) findings that exporters tend to be larger, more productive and more skill-intensive than non-exporting firms. It appears logical then that firms characterized by these qualities benefit more from international trade when trade barriers come down. Therefore, we hypothesize S&P 500 firms to have greater ability to take advantage of globalization than others.

We find that S&P 500 index firms tend to have greater *intangible intensity* than ex-S&P 500 index firms. The average ratio of aggregate R&D to aggregate sales of S&P500 firms (ex-S&P500 firms) was 2.4% (1.3%) during pre-globalization period of 1984-2002, and the ratio increased to 2.9% (1.9%) during post-globalization period of 2003-2019.

Further, our analysis shows that aggregate foreign EBIT margin (*F_EBITM*) of S&P500 firms exhibit a structural break in its time-series in the year 2004, the same as the *F_EBITM* of all publicly traded firms. Table 4 finds that the average *F_EBITM* of S&P 500 firms increased significantly by 47.4% following globalization, i.e., from 10.7% during the pre-globalization period (1984-2002) to 15.8% during the post-globalization period (2003-2019). In contrast, mean *F_EBITM* of ex-S&P 500 firms declined from 8.8% during pre-regime shift period to 7.4% during post-regime shift period. Thus, the overall increase in the average

[8]US firms are typically required to expense all their R&D and SG&A costs. The only exception is that US firms may choose to capitalize only software development costs, and most profitable software firms choose to expense such development costs also. Therefore, book intangibles mostly arise from takeover of other firms when the value of such intangibles taken over from target firms are fair valued in the acquiring firms' books. Our second measure of intangible intensity capitalizes and then amortizes such R&D and SG&A expenses based on prior literature. Section IV.D and Appendix A provide greater details of our construction of this measure, which is designed based on prior related literature.

F_EBITM for all US firms across the regime shift periods is due to the increase in *F_EBITM* of S&P 500 firms. Moreover, the average domestic EBIT margin (*D_EBITM*) of S&P 500 firms also decreased from 11.3% to 11% across the regime shift periods, just as ex- S&P 500 firms which experienced a decline from 6.5% to 5.9% in *D_EBITM*. In other words, the greater import competition following post-globalization of trade has hurt domestic profitability of all US firms, regardless of whether they are large such as those being part of S&P 500 index.

In our robustness tests, we find significant structural breaks in the time series of alternate profitability measures such as aggregate foreign pretax income margin, foreign operating income margin, and the ratio of aggregate foreign pretax income to aggregate total pretax income (*F_PIpct*) in the year 2004 for S&P 500 firms. It is important to note that *F_PIpct* also increased from 25.4% to 43.8% for S&P 500 firms across the regime shift periods. To the extent that US firms benefited from a secular trend of lower borrowing costs, and given that the ratio of aggregate foreign pretax income to aggregate total pretax income (*F_PIpct*) is sensitive to such changes in interest expenses, whereas *F_EBITM* is not, it is important to note that our tests using the *F_PIpct* measure of foreign profitability reinforces the same findings as those obtained with the use of *F_EBITM* measure.

While our empirical analysis does confirm an increase in profitability as measured by *EBITM* post globalization for all US firms collectively, and S&P 500 index firms in particular,[9] our paper is not about explaining the increase in market power per se. Rather, our empirical analysis finds that the increased foreign profitability is the major driver of increased overall profitability. Further, the

[9] De Loecker et al. (2020) finds that the increase in aggregate markup of US firms is due to larger firms in their sample. The median markup did not exhibit increasing trend during their sample period (see Figure C.1 in the paper which shows a dramatic increase in markups for the ninetieth percentile firms post-1984). Using market concentration as a proxy for market power, Autor et al. (2020) show that market power has increased for the largest 500 firms in Compustat. Lee et al. (2021), using Lerner index as a proxy for market power, find that market power increased for large firms.

increased profitability is not uniform across all firms, but is concentrated among firms in the S&P 500 index, a proxy for size and intangible intensity, and moreover, those in select sectors such as High-Tech and Healthcare. As one would expect, greater domestic competition induced by globalization, if anything, is associated with a weak decline in the domestic profitability of US firms in general. In this way, our findings provide one plausible explanation for the co-existence of the increased overall aggregate profitability of US firms despite greater import competition in domestic US markets following globalization. Our analysis also highlights the significant role played by intangibles in enabling large US firms to gain significant international sales and foreign profitability following globalization.

The rest of the paper is organized as follows. Section II develops our hypotheses. We describe the data and discuss our measure of profitability in Section III and present the empirical results in Section IV. Section V concludes the paper. We provide supplementary analysis in an online appendix.

II. Hypotheses

We start with the premise that China's entry into the WTO heralded a new era of international trade with reduced trade barriers among countries, and the importance of international trade to the US would also have increased in the years that followed. This motivates our first hypothesis.

HYPOTHESIS 1: *The time series of each of the variables, the ratio of US international trade to US GDP, aggregate foreign EBIT margin, percentage share of foreign EBIT to total EBIT and percentage share of foreign sale to total sale would exhibit a structural break around the time of China's entry into WTO with higher annual mean following the year of structural break.*

Trade theory would suggest that an increase in globalization boosts domestic

competition; consequently, we expect a reduction in domestic profitability following globalization.[10] For example, Hombert and Matray (2018) find that rising Chinese imports led to lower profitability of US firms in the manufacturing sector. Amiti et al. (2020) find that China's WTO entry significantly reduced the US manufacturing industry price indices for the exposed industries between the years 2000 and 2006. These findings of greater competition in the domestic US markets following globalization suggests that ceteris paribus, domestic operations of US firms would have become less profitable, leading to our second hypothesis.

HYPOTHESIS 2: *Following globalization, the domestic profitability of US firms would not increase.*

At the same time, with lowered trade barriers, globalization would also have provided greater export opportunities for US firms. For example, WTO membership required China to lower its tariffs drastically.[11] This would have particularly benefited firms which were market leaders in the US with significant intangible knowledge-based assets and internationally recognized brands. Such firms are more likely to be able to increase their foreign sales and foreign profits more than other firms. Such a view is consistent with Bernard, Eaton, Jensen and Kortum (2003), who find that "lower trade barriers, for example, tend to nudge out low-productivity plants while enabling the highly productive to sell more abroad". According to Bernard, Jensen, Redding and Schott (2007), "Exporters tend to be larger, more productive, and more skill and capital intensive."[12] This is consistent with the well-established view that intangible assets such as technical knowhow, positive network externalities, brand names, etc., inherently enjoy a scale advan-

[10] See Bernard, Eaton, Jensen and Kortum (2003), Bernard, Jensen, Redding and Schott (2007), Melitz and Ottaviano (2008), etc.
[11] See Lu and Yu (2015).
[12] See also the survey article by Bernard, Jensen, Redding and Schott (2012).

tage. For instance, one would expect that a firm which has already developed intangible assets such as a search engine, social media platform, or a new drug, would have a cost advantage when scaling such knowledge capital up to meet the demands in foreign markets. To the extent larger firms are more likely to have established or be able to establish in a more cost-efficient manner such commercially valuable intangible assets, such larger firms are more likely to enjoy competitive advantages in international markets. This leads to the following hypotheses.

HYPOTHESIS 3: *Following globalization, foreign profitability and contribution of foreign profits to total profits of US firms would increase.*

HYPOTHESIS 4: *Following globalization, bigger US firms would increase both their foreign sales as a percentage of their total sales and foreign profitability more than smaller US firms.*

HYPOTHESIS 5: *Following globalization, US firms with greater intangible intensity would increase both their foreign sales as a percentage of their total sales and foreign profitability more than other US firms.*

Note the contrast between our second and other hypotheses. While the second hypothesis does not expect any increase in domestic profitability, our third hypothesis anticipates greater foreign sales and higher foreign profitability. The fourth and fifth hypotheses focus on the key attributes of firms that would enable US firms to benefit more from globalization than other firms.

III. Data and Empirical Measures

A. Data

We examine firms that are in the Compustat Annual Fundamental database, which contains data from audited financial reports of US publicly-listed firms

(Compustat). To this database, we merge Compustat Geographic Segments data, which contains geographic and business segment-level data for the firms. US GDP and trade data are from the Federal Reserve Bank of St. Louis. Our final sample before aggregation consists of 165,399 non-financial firm-years across the sample period of 1984-2019 (13,753 S&P 500 firm-years and 151,646 ex-S&P 500 firm-years). Our sample period starts from 1984, the year from which we have foreign before tax income in Compustat and ends in 2019 to exclude confounding pandemic era effects. Compustat collects the geographic segment data as presented by firms.[13] The companies themselves decide the level of detail within their segment breakouts. We measure foreign sales ($fsale$) as the sum of all non-domestic geographic segment sales as reported by the Compustat geographic segments.

As opposed to SFAS 14 requirement that firms disclose " operating profit or losses", SFAS 131 (that became effective in 1998) required firms to disclose "a measure of profit or loss." While this latter measure was designed to better capture the financial effects of varieties of transactions a firm typically engages in with respect to its foreign operations, including the equity income from their foreign affiliates, extraordinary items etc., the information reported depends on how the firm's internal operations are organized. With the result the number of firms reporting operating earnings declined sharply after 1998. Our own primary measure of profitability, earnings before interest and taxes, are derived from footnotes on income taxes provided by firms as part of firms' audited financial statements

[13]Financial Accounting Standards Board (FASB) released its codification of then-existing standards in 2009, including the segment disclosure requirements subject to materiality thresholds under SFAS 131 which became part of the new Accounting Standards Codification (ASC) Topic 280. See https://www.govinfo.gov/content/pkg/FR-1999-01-12/pdf/99-589.pdf for greater details regarding segment disclosure requirements. Compustat clarifies that foreign sales represent both sales generated through a subsidiary in the foreign country and exports from the United States (https://wrds-www.wharton.upenn.edu/pages/support/support-articles/compustat/segments/compustat-geographical-and-operation-segments-construction-data-limitations-and-item-sales/)

as the measure of foreign pretax income ($pifo$).[14] While these measures of foreign sales ($fsale$) and foreign pretax income ($pifo$) are based on what firms themselves disclose, the wide diversity with respect to how firms organize their internal operations and structure their transactions abroad together with significant discretion enjoyed by firms in reporting geographic segments based on such internal organization of their affairs can potentially lead to biases that we cannot estimate based on publicly available data. For example, if a firm restructured its foreign operations or transactions in a manner that could affect its measurement of either or both foreign sales or foreign income, then it is possible that our measure of foreign profitability could change consequent to such changes in restructuring of their operations or transactions.[15]

B. Primary Measure of Profitability

A major research goal of the paper is to reconcile the increased overall profitability of US firms with increased import competition induced by freer trade following globalization. We use the ratio of Earnings Before Interest and Taxes ($EBIT$) to sales, referred to as *EBIT margin*, as our primary measure of profitability. As discussed earlier, our choice is based on the view that long-term

[14]The SEC regulation 210.4–08 requires that "Disclosure shall be made in the income statement or a note thereto, of (i) the components of income (loss) before income tax expense (benefit) as either domestic or foreign. " See https://www.govinfo.gov/content/pkg/CFR-2001-title17-vol2/pdf/CFR-2001-title17-vol2-sec210-4-08.pdf for greater details of such disclosure requirements. The regulation provides for a materiality condition which states that "Amounts applicable to foreign income (loss) and amounts applicable to foreign or other income taxes which are less than five percent of the total of income before taxes or the component of tax expense, respectively, need not be separately disclosed."

[15]For instance, if a firm decided to produce more abroad to cater to demand from foreign consumers, this could potentially change the way the firm computes foreign profits compared to when it meets such foreign demand from its US production or service facilities. In particular, high-tech products and services such as social media or search engines easily transcend national boundaries in their deliveries and in their consumption of resources to generate such revenues that it is hard to derive any other measures of profitability than what they report in their audited statements. In such cases, the measured foreign profitability is likely to change with such restructuring of their transactions. Similar measures of foreign-sales and foreign-income have been used in Denis, Denis and Yost (2002), Dyreng, Hanlon, Maydew and Thornock (2017), Jang (2017) and Erel, Jang and Weisbach (2020). The online appendix and Table OA1 from the said appendix describe our sample selection procedures in more detail. The definitions of all variables are provided in Appendix A.

viability requires firms to be able to recover all costs, (a) regardless of their functionality, i.e., whether related to production, research and development, selling, general or other administrative activities, and (b) regardless of their variability in the near-term.[16] EBIT margin reflects such economic need for firms to recover all costs to remain viable.

Further, EBIT margin is closely related to Lerner index, a widely used measure of market power.[17] Lee, Shin and Stulz (2021) use operating income divided by sales as a proxy for the Lerner index. Operating income excludes special items, whereas *EBIT* is determined after deducting all expenses related to conducting business including special items. By treating special items as expense, *EBIT* margin is robust to managers opportunistically shifting expenses from COGS and SG&A to special items in order to meet or beat analyst earnings forecasts.[18] Further, the use of *EBIT* as opposed to net income or pretax income ensures that our analysis is not confounded by fluctuations in tax rates and leverage decisions across firms and across time. One limitation is that using EBIT margin as a measure of profitability implicitly assumes that the user cost of capital as a percentage of sales has remained the same across the pre and post globalization periods.[19] We provide some evidence that our findings are robust to relaxing this assumption. Moreover, EBIT data can be derived for domestic versus international operations separately.

For estimating foreign and domestic operating EBIT measures, we allocate

[16]COGS contains only production related costs. But firms incur additional costs related to selling, marketing and administrative activities which must all be recovered to remain financially viable. See also Traina (2018) and Ertan, Lewellen and Thomas (2020), who emphasize the importance of firms having to recover selling, general and administrative costs in addition to production costs.

[17]See Aghion, Bloom, Blundell, Griffith and Howitt (2005) and Lee, Shin and Stulz (2021).

[18]See McVay (2006).

[19]There are at least two possible sets of reasons why the user cost of capital could also change due to globalization. First, changing level of competition could prompt firms to use greater automation and technology, resulting in increased capital intensity for any given cost of capital. Second, for any given level of capital intensity, the user cost per unit of capital could change (see Caballero and Krishnamurthy (2009) and Jagannathan, Kapoor and Schaumburg (2013)).

the net interest expense, special profit items and non-operating income across domestic and foreign pretax incomes based on the domestic and foreign share of the total sales of the firm. We also examine the time series of alternate measures of profit margins as well as the ratio of foreign pretax income to total pretax income (F_PIpct) and the ratio of foreign EBIT to total EBIT ($F\_EBITpct$).

IV. Empirical Analysis

A. Empirical Support for Hypotheses 1-3

Our first empirical exercise is to identify endogenous structural breaks in the time series of variables that would be potentially affected by increased globalization using Supremum Wald structural break tests (Andrews (1993)).

< Insert Table 1 >

Columns (1) and (2) in Table 1 show that (a) US trade to GDP and (b) foreign sales as a percentage of total sales exhibit structural breaks in years 2004 and 2003, respectively (significant at the 10% level). Next, columns (5) and (3) in Table 1 show that foreign EBIT margin (F_EBIT) and foreign EBIT as a percentage total EBIT ($F\_EBITpct$) exhibit structural breaks in 2004 and 2001, respectively (significant at the 1% level). In contrast, columns (4) and (6) that show no significant structural breaks in the time series of overall EBIT margin ($EBITM$) and domestic EBIT margin (D_EBITM) measures during our sample period.[20]

The structural breaks in the time series of various financial ratios occurring between the period 2001-2004 is consistent with our first hypothesis on the effects of increased globalization. These endogenously arising structural breaks leads us

[20]These structural breaks reported by Table 1 are based on the assumption that the variables evolve according to AR1 processes . Table OB1 in the online appendix reports structural break tests under the alternative assumption that the variables are uncorrelated over time. The results are similar with all statistically significant structural breaks occurring between 2001 and 2005.

to split our sample into two subperiods: 1984-2002 (pre regime shift period), and 2003-2019 (post regime shift period), and examine the change in firms' profitability measures across the two subperiods.[21] As can be seen from Table 2, the share of foreign sales in total sales and the share of foreign EBIT in total EBIT are significantly higher during the post regime shift period than before globalization.

< Insert Table 2 >

The Trade/GDP ratio increased by 35.3% due to freer trade, i.e., from an annual average of 20.3% during pre-globalization period to 27.4% during the post globalization period. Second, mean $EBITM$ also increased from 9.6% to 10.7% due to globalization, a 11.5% more than its pre-regime shift period value. However, this increase is primarily driven by F_EBITM increasing from 10.3% to 13.8%, a 33.6% increase following globalization regime shift. In contrast, Table 2 also documents that the mean D_EBITM decreased marginally (not significant) following globalization, suggesting that in the presence of increased domestic competition, US firms could not increase their profitability in their domestic operations following globalization.

The increasing importance of foreign sales to US firms following globalization is further underscored by three distinct patterns identified by Table 2: (a) foreign sales per firm year ($FSALE/firmyear$) averaged at $788 million during the post regime shift period, representing 278% increase over the $208 million during the pre-regime shift period; (b) the mean foreign sales to overall sales ratio increased significantly from 20.2% to 30.3%, a 50.3% increase over the pre-regime shift value; and (c) the ratio of foreign to overall EBIT ($F_EBITpct$) increased from 22.4% to 39.5%, i.e., by 76.8% of the pre-regime shift value. Thus, our findings

[21] This splits the period 2001-2004 during which endogenous structural breaks occur in the time series of the variables evenly.

in Tables 1 and 2 collectively support hypotheses 1, 2 and 3.

B. Empirical Support for Hypotheses 4 and 5

We use membership in the S&P 500 Index as an indicator of the firm being large with greater probability for controlling intangible assets, and partition firms into two groups: S&P 500 firms and ex-S&P 500 firms. Then, according to Hypotheses 4 and 5, S&P 500 firms are more likely to benefit more from increased globalization than ex-S&P 500 firms. The average sales (total sales across all firm years divided by the number of firm years in the sample), the mean total book value of assets, and the mean total book value of equity of S&P500 firms are, $12,713, $16,580 and $5,640 million (deflated using the GDP deflator with base year 2003), respectively. In contrast, the corresponding values for ex-S&P 500 firms are $532, $628, and $209 million, respectively (see Table OA4 in the online appendix).[22] Clearly, S&P 500 firms are much larger in size than ex-S&P 500 firms. Further, S&P 500 firms on average spent significantly more than ex-S&P 500 firms on R&D and SG&A expenditures, primary sources of intangibles as implied by online appendix Table 7. The average S&P 500 firm increased R&D expenditures (in 2003 dollars) from 233 million to 483 million across the regime shift periods. During the same periods, ex-S&P 500 firms increased from 5 million to 17 million. Table 3 below gives the endogenous structural break test results, and Table 4 compares the mean of the variables during the pre-regime shift and post-regime shift periods.

< Insert Tables 3 and 4 >

As can be seen from columns (4)-(6) of Table 3, the time series of *EBITM* as well as *D_EBITM* of ex-S&P 500 firms exhibit a structural break in the year 2002.

[22] That is, the mean sales, mean total assets and mean book value of S&P firms are 23.9, 26.4, and 27 times that of similar means for ex-S&P 500 firms, respectively.

However, Panel B of Table 4 shows that the structural breaks are accompanied by a decrease in their average overall $EBITM$ and D_EBITM by 6.8% and 8.9% of their respective pre 2002 period values, though neither decrease is statistically significant. In contrast, the time series of F_EBITM of S&P 500 firms has a structural break in 2004 (column (2) of Table 3) with a significant increase in its mean from 10.7% during 1984-2002 to 15.8% during 2003-2019, an increase by 47.4% (Panel A, Table 4).[23] Further, for S&P 500 firms the overall profitability measure $EBITM$ increased from 11.1% to 12.6% following globalization even though the domestic profitability measure came down from 11.3% to 11.0% (Panel A, Table 4). Clearly, the increase in overall profitability ($EBITM$) of S&P 500 firms is driven by the increase in their foreign profitability, F_EBITM.

Interestingly, Table 4, Panel B finds that foreign sales as a percentage of total sales ($FSALEpct$), and the average annual foreign sales per firm year ($FSALE/firmyear$) of ex-S&P 500 increased much more than corresponding increases of S&P 500 firms, primarily on account of lower base during pre-globalization period. Further, both domestic and foreign profitability measures of ex-S&P 500 firms suffered following globalization, suggesting the importance of size of operations and intangible assets for benefiting from globalization.

Panel C of Table 4 provides the test statistics for the difference in the means of the three profitability measures across the pre and post regime shift periods for S&P 500 firms and ex-S&P 500 firms. The foreign profitability of S&P 500 firms in excess of the foreign profitability of ex-S&P 500 firms increased significantly following globalization compared to pre globalization period. Although the overall profitability measure, $EBITM$, and the domestic profitability measure

[23]The structural break tests for constant only specification for these aggregate profit margins is provided in Table OB2 of the online appendix. For S&P 500 firms, the time-series of F_EBITM again exhibits a statistically significant structural break in the year 2004 whereas D_EBITM doesn't exhibit one during our sample period.

D_EBITM of S&P 500 firms in excess of corresponding profitability measures of ex-S&P 500 firms also increased following globalization, these increases are not statistically significant.

While the findings based on the above difference-in-difference tests are largely in line with hypotheses 4 and 5, there is a limitation. The composition of firms in these two sets (of S&P and ex-S&P 500 firms) change over time – those in the ex-S&P 500 (S&P 500) set may migrate to the S&P 500 (ex-S&P 500) set or exit our sample – see Figure OD2 in the online appendix. Despite this limitation, our finding of the significant incremental profitability accruing only to S&P 500 firms (and not for ex-S&P 500 firms) highlights the importance of larger size and industry leadership (an intangible asset) of S&P 500 firms for benefiting from globalization.

< Insert Figure 2 >

Figure 2 presents a visual representation of the times series of F_EBITM and D_EBITM for S&P 500 and ex-S&P 500 group of companies. While F_EBITM for S&P 500 firms increased significantly following globalization there is no such visually discernible difference in F_EBITM of ex-S&P 500 firms or D_EBITM of each of S&P 500 and ex-S&P 500 firms across pre and post globalization periods.

< Insert Figure 3 >

S&P 500 firms have also witnessed a steep increase in foreign sales as illustrated in Panel A of Figure 3. Panel B of Figure 3 illustrates no such steep differences between S&P 500 and ex-S&P 500 firms, regarding overall $EBITM$ or D_EBITM due to trade regime shifts. Overall, our findings are consistent with hypotheses 3-5. Collectively, our empirical analyses and results are consistent with the notion that the profitability of foreign operations of larger firms

especially those with higher intangible intensity, increased significantly due to globalization of trade and such increases in foreign profitability and foreign trade more than made up for any drop in domestic profitability of US firms due to potential increased domestic competition.

C. Reconciling our findings with prior literature on Market Power

Our focus is in decomposing the overall profitability of firms into foreign and domestic components and identifying firms that benefited more from globalization. Our focus is not in examining market power of firms. The prior literature which finds an increase in market power of US firms, using Lerner index (proxied by operating profit margin), markup over marginal cost, and market concentration as measures of market power does not distinguish between domestic and foreign profitability.[24] The rise in market power over time documented in the literature also appears to be mostly concentrated in large and more productive firms. De Loecker et al. (2020) find no increase in the markup of median size firms in their sample. Autor et al. (2020) find that market concentration has increased only for the 500 largest firms in the Compustat. Lee et al. (2021) find that market power, as measured by their proxy for Lerner index, increased for large firms in their sample but not for small firms. Our measure of profitability, EBIT margin, is closely related to Lerner index, and hence can possibly be viewed as another proxy for market power.[25] The evidence in Table 4 — of small declines in the

[24]See Gutiérrez and Philippon (2018); Covarrubias, Gutiérrez and Philippon (2020); De Loecker, Eeckhout and Unger (2020); Syverson (2019) ; Barkai (2020); Lee, Shin and Stulz (2021), etc.

[25]See Panel B of Figure 3 plots the EBIT margins and Operating margins (closely related to Lerner index). Operating margin is computed as operating income scaled by sales. EBIT margin is computed as the sum of operating income and non-operating incomes scaled by sales. As can be seen from the figure, the two series track each other fairly closely. De Loecker, Eeckhout and Unger (2020) use markup over marginal cost as proxied by a scale multiple (output elasticity) of Cost of Goods Sold (COGS) as one of the measures of market power. In Figure OD1 of the online appendix, we plot the time series of aggregate markup computed as in De Loecker, Eeckhout and Unger (2020) for S&P500 firms, and the aggregate gross markup implied by firm gross margins. Using each of these two measures, S&P 500 market power increased during our sample period also.

overall profitability, $EBITM$, and domestic profitability, D_EBITM, of ex-S&P firms – is consistent with the view that potentially increased domestic competition following globalization hurt smaller firms. To relate our findings to the findings in the prior literature that investigate trends in profitability and market power over time, we examine the trend in domestic and foreign profitability of S&P 500 firms, and ex-S&P 500 firms during our sample period, using the Mann-Kendall trend test.

< Insert Table 5 >

As can be seen, from the results given in Table 5, there is a statistically significant and increasing trend in aggregate EBIT margin only for S&P 500, and not ex-S&P 500, firms during the entire sample period 1984-2019. This is consistent with the findings in the earlier literature.

Further, from the results in panel A, Column (2) of Table 5, it is evident that foreign EBIT margins exhibit a significant and positive trend over the period 1984-2009 for S&P 500 firms. In contrast, ex-S&P 500 (see Panel B) do not have a similar positive trend. Moreover, Column (3) of Table 5 demonstrates that *domestic EBIT margin* for both S&P and ex-S&P 500 firms do not exhibit any positive trend over the period 1984-2019. Collectively, these Mann-Kendall trend tests findings from prior tables that increased profitability of foreign operations of S&P 500 firms following globalization was the primary driver behind the increase in their aggregate overall *EBIT margins*.[26]

To summarize, our findings suggests that the growth in market power of US firms documented in recent studies, and also confirmed by us, is driven mostly by the increase in *foreign EBIT margins* of S&P 500 firms during the post regime

[26]Panel C of Table 8 shows that *EBIT margins* of S&P 500 firms improved across the regime shift periods even after accounting for capitalizing and depreciating R&D and SG&A expenses.

shift period. Moreover, *D_EBITM* decreased across the regime shift periods due to greater import competition following globalization for each set of S&P and ex-S&P 500 firms.

D. Intangible Intensity and Foreign EBIT Margins

We had earlier argued that larger firms with valuable intangible assets are more likely to benefit from increased globalization than other firms. In this subsection, we examine whether there is a positive association between intangible intensity and increase in *F_EBITM* from pre to post structural break periods even among S&P 500 firms.

< Insert Table 6 >

We use two measures of *intangible intensity*. The first measure of intangible intensity that we use is the ratio of R&D to sales, analyzed in Panel A of Table 6. Each year, we sort S&P 500 firms into three groups based on their R&D expenditures to sales ratios. Firms with R&D expenditures below the reporting threshold do not report their R&D expenditures and are put into one group labelled "Low". Firms with reported R&D expenditures below the median of reported values are classified as "Medium" and the rest of the firms are classified as "High". The average foreign profitability measure, *F_EBITM*, of firms in the High group increased from 12.8% during the pre-regime shift period to 22% during the post-regime shift period (i.e., by 72.2%). In contrast, the *F_EBITM* of firms in the Medium(Low) group increased from 8.7%(10.9%) to 13.4%(13.2%) (i.e., increased by 53.2%(20.6%)) . It is noteworthy that ex-S&P 500 firms even from the "High" R&D/Sales ratio set do not experience any such increase in *F_EBITM* suggesting that the magnitude of the R&D expenditures, in addition to the ratio of R&D expenditures to sales, matters.

The second measure of intangible intensity that we use is the ratio of total intangibles to sales (*Totalintan/sale*), where total intangibles represent the sum of book value of intangibles (including goodwill), and estimated values of off balance sheet intangibles – knowledge capital (KC) and organizational capital (OC). [27] Following Eisfeldt, Kim and Papanikolaou (2020), Eisfeldt and Papanikolaou (2013) and Peters and Taylor (2017), KC and OC are estimated using the perpetual inventory model. Our conclusions based on this second measure of intangible intensity, are similar to the conclusions based on the first measure of intangible intensity.

In Panel B of Table 6, we sort firms into Low, Medium and High terciles based on their *Totalintan/sale* ratios and examine how their average aggregate *F_EBITM* changed from pre structural break period to post structural break period. We observe that in the High tercile group of S&P 500 firms, *F_EBITM* significantly increased from 13.5% to 22.4% following globalization. For the High tercile group of ex-S&P 500 firms, we do not observe any significant increase in *F_EBITM*. Further, Panel A of Table 7 in the online appendix also finds that the total intangibles/sales ratio post globalization is 60.2% for S&P 500 firms which is greater than 54.2% for ex-S&P 500 firms. Since intangible assets help benefit from competition and increased global opportunities, this is what one would expect.

< Insert Table 7 >

Given that the median value of sales for S&P 500 firms is 70 times greater than that of ex-S&P firms, mere increases in ratios of various metrics of intangibles to sales do not provide the entire picture. Therefore, Panel B of Table 7 in the online

[27] Book values of intangibles typically reflect fair values of such intangibles purchased from a third party, including as part of takeover or acquisition of another firm, after adjusting for accumulated amortization since their purchase. In contrast, KC and OC measures are constructed based on firms' internal R&D and SG&A expenses.

appendix also presents the relevant magnitudes to provide a proper context and to underline the substantial difference in intangible magnitudes between the two sets of firms. For instance, the average *MainSG&A* annual expense per S&P 500 firm year during the post globalization period was $2.204 billion, which is 17.6 times that of $125 million, the average main SG&A per ex-S&P 500 firm year.[28] Similarly, the total intangibles average $10.137 billion per firm year for S&P 500 firms during the post globalization period, and this accounts for 21.3 times the average of $475 million per firm year for ex-S&P 500 firms.

Collectively, our analyses in Table 6 and online appendix Table 7 are consistent with our hypotheses that S&P 500 firms that were larger with leading positions in the markets in which they were operating, particularly those with significant intangibles, were better positioned to improve their *F_EBITM* by taking greater advantage of foreign market opportunities provided by increased globalization than ex-S&P 500 firms.

E. Returns to Capital

This section examines if the growth in *foreign EBIT margins* across the regime shift translates into increased *accounting* returns to total capital employed. Unlike sales and EBIT variables, firms do not report a decomposition of capital employed into foreign and domestic components.[29] We, therefore, are only able to examine how overall returns to capital measures changed across pre and post globalization periods.

< Insert Table 8 >

In Panel A of Table 8, we examine the ratio of *EBIT to Total Capital Employed*

[28] Main SG&A is computed as total selling, general and administrative expenses less R&D expenses.
[29] Firms are not required to disclose such employment of capital across different geographic segments.

(TCE), an accounting measure of return on capital employed that is not affected by taxes and capital mix decisions. We show that for both S&P 500 and ex-S&P 500 set of firms, mean *EBIT/TCE* does not exhibit statistically significant increase following globalization. In fact, the S&P 500 mean *EBIT/TCE* decreased by 0.5 percentage points from 14.8% during the pre-regime shift to 14.3% during the post regime period. That the improvements in their mean *F_EBITM* and *EBITM* during the post regime shift years did not translate into higher return on *TCE* appears to be due to mean *SALE/TCE* ratio for the S&P 500 (ex-S&P 500) firms decreasing significantly from 132.9% (133.2%) to 113.1% (120.9%) across the pre and post regime shift periods. That is, firms appear to need greater total capital employed to generate a dollar in sales post globalization, presumably due to adopting greater capital-intensive operations following increased competition.

We examine the change in the components of *EBIT/TCE*, i.e., *Net Income (NI)/TCE, Interest/TCE, Tax/TCE,* across the pre and post regime periods in Panel A of Table 8.[30] We find that the increase in mean *NI/TCE* for S&P 500 firms across the regime shift periods is primarily due to reduced interest and tax rates during that period. Even though mean *EBIT/TCE* for S&P 500 firms declined by 0.5 percentage points following globalization, mean *Tax/TCE* and *Interest/TCE* ratios fell by 0.6 and 1.8 percentage points, respectively, resulting in *NI/TCE* going up.

We do not find any significant increase in either *EBIT/TCE* or *NI/TCE* for ex-S&P 500 firms, even though these firms also enjoyed significant reductions in interest and tax expenses during the period 2003-2019.

In Panel B of Table 8, we examine returns on equity and debt. Consistent with declining interest rates, mean *Interest/Debt* for S&P 500 firms decreased from

[30]The three components do not add up to exactly 100% because net income attributable to non-controlling interest is subtracted before arriving at net income of the firms.

8.1% to 4.6% across the regime shift periods. *Payouts/Equity* and Return on book Equity, i.e., *ROE (= NI/Equity)* registered significant increase for S&P 500 firms.[31] *ROE* of these firms increased from 13.1% to 15.5% across the regime shift subperiods. However, if the average profitability of foreign operations had remained the same during the pre and post regime shift periods, the *ROE* of S&P 500 firms would have declined to 12.6% during the post regime shift period. In other words, even holding the payouts fixed, increasing foreign profitability of S&P 500 firms appears to have contributed to this increased ROE following globalization.

Panel C of Table 8 illustrates one set of robustness test results. Even after capitalizing intangible expenses such as R&D and main SG&A expenses in the manner described in the previous section, Panel C of Table 8 preserves our previous findings: that is, intangible-adjusted *EBITM (IA_EBITM)* increased significantly only for S&P 500 firms (from 13.10% to 14.50% around regime shift), while intangible-adjusted return on *TCE (IA_EBIT/IA_TCE)* decreased for both S&P and ex-S&P firms following globalization.

F. Effect of Globalization on Firms in Different Sectors

In this subsection, we group firms in our overall sample into five industries/ sectors described in the French Data Library29. We consider the effect of globalization on firms in the first four of the five sectors, i.e., Consumer, Manufacturing, HighTech, and Healthcare sectors. We do not consider the fifth sector, "Others", in our analysis in this subsection, since firms in the "Others" sector are more heterogenous.[32] The results are given in Table 9.

[31] Payouts represent the sum of cash dividends and share buybacks.

[32] See Professor French's website for the definition of the five industries/sectors: https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

< Insert Table 9 >

As can be seen from Table 9, there are substantial differences in how globalization has affected firms in different sectors. Firms in the HighTech sector experienced significant increase in both domestic and overall profitability – i.e., *EBITM* and *F_EBITM* – following increased globalization. HighTech also did not experience a decline in its *D_EBITM* or its return on total capital employed, *EBIT/TCE*. The Healthcare sector had a significant increase in foreign profitability and a significant decline in domestic profitability and the effects of the two almost offset each other, with the result the overall profitability remained almost the same. Consumer sector experienced a decline in both domestic and foreign profitability. While the domestic profitability of Manufacturing declined, the increased foreign profitability more than offset that decline with the result that the overall profitability increased. While both Consumer and Healthcare sectors experienced a decline in overall ROE, the decline is significant only for the Healthcare sector. Intangible intensities (ratio of total intangibles to sales ratios) of all the four sectors increased following increased globalization (see Table OD1 in the Online Appendix), consistent with the view that increased globalization would lead to increased spending in R&D and SG&A expenditures to remain competitive. In summary, the impact of globalization across different sectors has not been uniform. Only the High Tech sector seems to have benefited significantly on most dimensions due to trade globalization.

G. Role of effective tax rates

One of our major findings is that firms with higher *intangibles* especially higher R&D, experienced larger increases in their *foreign EBIT margins* following globalization. Prior literature documents that the presence of intangible assets, like

patents protecting knowledge capital used to make income shifting by US multinational corporations (MNCs) to lower-taxed foreign jurisdictions easier.[33] We, therefore, study the time-series properties of aggregate *Effective Tax Rates (ETR)* defined as aggregate tax expense to aggregate pretax income.

Note that only S&P 500 firms, and not ex-S&P 500 firms, realized the higher *foreign EBIT margins* during the post regime shift period. If the increase in *F_EBITM* is due to income shifting for tax reasons, we should find that the difference between the effective tax rates of S&P500 firms and ex S&P500 firms would have declined during the post globalization period. We, therefore, examine if there is a declining trend in the time series of the difference between the ETRs of S&P 500 and ex-S&P 500 firms *(ETR_diff)* using a Mann-Kendall trend test. As ETRs could be volatile because the denominator is a profit measure and not a revenue measure, we use the non-parametric rank-based Mann-Kendall test. To deal with volatility induced by lower or negative pretax profits, we also examine *ETR_diff_3MA*, the difference in the three-year moving average measures of S&P 500 and ex-S&P 500 firms' ETRs. We also drop years in which the aggregate ex-S&P 500 pretax income is negative.[34]

< Insert Table 10 >

The Mann Kendall test results, presented in Panel A of Table 10, do not reject the null hypothesis of no trend in the time series of each of *ETR_diff* and *ETR_diff_3MA* across either the whole sample period (1984-2019) or across the post-regime shift period (2003-2019).

Our second set of tests revolve around structural breaks. Since Table 3 found structural shifts in *foreign EBIT margins* only for S&P 500 firms, if *foreign EBIT*

[33] See for example, Faulkender, Hankins and Petersen (2019)

[34] In online appendix Figure OD3 and Figure OD4, we present the time-series plots of *ETR* for S&P 500 firms and *ETR_diff* respectively.

margin structural breaks arose only because of tax advantage/management,[35] then one would expect to find structural breaks in the time series of S&P 500 firms' *ETR* and *ETR_3MA* during the period 2001-2004. However, as can be seen from Panel B of Table 10, the significant structural breaks for *ETR* and *ETR_3MA* of S&P 500 firms occur in 2009 and 2010. Several possible explanations for such later structural breaks in ETR would include the effect of enhanced bonus depreciation in 2009, the impact of financial crisis driving the aggregate pre-tax income to a significantly lower level than usual (controlling for other factors such as growth), etc.[36]

H. Alternative Profitability Measures

We examine the robustness of our findings in Tables 3 and 4 with respect to using pretax income margin and operating margin instead of *EBIT margin* as profitability measures. In what follows we first examine pretax income margin (*PIM*), foreign pretax income margin (*F_PIM*), and domestic pretax income margin (*D_PIM*).

< Insert Table 11 >

Notice from columns 1-3 of Panel A of Table 11 that the structural break year (2004) for S&P 500 firms' foreign pretax margin (*F_PIM*) is the same as that for *F_EBITM*. We do not observe any significant structural breaks in the time series of overall pretax margin (*PIM*) and domestic pretax margin (*D_PIM*), again consistent with the patterns for *EBITM* from Table 1.

From Panel B of Table 11, one can also observe that the mean *F_PIM* for S&P 500 firms increased from 8.3% during 1984-2002 to 14.2% during 2003-2019.

[35] See Faulkender et al. (2019) for a discussion of profit shifting for tax reasons.
[36] See Keightley (2011)

F_PIM was the major driver of mean PIM which increased from 8.1% to 10.8% over the corresponding periods. We were unable to detect a significant change in mean *D_PIM* across the regime shift periods, again consistent with the behaviour of *E_EBITM*. Next we consider operating income margin as the alternative measure of profitability across the pre and post regime shift subperiods.[37] The variables we consider are: Operating Margin (*OPM*), proxying for the Lerner index used by Lee, Shin and Stulz (2021), Foreign Operating Profit Margin (*F_OPM*) and Domestic Operating Profit Margin (*D_OPM*). The results are in columns 4-6 in Panel A of Table 11.

As expected, *F_OPM* exhibits a significant structural break in the year 2004 coinciding with the year of structural breaks in *F_EBITM* and *F_PIM*. Mean *F_OPM (OPM)* for S&P 500 firms increased significantly from 10.4% (10.7%) during 1984-2002 to 15.7% (12.7%) during 2003-2019. *D_OPM* remained flat during this period. Overall, the results in Table 11 confirm that our findings about the behaviour of *EBITM* and its components *F_EBITM* and *D_EBITM* are robust to using alternate measures of profit margins. We also examine the ratio of aggregate foreign pretax income to total pretax income (*F_PIpct*) for S&P 500 firms in Table 11. *F_PIpct* exhibits a statistically significant structural break in 2004 and increased from 25.4% during 1984-2002 and 43.8% during 2003-2019, representing a 72.3% increase due to globalization. In summary, the alternate measures of profitability yield results similar to those we found with EBIT measure.

[37]The difference between operating income and pretax income mostly consists of non-operating expenses and income. Our measure of *EBIT* includes both operating and non-operating expenses and incomes, but excludes interest and taxes, whereas pretax income is derived after deducting interest expenses, but before taxes.

I. Changes in S&P 500 composition

The composition of firms in the S&P 500 index changes over time with more successful firms replacing those who are less. We find that our conclusions are unlikely to be driven by index composition changes – we refer the interested reader to Table OC1 and the related discussions in the online Appendix.

J. Materiality threshold in the disclosure of pretax income from foreign operations

The SEC regulation § 210.4–08, which mandates the disclosure of foreign pretax income in the firm 10-K reports, stipulates a materiality condition at 5% of total pretax income. Table OC2 in the online Appendix provides a detailed discussion as to why our conclusions are unlikely to be driven by firms being just below the threshold prior to 2002 and crossing the threshold just 2002.

V. Summary and Conclusion

We find that the overall profitability of US firms as measured by the ratio of aggregate Earnings Before Interest and Taxes to aggregate Sales (EBIT Margin, *EBITM)*, increased significantly following increased globalization heralded by China's entry into WTO in December 2001. While this is consistent with findings in the prior literature that markups have increased over time, we find that the increase in *EBITM* is driven primarily by the increased foreign profitability of S&P 500 firms, which are larger and spend significantly more on R&D than firms not in S&P 500 index (ex-S&P 500), and have greater intangible intensity than ex-S&P 500 firms. Even among S&P 500 firms, those firms that had higher intangible intensities as measured by higher *R&D/Sales* and *Intangible Assets/Sales* ratios had higher increases in their foreign profitability. Neither S&P 500 nor ex-S&P 500 firms experienced any increase in their domestic *EBITM* following

increased globalization, consistent with increased import competition.

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Appendix A: Variable Definitions

Variable	Definition	Estimation
fpi	Foreign pretax income	Compustat $pifo$
dpi	Domestic pretax income	fpi - pi
$sale$	Total sale	Compustat $sale$
$fsale$	Foreign sale	Sum of all non-domestic geographic segment sales reported in Compustat geographic segments
$dsale$	Domestic sale	$sale - fsale$
f_ebit	Foreign earnings before interest and tax	$fpi + xint \times \left(\frac{fsale}{sale}\right)$
$ebit$	Total earnings before interest and tax	$pi + xint$
d_ebit	Domestic earnings before interest and tax	$(pi - fpi) + xint \times \left(\frac{sale - fsale}{sale}\right)$
$EBITM$	Aggregate earnings before interest and tax margin (EBIT Margin)	$\frac{\sum_i ebit_{it}}{\sum_i sale_{it}}$
F_EBITM	Aggregate foreign EBIT margin	$\frac{\sum_i f\_ebit_{it}}{\sum_i fsale_{it}}$
D_EBITM	Aggregate domestic EBIT margin	$\frac{\sum_i d\_ebit_{it}}{\sum_i (sale_{it} - fsale_{it})}$
$F\_EBITpct$	Aggregate foreign EBIT to total EBIT	$\frac{\sum_i f\_ebit_{it}}{\sum_i ebit_{it}}$
$FSALEpct$	Aggregate foreign sale to total sale	$\frac{\sum_i fsale_{it}}{\sum_i sale_{it}}$
$SALE$	Aggregate sale	$\sum_i sale_{it}$
$FSALE/firmyear$	Average annual foreign sale per firm	$FSALE$ divided by the number of firms used to estimate $FSALE$ in a given year
$post$	Dummy variable identifying whether fiscal year falls before/after regime shift	equals 1 if fiscal year > 2002, and 0 otherwise
NI	Aggregate net income	$\sum_i ib_{it}$ where ib is income before extraordinary items
Tax	Aggregate tax expense	$\sum_i txt_{it}$ where txt is tax expense
$Interest$	Aggregate interest expense	$\sum_i xint_{it}$ where $xint$ is interest expense
$Equity$	Aggregate book equity	$\sum_i (ceq_{it} + pstk_{it})$ where ceq is common shareholder equity and $pstk$ is preferential shareholder equity
$Debt$	Aggregate book debt	$\sum_i (dlc_{it} + dltt_{it})$ where dlc is short term debt and $dltt$ is long term debt
TCE	Aggregate total capital employed	$\sum_i (dlc_{it} + dltt_{it} + ceq_{it} + pstk_{it})$

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Variable	Definition	Estimation
$Payouts$	Aggregate payouts to shareholders	$\sum_i dv_{it} + prstkc_{it}$ where dv is cash dividends and $prstkc$ is share buybacks
ROE	Aggregate return on equity	$NI/Equity$
xrd	R&D expense	Compustat xrd
$xsga$	SG&A expense	Compustat $xsga$
$R\&D$	Aggregate R&D expense	$\sum_i xrd_{it}$
$MainSG\&A$	Aggregate SG&A expense excluding R&D expense (if included in SG&A)	$\sum_i (xsga_{it} - xrd_{it})$
$intan$	Book intangible assets	Compustat $intan$
$Bookintan$	Aggregate book intangibles	$\sum_i intan_{it}$
KC	Knowledge Capital	$KC_{i,t} = (1-\delta_{KC})KC_{i,t-1} + \gamma_{KC} xrd_{it}; \delta_{KC} = 15\%; \gamma_{KC} = 100\%$
OC	Organizational Capital	$OCi,t = (1-\delta_{OC})OC_{i,t-1} + \gamma_{OC}(xsga_{it} - xrd_{it}); \delta_{OC} = 20\%; \gamma_{OC} = 30\%$
$Capitalizedintan$	Aggregate capitalized intangibles	$\sum_i (KC_{it} + OC_{it})$
$Totalintan$	Aggregate Intangible Capital	$Bookintan + Capitalizedintan$
ia_ebit	Intangible-adjusted EBIT	$ebit + xrd + 0.3 * (xsga - xrd) - 0.15 * KC - 0.2 * OC$
ia_tce	Intangible-adjusted TCE	$dlc + dltt + ceq + pstk + KC + OC$
ETR	Aggregate effective tax rate	$\frac{\sum_i txt_{it}}{\sum_i pi_{it}}$
spi	Special profit items	Compustat spi
$nopi$	Non-operating income	Compustat $nopi$
OPM	Aggregate operating income margin	$\frac{\sum_i (ebit_{it} - (nopi_{it} + spi_{it}))}{\sum_i sale_{it}}$
F_OPM	Aggregate foreign operating income margin	$\frac{\sum_i (f\_ebit_{it} - (nopi_{it} + spi_{it}) \times \left(\frac{fsale_{it}}{sale_{it}}\right))}{\sum_i fsale_{it}}$
D_OPM	Aggregate domestic operating income margin	$\frac{\sum_i (d\_ebit_{it} - (nopi_{it} + spi_{it}) \times \left(\frac{sale_{it} - fsale_{it}}{sale_{it}}\right))}{\sum_i (sale_{it} - fsale_{it})}$
PIM	Aggregate pretax income margin	$\frac{\sum_i pi_{it}}{\sum_i sale_{it}}$
F_PIM	Aggregate foreign pretax income margin	$\frac{\sum_i fpi_{it}}{\sum_i fsale_{it}}$
D_PIM	Aggregate domestic pretax income margin	$\frac{\sum_i (pi_{it} - fpi_{it})}{\sum_i (sale_{it} - fsale_{it})}$
ETR_diff	Difference in ETR	Difference in ETR of S&P 500 and ex-S&P 500 firms
ETR_diff_3MA	Difference in 3MA ETR	Difference in three-year moving average of ETR of S&P 500 and ex-S&P 500 firms

Note: This table provides definitions of variables used in the paper. All aggregate variables are year-level variables ("time" index subscript is not provided for brevity). For aggregation, 'i' represents firms and 't' represents time. "Compustat" indicates that the variable is directly available in the Compustat annual fundamentals database.

Appendix B - Descriptive Statistics

Average during	1984-2002	2003-2019	1984-2002	2003-2019	1984-2002	2003-2019
Sample	All firms		S&P 500		ex-S&P 500	
Panel A: Aggregate annual averages in $trillions (2003 dollars)						
US GDP	8.56	13.47				
US Trade	1.77	3.70				
Sale	5.68	8.68	3.79	6.05	1.89	2.63
Foreign sale	1.17	2.64	0.94	2.01	0.23	0.64
Domestic sale	4.51	6.03	2.85	4.04	1.67	1.99
EBIT	0.54	0.93	0.42	0.77	0.12	0.17
Foreign EBIT	0.12	0.37	0.10	0.32	0.02	0.05
Domestic EBIT	0.42	0.56	0.32	0.45	0.10	0.12
Interest	0.17	0.18	0.11	0.11	0.06	0.07
Tax	0.16	0.22	0.12	0.19	0.04	0.04
Net Income (NI)	0.20	0.52	0.19	0.46	0.02	0.06
Payouts	0.21	0.54	0.17	0.46	0.05	0.08
Debt	2.17	3.61	1.46	2.48	0.72	1.13
Equity	2.17	4.00	1.45	2.95	0.72	1.06
Totalintan	1.93	5.09	1.32	3.67	0.61	1.42
Panel B: GDP-scaled ratios						
Trade/GDP	20.3%	27.4%				
Sale/GDP	66.2%	64.6%	44.5%	45.0%	21.8%	19.7%
Foreign sale/GDP	13.4%	19.6%	10.9%	14.9%	2.5%	4.7%
Domestic sale/GDP	52.9%	45.0%	33.6%	30.0%	19.3%	14.9%
EBIT/GDP	6.4%	6.9%	4.9%	5.7%	1.4%	1.2%
Foreign EBIT/GDP	1.4%	2.7%	1.2%	2.4%	0.2%	0.3%
Domestic EBIT/GDP	5.0%	4.2%	3.8%	3.3%	1.2%	0.9%
Debt/GDP	24.9%	26.7%	16.7%	18.3%	8.2%	8.4%
Equity/GDP	25.2%	29.6%	17.0%	21.8%	8.2%	7.9%
Totalintan/GDP	21.7%	37.5%	15.0%	27.0%	6.7%	10.5%

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Average during	1984-2002	2003-2019	1984-2002	2003-2019	1984-2002	2003-2019

Note: This table provides descriptive statistics for variables used in this paper. We divide our sample into the pre-regime shiftperiod (1984-2002) and the post-regime shift period (2003-2019) based on structural breaks in the time series of several financial ratios based on Supremum Wald tests. In panel A, we provide aggregate annual averages of these variables in trillions of USD deflated using the GDP deflator with base year 2003. In panel B, we provide GDP-scaled ratios. US Trade is the sum of aggregate US imports and US exports. *Totalintan* is the sum of *Bookintan* (intangible capital disclosed by firms on their balance sheets) and *Capitalizedintan* (intangible capital computed based on capitalizing past R&D expenditures and a fraction of SG&A expenses and depreciating them). Variables are defined in Appendix A.

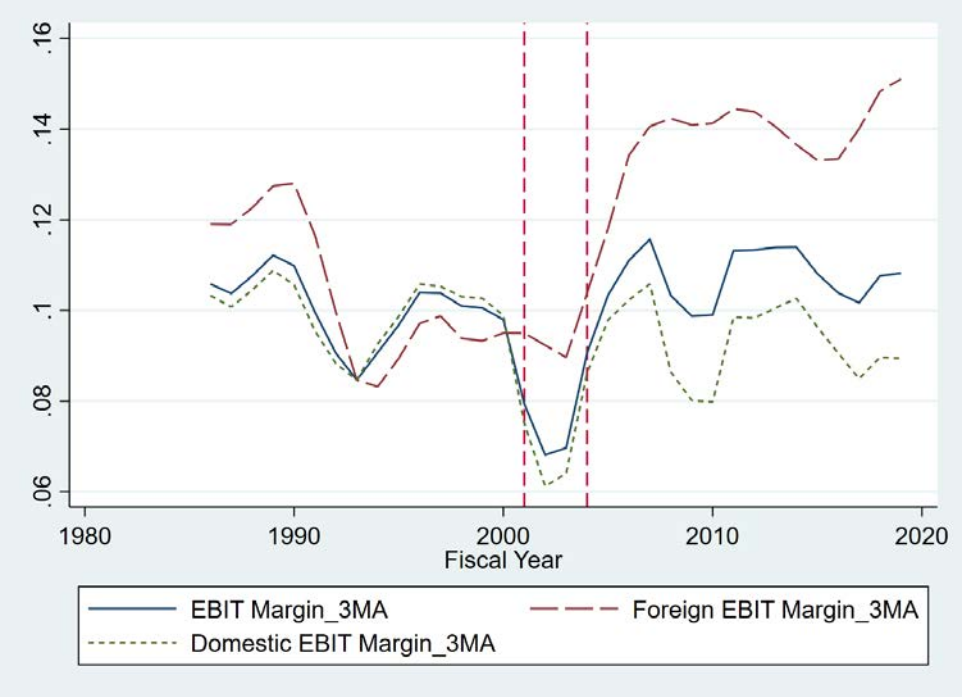
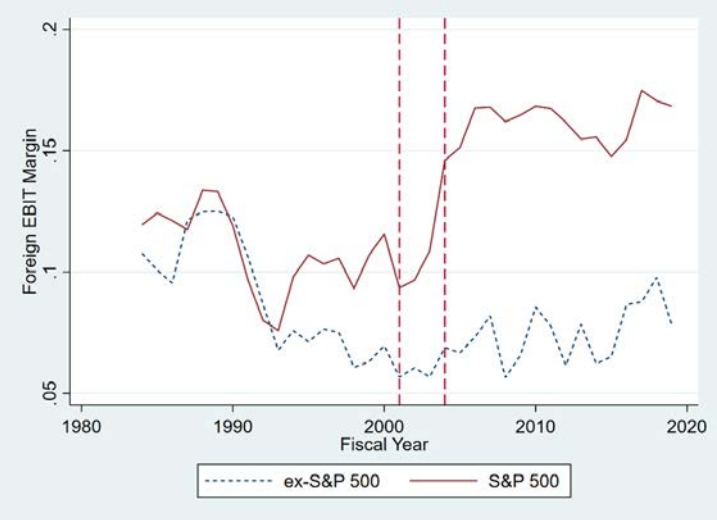
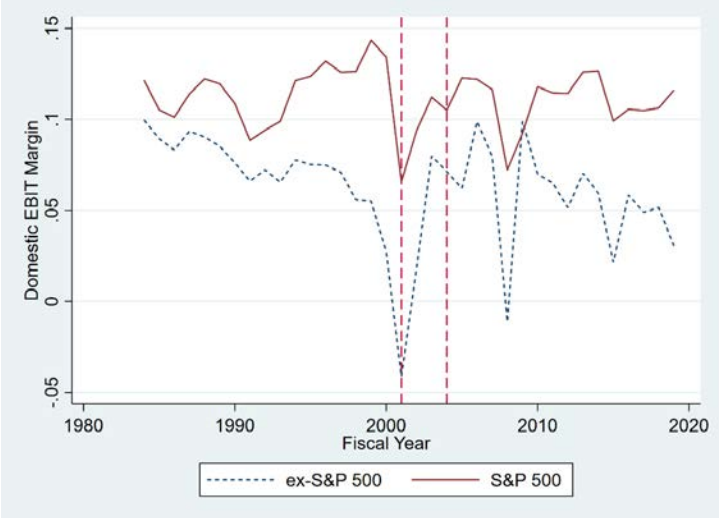


Figure (1) Time series of aggregate profit margins

Note: EBIT Margin denotes the ratio of aggregate Earnings Before Interest and Taxes (EBIT) of all firms in our sample to their corresponding aggregate Sales. 3MA denotes three year moving average. The vertical-dotted lines in red correspond to years 2001 and 2004. Andrews (1993) supremum Wald test for endogenous structural break identifies structural breaks in the time series of several financial ratios during the period 2001 and 2004. The variables are described in Appendix A.



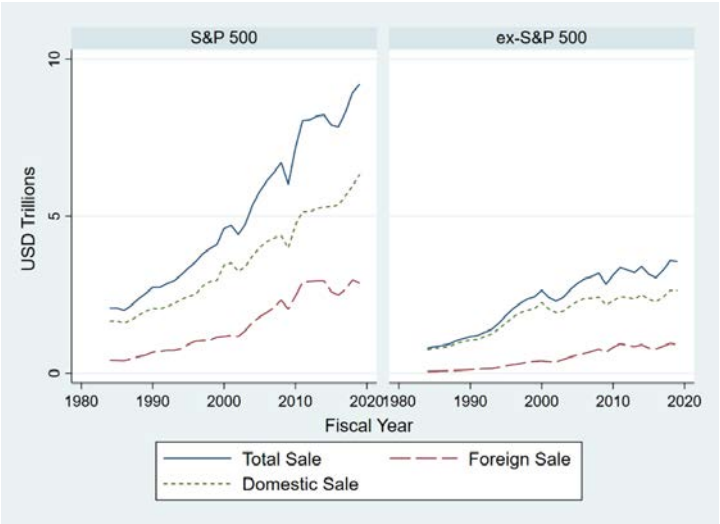
(a) Panel A: Foreign EBIT Margins of S&P 500 andex-S&P 500 firms



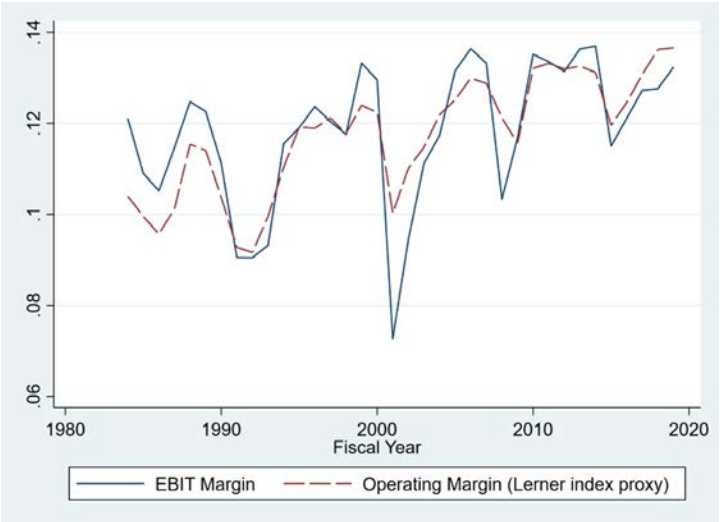
(b) Panel B: Domestic EBIT Margins of S&P 500 and ex-S&P 500 firms

Figure (2) Time series of aggregate foreign and domestic EBIT margins of S&P 500 and ex-S&P 500 firms

Note: The vertical dotted lines in red correspond to years 2001 and 2004. Andrews (1993) supremum Wald test for endogenous structural break identifies structural breaks in the time series of several financial ratios during the period 2001 and 2004. The variables are described in Appendix A.



(a) Panel A: Aggregate foreign sale of S&P 500 and ex-S&P 500 firms



(b) Panel B: EBIT margin and operating margin of S&P 500 and ex-S&P 500 firms

Figure (3) Time series of aggregate sale, foreign and domestic sales, EBIT margin and operating margin of S&P 500 and ex-S&P 500 firms

Note: Aggregate sales are in trillions of US dollars. All variables are described in Appendix A.

Table (1) Structural breaks in the time series of relevant measures

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Trade/GDP*	*FSALEpct*	*F_EBITpct*	*EBITM*	*F_EBITM*	*D_EBITM*
Lagged Trade/GDP	0.910***					
	(0.0592)					
Lagged FSALEpct		0.956***				
		(0.0324)				
Lagged F_EBITpct			0.742***			
			(0.114)			
Lagged EBITM				0.403**		
				(0.158)		
Lagged F_EBITM					0.904***	
					(0.0824)	
Lagged D_EBITM						0.253
						(0.165)
Constant	0.0238	0.0147*	0.0847**	0.0602***	0.0122	0.0697***
	(0.0142)	(0.00824)	(0.0365)	(0.0162)	(0.00997)	(0.0158)
Observations	35	35	35	35	35	35
R-squared	0.878	0.964	0.563	0.165	0.785	0.066
Break Date	2004	2003	2001	2003	2004	2008
Chi2	10.09	9.984	22.51	5.842	16.03	2.971
DF	2	2	2	2	2	2
p-value	0.0915	0.0953	0.000363	0.433	0.00718	0.892

Note: Supremum Wald test (Andrews, 1993) for endogenous structural breaks in the times series of relevant variables in our sample during the period 1984-2019, using an *AR1 specification*. *Trade/GDP* is the ratio of overall US trade to US GDP. *FSALEpct* is the percentage share of aggregate foreign sales in aggregate total sales. *F_EBITpct* is the percentage share of aggregate foreign EBIT in aggregate overall EBIT. *EBITM* is the aggregate EBIT margin. *F_EBITM* is the aggregate foreign EBIT margin and *D_EBITM* is the aggregate domestic EBIT margin. All variables are described in Appendix A. Standard errors are shown in parentheses. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level, respectively.

Table (2) Mean of aggregate financial ratios of firms during the pre (1984-2002) and post (2003-2019) regime shift periods

VARIABLES	Average during 1984-2002	Average during 2003-2019	Change %	NW t-statistic
Trade/GDP	20.3%	27.4%	35.3%	5.69
FSALE/firmyear	208.4	788.0	278.1%	6.78
FSALEpct	20.2%	30.3%	50.3%	7.68
F_EBITpct	22.4%	39.5%	76.8%	5.79
EBITM	9.6%	10.7%	11.5%	2.00
F_EBITM	10.3%	13.8%	33.6%	5.10
D_EBITM	9.5%	9.4%	-1.0%	-0.14

Note: This table shows results for the regression, $y_t = \gamma + \delta \times post + \epsilon_t$, where *post* is a dummy variable taking a value of 1 if $t > 2002$, and zero otherwise, and y_t represents the variable of interest. *Trade/GDP* is the ratio of overall US trade to US GDP. *FSALE/firmyear* is the annual average foreign sales per firm in millions of USD in 2003 dollars. *FSALEpct* is the percentage share of aggregate foreign sales in aggregate total sales. *F_EBITpct* is the percentage share of aggregate foreign EBIT in aggregate total EBIT. *EBITM* is the aggregate EBIT margin. *F_EBITM* is the aggregate foreign EBIT margin and *D_EBITM* is the aggregate domestic EBIT margin. "Change %" represents the percentage increase in the mean value during the post-globalization period of 2003-2019 relative to the mean during the of pre-globalization period of 1984-2002. All variables are described in Appendix A.

Table (3) Structural breaks in the time series of aggregate profit margins of S&P 500 and ex-S&P 500 firms

	S&P 500			ex-S&P 500		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*EBITM*	*F_EBITM*	*D_EBITM*	*EBITM*	*F_EBITM*	*D_EBITM*
Lagged EBITM	0.521***			0.385**		
	(0.151)			(0.158)		
Lagged F_EBITM		0.934***			0.785***	
		(0.0716)			(0.101)	
Lagged D_EBITM			0.340**			0.331*
			(0.163)			(0.163)
Constant	0.0568***	0.0100	0.0733***	0.0390***	0.0166*	0.0402***
	(0.0179)	(0.00957)	(0.0183)	(0.0112)	(0.00842)	(0.0114)
Observations	35	35	35	35	35	35
R-squared	0.265	0.837	0.117	0.153	0.649	0.111
Break Date	2003	2004	2001	2002	1992	2002
Chi2	5.657	20.09	6.342	20.65	13.17	19.23
DF	2	2	2	2	2	2
p-value	0.459	0.00113	0.368	0.000868	0.0252	0.00167

Note: Supremum Wald test (Andrews, 1993) for endogenous structural break in the time series of aggregate overall EBIT margin, foreign EBIT margin and domestic EBIT margin of S&P 500 and ex-S&P 500 firms in our sample during the period 1984-2019, using *AR1 specification. EBITM* is the aggregate overall EBIT margin. *F_EBITM* is the aggregate foreign EBIT margin and *D_EBITM* is the aggregate domestic EBIT margin. All variables are described in Appendix A. Standard errors are shown in parentheses. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level, respectively.

Table (4) Mean of aggregate financial ratios of firms during the pre (1984-2002) and post (2003-2019) regime shift periods for S&P 500 and ex-S&P 500 firms

VARIABLES	Average during 1984-2002	Average during 2003-2019	Change %	NW t-statistic
Panel A: S&P 500 firms				
FSALE/firmyear	2,383.5	5,507.0	131.0%	7.34
FSALEpct	24.5%	33.0%	34.7%	6.52
EBITM	11.1%	12.6%	13.8%	3.25
F_EBITM	10.7%	15.8%	47.4%	7.54
D_EBITM	11.3%	11.0%	-2.1%	-0.38
Panel B: ex-S&P 500 firms				
FSALE/firmyear	43.0	212.7	394.5%	7.08
FSALEpct	11.2%	24.2%	115.8%	7.61
EBITM	6.8%	6.3%	-6.8%	-0.42
F_EBITM	8.8%	7.4%	-16.2%	-1.54
D_EBITM	6.5%	5.9%	-8.9%	-0.46
Panel C: Difference-in-Differences S&P 500 and ex-S&P 500				
EBITM_diff	4.3%	6.3%	46.5%	1.86
F_EBITM_diff	2.0%	8.5%	325.0%	8.76
D_EBITM_diff	4.8%	5.1%	6.2%	0.27

Note: This table shows results for the regression, $y_t = \gamma + \delta \times post + \epsilon_t$, where *post* is a dummy variable taking a value of 1 if $t > 2002$, and zero otherwise, and y_t represents the variable of interest. *Trade/GDP* is the ratio of overall US trade to US GDP. *FSALE/firmyear* is the annual average foreign sales per firm in millions of USD in 2003 dollars. *FSALEpct* is the percentage share of aggregate foreign sales in aggregate total sales. *F_EBITpct* is the percentage share of aggregate foreign EBIT in aggregate total EBIT. *EBITM* is the aggregate EBIT margin. *F_EBITM* is the aggregate foreign EBIT margin and *D_EBITM* is the aggregate domestic EBIT margin. Panel A and Panel B present results for S&P 500 and ex-S&P 500 firms, respectively. Panel C presents regressions for the difference in each of three notions of aggregate profit margins between S&P 500 and ex-S&P 500 firms. *EBITM_diff, F_EBITM_diff* and *D_EBITM_diff* are measures of differences in *EBITM, F_EBITM* and *D_EBITM* of S&P 500 firms and ex-S&P 500 firms, respectively. "Change %" represents the percentage increase in the mean value during the post-globalization period of 2003-2019 relative to the mean during the of pre-globalization period of 1984-2002. All variables are described in Appendix A.

Table (5) Mann-Kendall trend tests for aggregate profit margins of S&P 500 and ex-S&P 500 firms

	(1)	(2)	(3)
VARIABLES	*EBITM*	*F_EBITM*	*D_EBITM*
Panel A: S&P 500 firms			
Observations	36	36	36
Kendall's tau-b	0.343	0.438	-0.0127
Kendall's score	216	276	-8
p-value	0.00341	0.00018	0.924
Panel B: ex-S&P 500 firms			
Observations	36	36	36
Kendall's tau-b	-0.429	-0.248	-0.451
Kendall's score	-270	-156	-284
p-value	0.000248	0.0348	0.000116
Panel C: All firms			
Observations	36	36	36
Kendall's tau-b	0.137	0.410	-0.216
Kendall's score	86	258	-136
p-value	0.247	0.000464	0.0659

Note: Mann-Kendall trend tests for aggregate EBIT margin, foreign EBIT margin and domestic EBIT margin for S&P 500, ex-S&P 500, and for all firms in our sample during the period 1984-2019. *EBITM* is the aggregate overall EBIT margin. *F_EBITM* is the aggregate foreign EBIT margin and *D_EBIT*M is the aggregate domestic EBIT margin. All variables are described in Appendix A.

Table (6) Intangible capital and foreign profitability

VARIABLES	Average during 1984-2002	Average during 2003-2019	Change %	NW t-statistic	Average during 1984-2002	Average during 2003-2019	Change %	NW t-statistic
	S&P 500				ex-S&P 500			
Panel A: Regressions on F_EBITM of firm-years sorted on xrd/sale ratio								
Low xrd/sale	10.9%	13.2%	20.6%	1.83	8.3%	6.4%	-22.8%	-1.78
Medium xrd/sale	8.7%	13.4%	53.2%	6.14	9.6%	8.2%	-14.1%	-1.36
High xrd/sale	12.8%	22.0%	72.2%	5.61	7.1%	7.0%	-1.3%	-0.06
High - Low xrd/sale	1.9%	8.9%	372.3%	2.67	-1.2%	0.6%	152.5%	1.23
Panel B: Regressions on F_EBITM of firm-years sorted on Totalintan/sale ratio								
Low Totalintan/sale	7.4%	13.2%	78.8%	4.89	8.3%	5.8%	-29.7%	-2.12
Medium Totalintan/sale	11.6%	13.2%	14.0%	1.85	8.7%	8.5%	-2.0%	-0.24
High Totalintan/sale	13.5%	22.4%	65.6%	7.04	9.7%	10.0%	3.1%	0.27
High - Low Totalintan/sale	6.1%	9.1%	49.5%	2.67	1.4%	4.2%	198.2%	1.82

Note: This table shows results for the regression, $y_t = \gamma + \delta \times post + \epsilon_t$, where *post* is a dummy variable taking a value of 1 if $t > 2002$, and zero otherwise, and y_t represents the variable of interest. Panel A shows the regressions on aggregate foreign EBIT margin (*F_EBITM*) for samples sorted on the ratio of R&D expense (*xrd*) to sale (*xrd/sale*) for S&P 500 and ex-S&P 500 firms in our sample during the period 1984-2019. Every year, we classify firms with no explicitly reported R&D (and thus yielding a zero value for *xrd/sale* ratio) as *Low*, with the remaining firms classified as either *Medium* (*High*) if they fall below (above) the median value of the remaining firms with non-zero *xrd/sale* for the given year. In Panel B, we run similar regressions after sorting observations based on the ratio of *Totalintan* to sales, where *Totalintan* is the sum intangible capital disclosed by firms on their balance sheets and intangible capital computed based on capitalizing past R&D expenditures and a fraction of SG&A expenses and depreciating them. "Change %" represents the percentage increase in the mean value during the post-globalization period of 2003-2019 relative to the mean during the of pre-globalization period of 1984-2002. All variables are described in Appendix A.

Table (7) Intangible Capital - S&P 500 and ex-S&P 500

VARIABLES	Average during 1984-2002	Average during 2003-2019	Change %	NW t-statistic	Average during 1984-2002	Average during 2003-2019	Change %	NW t-statistic
	S&P 500				ex-S&P 500			
Panel A: Aggregate intangible ratios								
R&D/SALE	2.4%	2.9%	20.7%	2.73	1.3%	1.9%	49.3%	3.53
MainSG&A/SALE	12.9%	13.3%	3.1%	2.19	14.3%	14.4%	0.6%	0.24
Bookintan/SALE	8.4%	30.1%	258.9%	6.2	11.7%	30.0%	157.4%	5.84
Capitalizedintan/SALE	25.5%	30.1%	18.1%	3.83	18.6%	24.2%	30.0%	6.68
Totalintan/SALE	33.9%	60.2%	77.7%	5.76	30.3%	54.2%	79.1%	6.21
Panel B: Intangible assets per firm year								
R&D	233	483	107.2%	4.72	5	17	241.5%	5.44
MainSG&A	1,239	2,204	77.9%	7.64	52	125	138.7%	6.4
Bookintan	892	5,110	472.6%	5.6	47	265	463.4%	5.81
Capitalizedintan	2,470	5,028	103.6%	5.72	69	210	205.7%	7.04
Totalintan	3,362	10,137	201.5%	5.69	116	475	310.5%	6.3

Note: This table shows results for the regression, $y_t = \gamma + \delta \times post + \epsilon_t$, where *post* is a dummy variable taking a value of 1 if $t > 2002$, and zero otherwise, and y_t represents the variable of interest. *SALE, R&D* and *MainSG&A* are aggregate sale, aggregate R&D expenses and aggregate SG&A expenses excluding R&D expenses respectively. *Bookintan* is the aggregate intangible assets reported by firms on their balance sheets. *Capitalizedintan* is the aggregate intangible assets computed by capitalizing past R&D and SG&A expenses into Knowledge Capital (KC) and Organizational Capital (OC) respectively using perpetual inventory models. *Totalintan* is the sum of *Bookintan* and *Capitalizedintan*. In Panel B, the amounts are in millions of USD deflated using the GDP deflator with base year 2003. "Change %" represents the percentage increase in the mean value during the post-globalization period of 2003-2019 relative to the mean during the of pre-globalization period of 1984-2002. All variables are described in Appendix A.

Table (8) Mean of aggregate return on capital measures of firms during the pre (1984-2002) and post (2003-2019) regime shift periods

	S&P 500			ex-S&P 500		
Average during	1984-2002	2003-2019	NW t-statistic	1984-2002	2003-2019	NW t-statistic
Panel A: TCE-scaled ratios						
EBIT/TCE	14.8%	14.3%	-0.55	9.1%	7.6%	-0.95
NI/TCE	6.6%	8.5%	3.25	1.7%	2.6%	0.78
Taxes/TCE	4.1%	3.5%	-1.27	2.8%	1.7%	-3.12
Interest/TCE	3.9%	2.1%	-6.22	4.5%	3.3%	-3.31
SALE/TCE	132.9%	113.1%	-3.58	133.2%	120.9%	-2.74
Equity/TCE	50.6%	54.3%	1.67	49.7%	48.4%	-0.78
Debt/TCE	49.4%	45.7%	-1.67	50.3%	51.6%	0.78
Panel B: Returns to equity and debtholders						
Interest/Debt	8.1%	4.6%	-4.61	9.0%	6.4%	-4.34
Payouts/Equity	11.4%	15.4%	4.18	6.7%	7.8%	1.64
NI/Equity (ROE)	13.1%	15.5%	2.36	3.5%	5.2%	0.77
Panel C: Intangible-adjusted EBITM and EBIT/TCE						
EBITM	11.1%	12.6%	3.25	6.8%	6.3%	-0.42
IA_EBITM	13.1%	14.5%	2.7	9.3%	8.5%	-0.79
EBIT/TCE	14.8%	14.3%	-0.55	9.1%	7.6%	-0.95
IA_EBIT/IA_TCE	13.1%	12.3%	-1.04	10.1%	8.0%	-1.74

Note: This table shows results for the regression, $y_t = \gamma + \delta \times post + \epsilon_t$, where *post* is a dummy variable taking a value of 1 if $t > 2002$, and zero otherwise, and y_t represents the variable of interest. Panel A presents results for return on capital measures. Panel B presents results for the return on capital ratios. Panel C presents results for capitalized intangibles-adjusted EBIT margin (*IA_EBITM*) and *EBIT/TCE* ratio (*IA_EBIT/IA_TCE*). *IA_EBITM* is computed as $\frac{\sum_i ia\_ebit_{it}}{\sum_i sale_{it}}$ and IA_EBIT/IA_TCE is computed as $\frac{\sum_i ia\_ebit_{it}}{\sum_i ia\_tce_{it}}$ where i represents the S&P 500 or ex-S&P 500 firms in the fiscal year t; and ia_ebit_{it} and ia_tce_{it} are capitalized intangible-adjusted measures of EBIT and TCE at firm-level. All variables are described in Appendix A.

Table (9) Mean of aggregate financial ratios of firms during the pre (1984-2002) and post (2003-2019) regime shift periods for sectors

	Consumer			Manufacturing			HighTech			Healthcare		
Average during	1984-2002	2003-2019	NW t-statistic	1984-2002	2003-2019	NW t-statistic	1984-2002	2003-2019	NW t-statistic	1984-2002	2003-2019	NW t-statistic
Panel A: EBIT Margins												
FSALE/firmyear	233	1037	6.1	359	1194	7.43	163	710	5.44	107	284	7.12
FSALEpct	14.4%	22.6%	7.44	25.1%	35.8%	8.07	24.6%	40.3%	7.01	26.0%	29.2%	3
EBIT Margin	7.1%	6.4%	-2.05	11.1%	11.3%	0.14	10.0%	15.1%	2.48	15.0%	15.2%	0.47
Foreign EBIT Margin	10.2%	7.6%	-3.32	9.0%	12.9%	3.92	11.4%	16.3%	2.24	17.6%	32.1%	7.73
Domestic EBIT Margin	6.6%	6.1%	-1.3	11.9%	10.3%	-1.55	9.6%	14.1%	1.87	14.2%	8.3%	-9.03
Panel B: Average over pre and post regime shift – scaled by TCE												
EBIT/TCE	14.5%	14.1%	-0.38	13.3%	12.4%	-0.52	11.4%	13.2%	0.86	19.1%	13.0%	-8.31
Net Income/TCE	5.7%	7.7%	1.81	5.4%	6.3%	0.93	4.1%	8.0%	2.38	10.3%	8.0%	-4.79
Taxes/TCE	3.9%	3.5%	-0.84	3.6%	3.4%	-0.37	4.0%	3.0%	-2.35	5.8%	3.2%	-8.14
Interest/TCE	4.8%	2.8%	-4.51	4.1%	2.6%	-6.23	3.3%	2.0%	-4.86	2.9%	1.7%	-4.65
Sale/TCE	203.1%	220.5%	1.41	118.9%	107.2%	-1.49	107.9%	88.8%	-2.76	127.6%	85.3%	-10.41
Equity/TCE	42.9%	45.6%	0.86	51.6%	53.6%	1.32	58.5%	61.2%	1.04	65.9%	61.4%	-1.71
Debt/TCE	57.1%	54.4%	-0.86	48.4%	46.4%	-1.32	41.5%	38.8%	-1.04	34.1%	38.6%	1.71
Panel C: Average over pre and post regime shift – ROE and ROD measures												
Interest/Debt	8.6%	5.1%	-4.16	8.6%	5.6%	-4.57	7.9%	5.4%	-4.03	8.4%	4.5%	-5.51
Payouts/Equity	10.7%	17.2%	4.31	10.2%	11.0%	1.03	8.3%	15.5%	5.36	14.0%	16.1%	1.77
Net Income/Equity (ROE)	13.2%	16.4%	1.72	10.5%	11.6%	0.67	7.1%	13.3%	2.19	15.6%	13.0%	-3.68

Note: This table shows results for the regression, $y_t = \gamma + \delta \times post + \epsilon_t$, where *post* is a dummy variable taking a value of 1 if $t > 2002$, and zero otherwise, and y_t represents the variable of interest. We use Fama French five industry classification for segregating into industries. All variables are described in Appendix A.

Table (10) Aggregate effective tax rates

Panel A: Mann-Kendall trend tests on the time-series of difference in ETRs between S&P 500 and ex-S&P 500

	1984-2019		2003-2019	
VARIABLES	*ETR_diff*	*ETR_diff_3MA*	*ETR_diff*	*ETR_diff_3MA*
Observations	33	32	16	15
Kendall's tau-b	0.0871	0.0605	-0.0667	-0.181
Kendall's score	46	30	-8	-19
p-value	0.486	0.638	0.753	0.373

Panel B: Supremum Wald structural break tests for S&P 500 (AR1 model)

	(1)	(2)
VARIABLES	*ETR*	*ETR_3MA*
Lagged ETR	0.849***	
	(0.116)	
Lagged ETR_3MA		1.015***
		(0.0703)
Constant	0.0447	-0.0121
	(0.0404)	(0.0245)
Observations	35	33
R-squared	0.620	0.870
Break Date	2009	2010
Chi2	13.76	11.02
DF	2	2
p-value	0.0196	0.0625

Note: Panel A of this table shows the results of Mann-Kendall trend tests for the time-series of difference in aggregate Effective Tax Rates (*ETR*) between S&P 500 firms and ex-S&P 500 firms in our sample during 1984-2019. Panel B of this table shows the results of Supremum Wald structural break tests for the aggregate effective tax rate measures of the S&P 500 group of firms during the period 1984-2019, specified as AR1 models. *ETR_3MA* is the three-year moving average of ETR. *ETR_diff* is the difference between ETR measure of S&P 500 and ex-S&P 500 firms. *ETR_diff_3MA* is the difference between *ETR_3MA* of S&P 500 firms and ex-S&P 500 firms. Standard errors are shown in parentheses. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level, respectively. All variables are described in Appendix A.

Table (11) Alternate measures of profit margins for S&P 500 firms

Panel A: Supremum Wald structural break-tests (AR1 models)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	*PIM*	*F_PIM*	*D_PIM*	*OPM*	*F_OPM*	*D_OPM*	*F_PIpct*
Lagged PIM	0.698***						
	(0.128)						
Lagged F_PIM		0.953***					
		(0.0635)					
Lagged D_PIM			0.441***				
			(0.157)				
Lagged OPM				0.827***			
				(0.0969)			
Lagged F_OPM					0.944***		
					(0.0681)		
Lagged D_OPM						0.589***	
						(0.141)	
Lagged F_PIpct							0.842***
							(0.0890)
Constant	0.0287**	0.00662	0.0478***	0.0212*	0.00923	0.0461***	0.0595*
	(0.0122)	(0.00727)	(0.0137)	(0.0113)	(0.00894)	(0.0158)	(0.0316)
Observations	35	35	35	35	35	35	35
R-squared	0.472	0.872	0.194	0.688	0.853	0.345	0.730
Break Date	2003	2004	1994	2002	2004	2001	2004
Chi2	9.094	24.08	4.899	6.565	16.86	7.826	16.98
DF	2	2	2	2	2	2	2
p-value	0.135	0.000173	0.575	0.342	0.00495	0.219	0.00468

Continued on next page

Table 11 – *Continued from previous page*

Panel B: Change in mean of financial ratios across regime shift subperiods

VARIABLES	Average during 1984-2002	Average during 2003-2019	Change %	NW t-statistic
PIM	8.1%	10.8%	32.2%	4.7
F_PIM	8.3%	14.2%	70.2%	8.49
D_PIM	8.1%	9.1%	11.4%	1.33
OPM	10.7%	12.7%	18.5%	4.95
F_OPM	10.4%	15.7%	51.0%	7.85
D_OPM	11.0%	11.3%	1.9%	0.39
F_PIpct	25.4%	43.8%	72.3%	7.76

Note: Panel A of this table shows the results Supremum Wald test (Andrews, 1993) for endogenous structural break in the time series of variables. *PIM, F_PIM* and *D_PIM (OPM, F_OPM* and *D_OP*M) are aggregate overall, domestic, and foreign pretax (operating) income margins. *F_Pipct* is the ratio of aggregate foreign pretax income to total pretax income. Panel B of This table shows results for the regression, $y_t = \gamma + \delta \times post + \epsilon_t$, where *post* is a dummy variable taking a value of 1 if $t > 2002$, and zero otherwise, and y_t represents the variable of interest. Standard errors are shown in parentheses. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level, respectively. All variables are described in Appendix A.

Online Appendices

for

Globalization and Profitability of US Firms: The Role of Intangibles

By Bullipe R. Chintha, Ravi Jagannathan and Sri S. Sridhar[38]

Online Appendix: Index

Online Appendix A: Constructing Aggregate Measures

First, we merge the Compustat data with Compustat geographic segments data during our sample period 1984-2019. We drop firm years with missing or non-positive values of book assets or sales. We further restrict our sample to firms whose common shares were traded on NYSE, AMEX or NASDAQ.[39] We classify firms into two groups, those that are in the S&P 500 index (S&P 500 firms) and others (ex-S&P firms) for each year.[40]

Second, we exclude financial firms and aggregate the accounting data across all remaining firms in each of our two major sets of firms, S&P 500 firms, and ex-S&P firms, for each year.[41] Aggregating firm level data for all firms, S&P 500 firms, and ex-S&P 500 firms, gives us a time series of aggregate financial statements for 36 years, starting in 1984 and ending in 2019.[42] We begin our sample from fiscal year 1984 because of data availability on foreign pretax income. Our sample period ends in 2019 to abstract away from the confounding effects of Covid 19 pandemic.[43]

[39]This step excludes American Depositary Receipts (ADRs) from our sample.

[40]In some instances, the calendar year does not coincide with the fiscal year of a firm. In such cases, we match the fiscal year of the firm to a calendar year as follows. If a firm's fiscal year ends between January and May of calendar year t, the firm's fiscal-year financial data is classified as belonging to calendar year $t-1$. Alternatively, if a company's fiscal year ends between June and December of calendar year t, the company's fiscal-year financial data is classified as belonging to calendar year t. This is also the approach used by Compustat to define the variable, fiscal-year (*fyear*). We find that more than 60% of the firms in our Compustat sample have a December fiscal year-end, as shown in Panel A of Figure OA1 in the online appendix. Firms with December fiscal year-ends contribute to more than 70% of the aggregate sales. We also validate our annual, audited aggregate data for S&P 500 firms with that of Shiller's quarterly (and, hence, unaudited) aggregates (see http://www.econ.yale.edu/ shiller/data.htm). Table OA2 in the online appendix provides a detailed discussion of the validation test with Shiller's S&P 500 index earnings series.

[41]Since financial firms are not required to provide results from their foreign operations, we exclude them from our sample. Moreover, several accounting line-item definitions are not the same for financial and non-financial firms.

[42]The aggregate for any given variable, say, EBIT margin ($EBITM$) for any given set of firms for a given year is derived by the sum of $EBIT$ for all firms in that set to the sum of sales for all firms in that set for that year, for e.g., $EBITM_t = \frac{\sum_i ebit_{it}}{\sum_i sale_{it}}$, where subscript "$i$" refers to the firm and "t" refers to the time period, i.e., year. One can derive aggregates of other variables, e.g., foreign and domestic $EBITM$, in a similar manner. We present the aggregate balance sheet, income statement and cash flow statement for S&P 500 and ex-S&P 500 firms for years 1984 and 2019 in Tables OA5, OA6 and OA7 in the online appendix.

[43]The number of firms in our sample steadily increase from 4,712 in year 1984 to reach a peak of 6,651

Our final sample before aggregation consists of 165,399 non-financial firm-years across the sample period of 1984-2019 (13,753 S&P 500 firm-years and 151,646 ex-S&P 500 firm-years). As is well known, S&P 500 firms are much larger than those of ex-S&P 500 firms. S&P 500 firms have a mean (median) sale of $13.3 ($5.5) billion compared to a mean (median) of $0.55 ($0.08) billion for ex-S&P 500 firms. The mean (median) total book assets of S&P 500 firms at $17.7 (6.5) billion dwarfs that of $0.66 ($0.08) billion of the ex-S&P 500 firms.[44]

For estimating foreign and domestic operating profit measures, we allocate the net interest expense, special profit items and non-operating income across domestic and foreign pretax incomes based on the domestic and foreign share of the total sales of the firm.[45]

Foreign pretax income (*fpi*) data is available in Compustat beginning 1984.[46] We derive the domestic pretax income as the difference between the reported overall pretax income (*pi*) and foreign pretax income (*fpi*). We then add back any interest expenses to each of foreign and domestic EBIT components, where such geographic segment-wise interest expense is estimated by allocating the total interest expense (*xint*) to domestic and foreign operations based on their respective share of sales. Foreign sales (*fsale*) and domestic from Compustat geographic

in year 1996 after which the number falls to about 2,861 in the year 2019 as illustrated in Table OA3 in the online appendix. These numbers are in line with Doidge et al. (2017)'s finding that 1996 was the year of the listing peak for US firms.

[44]Table OA4 in Appendix B (online) provides more descriptive statistics for S&P 500 firms and ex-S&P 500 firms.

[45]OPM is computed as $\frac{\sum_i (ebit_{it} - (nopi_{it} + spi_{it}))}{\sum_i sale_{it}}$, *F_OPM* is computed as $\frac{\sum_i \left(f\_ebit_{it} - (nopi_{it} + spi_{it}) \times \left(\frac{fsale_{it}}{sale_{it}}\right)\right)}{\sum_i fsale_{it}}$ and *D_OPM* is computed as $\frac{\sum_i \left(d\_ebit_{it} - (nopi_{it} + spi_{it}) \times \left(\frac{sale_{it} - fsale_{it}}{sale_{it}}\right)\right)}{\sum_i (sale_{it} - fsale_{it})}$, where i is the unit of aggregation (S&P 500 constituents) in a fiscal year t.

[46]The SEC regulation § 210.4–08 requires that "Disclosure shall be made in the income statement or a note thereto, of (i) the components of income (loss) before income tax expense (benefit) as either domestic or foreign. . . ". The regulation comes with a materiality condition which states that "Amounts applicable to foreign income (loss) and amounts applicable to foreign or other income taxes which are less than five percent of the total of income before taxes or the component of tax expense, respectively, need not be separately disclosed."

segments data, as the sum of all non-domestic segment sales reported by each firm. The definitions of all variables are provided in Appendix A.

Table (OA1) Firms in our sample

Sample	No. of observations	
Panel A: Criteria/filter used in sample construction (Compustat Annual fundamentals database)		
Firm-years with common stocks (share codes 10 or 11) trading on the NYSE, AMEX, and/or NASDAQ, for fiscal years between 1984 and 2019. We do not consider American Depositary Receipts (ADRs) as common shares. We obtain stock market variables like share price, exchange codes, and share codes from Compustat/CRSP merged database.	232,790	
Drop if missing, zero or negative values of total assets and sale (-)	23,767	
Drop financial firms identified by FF-11 category (-)	36,169	
Drop if profit data is missing (-)	22	
Panel B: Merging Compustat annual fundamentals with geographic segments data		
Drop if firms report negative foreign sale or foreign sale greater than total sale (-)	1,080	
Drop if firms report non-zero pretax income from foreign operations but report zero foreign sale or non-missing, non-zero pretax income but missing foreign sale (-)	6,353	
Final sample	165,399	
	S&P 500	ex-S&P 500
Final sample	13,753	151,646

Note: We identify firms in the S&P 500 index based on CRSP data, using a modified version of the python code written by wrds staff member Freda Song Drechsler available at https://www.fredasongdrechsler.com/intro-to-python-for-fnce/sp500-constituents.

Table (OA2) Validation using Shiller's S&P 500 index earnings.

Fiscal year	*Shillers_E*	*Agg_ni/S&P500id*
1984	16.6	17.7
1985	14.6	15.8
1986	14.5	14.7
1987	17.5	18.7
1988	23.8	24.4
1989	22.9	23.5
1990	21.3	22.1
1991	16.0	17.7
1992	19.1	19.2
1993	21.9	22.7
1994	30.6	31.2
1995	34.0	34.6
1996	38.7	37.7
1997	39.7	40.9
1998	37.7	41.4
1999	48.2	51.2
2000	50.0	48.6
2001	24.7	22.3
2002	27.6	27.3
2003	48.7	51.2
2004	58.6	58.9
2005	69.8	69.4
2006	81.5	80.6
2007	66.2	66.7
2008	14.9	26.6
2009	51.0	56.1
2010	77.4	85.0
2011	87.0	90.5
2012	86.5	87.2
2013	100.2	102.9
2014	102.3	100.9
2015	86.5	86.6
2016	94.6	97.7
2017	109.9	111.7
2018	132.4	114.3
2019	139.5	144.1
Correlation		99.50%

Note: In order to validate our methodology for constructing aggregate financial statements, we compare the net income time series of our aggregate financial statements (including financial firms) with the time series of earnings for the S&P 500 index constructed by Shiller (see Shiller (2015) for details), available at Professor Shiller's website - http://www.econ.yale.edu/∼shiller/data.htm. To compare both time-series, we need to account for the S&P 500 index divisor. We estimate the value of S&P 500 index divisor (*S&P500id*) at the end of each calendar year as the ratio of market capitalization of the S&P 500 firms to the value of the S&P 500 index at the end of each calendar year. We construct the adjusted net income time-series by dividing aggregate net income (*Agg_ni*) from our aggregate financial statements with the *S&P500id* for each year and compare the adjusted time-series (*Agg_ni/S&P500id*) with the Shiller's S&P 500 earnings (*Shillers_E*) time-series.

Table (OA3) Distribution of firms across years

Fiscal year	# Firms in our sample
1984	4,712
1985	4,984
1986	5,149
1987	5,103
1988	4,956
1989	4,884
1990	4,974
1991	5,099
1992	5,426
1993	5,714
1994	5,996
1995	6,636
1996	6,748
1997	6,603
1998	6,651
1999	6,260
2000	5,742
2001	5,217
2002	4,912
2003	4,661
2004	4,522
2005	4,369
2006	4,166
2007	3,917
2008	3,724
2009	3,604
2010	3,443
2011	3,336
2012	3,271
2013	3,194
2014	3,107
2015	2,991
2016	2,876
2017	2,802
2018	2,789
2019	2,861
Total firm years	165,399

Table (OA4) Summary statistics for subsamples of S&P 500 and ex-S&P 500 firms

	N	Mean	p25	Median	p75	Std. Dev.
			S&P 500			
Sales	13,753	12,713	2,610	5,642	12,312	24,874
Book Assets	13,753	16,580	2,871	6,707	16,359	37,813
Book Equity	13,753	5,640	1,122	2,389	5,638	12,183
R&D expenditure	13,753	343	0	18	206	1,075
			ex-S&P 500			
Sales	1,51,646	532	16	86	406	1,876
Book Assets	1,51,646	628	19	88	405	2,833
Book Equity	1,51,646	209	6	36	162	1,115
R&D expenditure	1,51,646	9	0	0	4	56

Note: The amounts are in millions of USD deflated using the GDP deflator with base year 2003.

Table (OA5) Aggregate balance sheets - S&P 500 and ex-S&P 500

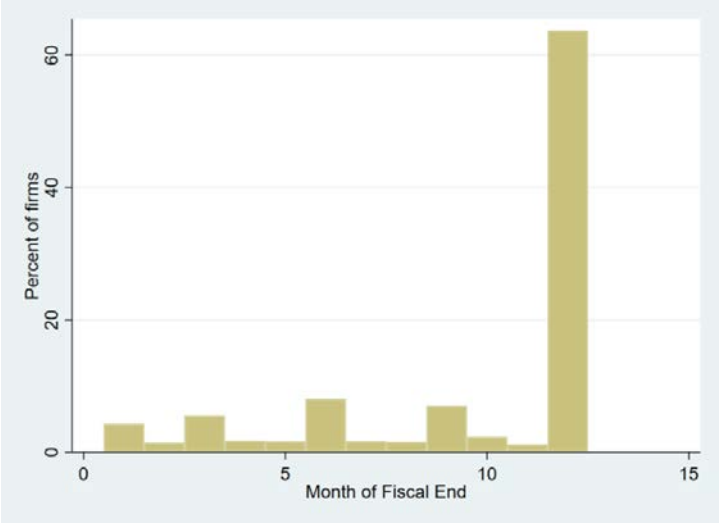
Amounts in $ millions	S&P 500		ex-S&P 500	
	1984	2019	1984	2019
Cash And Short-Term Investments	112,121	1,570,409	50,644	425,891
Receivables - Total	239,013	1,263,349	100,461	485,584
Inventories - Total	235,251	833,567	94,719	338,284
Current Assets - Other	36,656	331,945	12,967	123,136
Current Assets - Total	623,041	3,999,270	259,209	1,372,894
Property, Plant, And Equipment - Total (Net)	1,068,418	4,619,128	422,697	1,884,592
Investments And Advances - Equity Method	77,112	299,677	11,410	75,781
Investments And Advances - Other	76,607	795,073	31,630	89,268
Intangibles	27,706	3,883,849	12,930	1,324,797
Assets - Other	64,421	848,843	34,081	225,005
Assets - Total	1,937,305	14,445,840	772,053	4,972,338
Debt In Current Liabilities	83,655	659,846	34,266	179,434
Accounts Payable	164,186	1,007,520	64,402	312,396
Income Taxes Payable	44,063	51,926	9,703	15,123
Current Liabilities - Other	162,572	1,316,871	52,954	437,441
Current Liabilities - Total	454,475	3,036,163	161,488	944,387
Long-Term Debt - Total	407,461	4,134,039	216,370	1,796,593
Liabilities - Other	76,575	1,572,729	28,300	441,910
Deferred Taxes and Investment Tax Credit	157,677	632,052	51,848	177,965
Liabilities - Total	1,096,188	9,374,982	457,843	3,360,855
Preferred Stock - Carrying Value	34,019	28,182	27,135	57,824
Common Equity	798,662	4,874,575	283,147	1,479,541
Total Shareholders' Equity	832,681	4,902,757	310,383	1,537,471

Table (OA6) Aggregate income statements - S&P 500 and ex-S&P 500

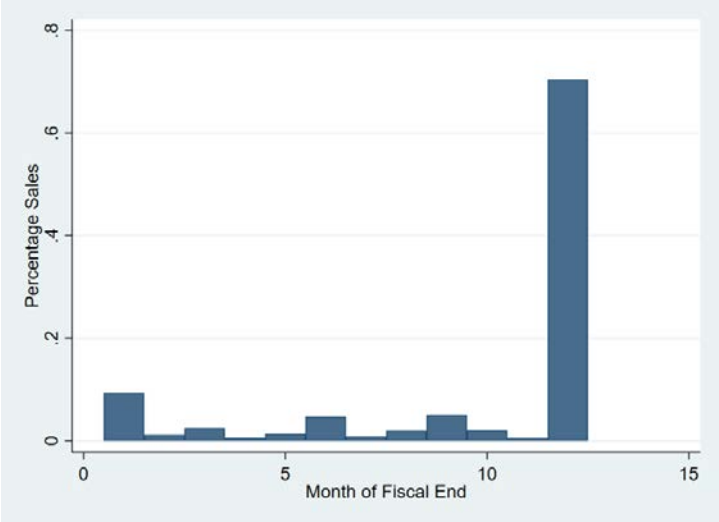
Amounts in $ millions	S&P 500		ex-S&P 500	
	1984	2019	1984	2019
Sales	2,070,265	9,202,821	797,208	3,547,551
Cost Of Goods Sold (-)	1,468,200	5,858,993	591,126	2,472,665
Selling, General and Administrative Expense (-)	285,436	1,546,627	102,645	652,743
Operation Income Before Depreciation	316,630	1,797,201	103,437	422,143
Depreciation And Amortization (-)	101,268	540,214	32,274	212,951
Operation Income After Depreciation	215,362	1,256,987	71,163	209,192
Nonoperating Income (+)	37,837	86,053	12,015	17,278
Special Income (+)	(2,452)	(125,258)	(3,307)	(75,174)
Earnings Before Interest and Taxes (EBIT)	250,748	1,217,782	79,871	151,150
Interest Expense (-)	55,311	169,410	26,488	98,414
Pretax Income (PI)	195,437	1,048,372	53,383	52,736
Income Taxes - Total (-)	81,380	180,412	23,018	19,800
Minority Interest (-)	906	8,514	268	3,771
Income Before Extraordinary Items (Net Income)	113,152	859,446	30,096	29,164

Table (OA7) Aggregate cash flow statements- S&P 500 and ex-S&P 500

Amounts in $ millions	S&P 500		ex-S&P 500	
	1984	2019	1984	2019
Income Before Extraordinary Items	111,780	867,960	29,487	33,088
Depreciation And Amortization (+)	103,378	578,352	33,238	229,265
Extraordinary Items and Discontinued Operations (+)	2,716	(3,352)	1,718	(619)
Deferred Taxes (+)	16,353	(20,883)	6,663	(14,817)
Equity In Net Loss (+)	(2,119)	2,094	(63)	998
Sale Of PPE And Sale of Investments - Loss (+)	-	(31,131)	-	(7,677)
Funds From Operations - Other (+)	10,758	126,736	2,001	114,184
Accounts Receivable - Decrease (+)	-	(34,816)	-	(9,145)
Inventory - Decrease (+)	-	(55,267)	-	(2,585)
Accounts Payable & Accrued Liabilities - Increase (+)	-	23,197	-	(1,267)
Income Taxes - Accrued - Increase (+)	-	(1,211)	-	(1,595)
Assets And Liabilities - Other (+)	-	(17,525)	-	(1,239)
Operating Activities - Net Cash Flow	242,865	1,434,154	73,044	338,631
Increase In Investments (-)	7,648	690,756	10,659	84,231
Sale Of Investments (+)	3,413	807,352	8,598	63,166
Short-Term Investments - Change (+)	-	17,314	-	(2,596)
Capital Expenditures (-)	176,515	617,126	67,554	254,086
Sale Of Property, Plant, And Equipment (+)	10,945	26,721	5,949	18,640
Acquisitions (-)	46,025	214,114	9,630	138,591
Investing Activities - Other (+)	-	32,647	-	38,990
Investing Activities - Net Cash Flow	(215,830)	(637,962)	(73,296)	(358,772)
Sale Of Common and Preferred Stock (+)	16,505	73,301	12,930	92,448
Purchase Of Common and Preferred Stock (-)	23,039	484,533	5,817	68,797
Cash Dividends (-)	53,679	352,757	15,575	54,263
Long-Term Debt - Issuance (+)	77,176	1,010,130	49,998	791,948
Long-Term Debt - Reduction (-)	45,654	819,938	31,509	692,023
Changes In Current Debt (+)	1,631	(18,174)	(1,669)	4,062
Financing Activities - Other (+)	-	(26,665)	-	(23,674)
Excess tax benefit of stock options (+)	-	-	-	(2)
Financing Activities - Net Cash Flow	(27,060)	(618,637)	8,357	49,722



(a) Panel A: Number of firms and the month of fiscal end



(b) Panel B: Percentage of overall sales and the month of fiscal end

Figure (OA1) Percentage of firm-years and aggregate sales based on fiscal year end

Note: The x-axis represents the months of a year from January to December as 1-12.

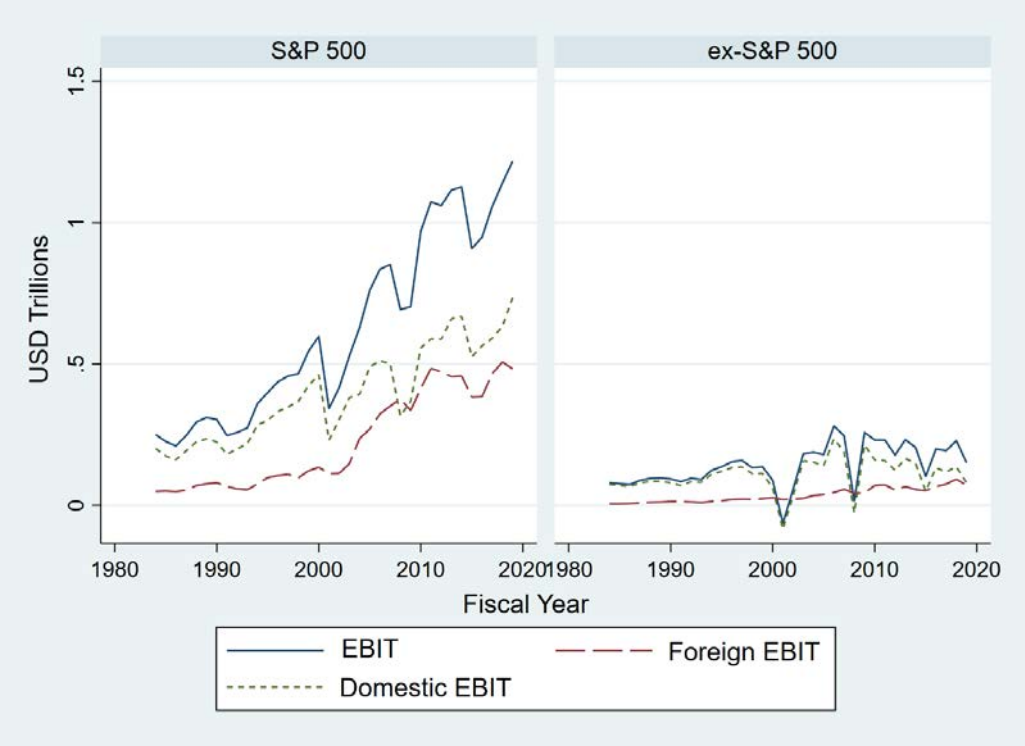


Figure (OA2) Aggregate EBIT, foreign EBIT, and domestic EBIT – S&P 500 and ex-S&P 500 firms

Note: Aggregate EBIT, foreign EBIT and domestic EBIT are in trillions of US dollars. All variables are described in Appendix A.

Online Appendix B: Structural break tests- Alternate specification

Table (OB1) Endogenous structural break tests for relevant variables - all firms, Constant only specification

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*Trade/GDP*	*FSALEpct*	*F_EBITpct*	*EBITM*	*F_EBITM*	*D_EBITM*
Constant	0.237***	0.250***	0.305***	0.101***	0.120***	0.0941***
	(0.00728)	(0.00948)	(0.0184)	(0.00270)	(0.00388)	(0.00303)
Observations	36	36	36	36	36	36
R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Break Date	2005	2004	2001	2005	2004	2000
Chi2	90.02	157.3	101.1	4.924	66.73	4.275
DF	1	1	1	1	1	1
P Value	0	0	0	0.255	0	0.335

Note: Supremum Wald test (Andrews, 1993) for endogenous structural breaks in the times series of relevant variables in our sample during the period 1984-2019, specified as constant-only models. *Trade/GDP* is the ratio of overall US trade to US GDP. *FSALEpct* is the percentage share of aggregate foreign sales in aggregate total sales. *F_EBITpct* is the percentage share of aggregate foreign EBIT in aggregate overall EBIT. *EBITM* is the aggregate EBIT margin. *F_EBITM* is the aggregate foreign EBIT margin and *D_EBITM* is the aggregate domestic EBIT margin. Standard errors are shown in parentheses. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level, respectively. All variables are described in Appendix A.

Table (OB2) Endogenous structural break tests for aggregate profit margins of S&P 500 and ex-S&P 500 firms, Constant only specification

	S&P 500			ex-S&P 500		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*EBITM*	*F_EBITM*	*D_EBITM*	*EBITM*	*F_EBITM*	*D_EBITM*
Constant	0.118***	0.131***	0.111***	0.0655***	0.0811***	0.0622***
	(0.00257)	(0.00502)	(0.00274)	(0.00434)	(0.00341)	(0.00503)
Observations	36	36	36	36	36	36
R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Break Date	2005	2004	2001	1998	1992	1998
Chi2	13.72	149.1	3.172	11.13	85.80	9.935
DF	1	1	1	1	1	1
P Value	0.00459	0	0.519	0.0155	0	0.0272

Note: Supremum Wald test (Andrews, 1993) for endogenous structural break in the time series of aggregate overall EBIT margin, foreign EBIT margin and domestic EBIT margin of S&P 500 and ex-S&P 500 firms in our sample during the period 1984-2019, specified as constant only models. *EBITM* is the aggregate EBIT margin. *F_EBITM* is the aggregate foreign EBIT margin and *D_EBITM* is the aggregate domestic EBIT margin. Standard errors are shown in parentheses. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level, respectively. All variables are described in Appendix A.

Changing composition of S&P 500 firms

The constituents of S&P 500 index change every quarter based on several factors including changes in firms' market capitalization, firms' changing fortunes, being the subject matter of a takeover, etc. These changes in constitution of the S&P 500 index may be negligible at a quarterly or a yearly horizon, but over a period of multiple decades that our sample period spans, the changes in composition of the S&P 500 have the potential to affect the interpretation of our results.

To examine if the structural breaks and OLS regressions in Tables 3 and 4 are robust to changing composition of the S&P 500 index during our sample period, we devise a modified S&P 500 index by fixing the S&P 500 constituents constant as in the fiscal year 2002 (i.e., as on the last year of the pre-regime shift period) for our entire sample period 1984-2019. This ensures that none of the firms which moved freshly to S&P 500 in the fiscal years 2004-2019 are part of the data used to build the modified profit margin timeseries.[47]

If the structural breaks observed in Table 3 for the S&P 500 index are arising because of the change in composition of the S&P 500 index in the subsequent years, then we do not expect to see the observed structural breaks in this new time-series which restricts the sample to firms to the S&P 500 constituents as of the year 2002. The Supremum Wald tests and dummy variable regression results for the fixed-composition S&P 500 index are given in Panels A and B of Table OC1 in the online appendix, respectively.

Panel A of this Table OC1 identifies that the *F_EBITM* of the fixed-composition S&P 500 index exhibiting a statistically significant structural break in the year

[47] This fixed composition for the S&P 500 index would exclude recent heavyweights including Alphabet Inc, Amazon Inc and Facebook Inc, which were not part of the S&P 500 index as of 2002. Figure OD2 of the online appendix illustrates the number of non-financial S&P 500 firms across 1984-2019 for our "fixed" composition sample before the aggregation of the financial statements.

2004. Further, Panel B of the same table finds that the fixed-composition S&P 500 mean *F_EBITM* increases significantly from 10.9% during 1984-2002 to 15.9% during 2003-2019.

Interestingly, *D_EBITM* of fixed-composition S&P 500 also exhibits a significant structural break in 2001. However, from Panel B of Table OC1, we observe that the *D_EBITM* decreases by 9.9% across the regime shift period. These tests collectively show that the results we obtained in Tables 3 and 4 were not driven by changes in the composition of S&P 500 index during our sample period.

Table (OC1) Fixed composition of S&P 500 sample

Panel A: Supremum Wald structural break-tests (AR1 models)			
	(1)	(2)	(3)
VARIABLES	EBITM	F_EBITM	D_EBITM
Lagged EBITM	0.337**		
	(0.164)		
Lagged F_EBITM		0.910***	
		(0.0790)	
Lagged D_EBITM			0.283*
			(0.165)
Constant	0.0806***	0.0135	0.0820***
	(0.0200)	(0.0106)	(0.0192)
Observations	35	35	35
R-squared	0.114	0.801	0.082
Break Date	2009	2004	2001
Chi2	5.825	19.88	17.45
DF	2	2	2
p-value	0.436	0.00124	0.00378

Panel B: Change in mean of financial ratios across regime shift subperiods				
VARIABLES	Average during 1984-2002	Average during 2003-2019	Change %	NW t-statistic
EBITM	11.7%	12.6%	7.7%	1.95
F_EBITM	10.9%	15.9%	45.9%	7.95
D_EBITM	12.1%	10.9%	-9.9%	-1.97

Note: For creating the fixed composition S&P 500 sample, we restrict the firms in our sample to S&P 500 constituents in the fiscal year 2002. Panel A shows Supremum Wald test (Andrews, 1993) for endogenous structural break in the time series of aggregate overall EBIT margin, foreign EBIT margin and domestic EBIT margin of the fixed-composition S&P 500 during the period 1984-2019, using *AR1 specification. EBITM* is the aggregate overall EBIT margin. *F_EBITM* is the aggregate foreign EBIT margin and *D_EBITM* is the aggregate domestic EBIT margin. Panel B shows results for the regression, $y_t = \gamma + \delta \times post + \epsilon_t$, where *post* is a dummy variable taking a value of 1 if $t > 2002$, and zero otherwise, and y_t represents the variable of interest. All variables are described in Appendix A. Standard errors are shown in parentheses. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level, respectively.

Disclosure of foreign pretax income

In our main results, we assume that foreign pretax income (*fpi*) is zero if firms do not report the same. We examine whether our results are sensitive to this assumption as follows. We build two alternate samples of S&P 500 firms, aggregate the respective financial statements, and run structural break tests and examine the mean of the variables during the pre and post regime shift periods. In the first sample, we drop S&P 500 firm-years whenever the variable *fpi* is missing and report the results in columns 1-3 of Table OC2 in online appendix. In the second sample, we assume that all firm-years where *fpi* data is not available, are at the threshold of the materiality condition (5% of respective overall pretax income) and report the results in columns 4-6 of Table OC2.

In Panel A of Table OC2 in online appendix, for the first sample, the test is able to detect a structural break for *F_EBITM* in 2003 but it is not statistically significant and for the second sample, we observe a statistically significant structural break in the year 2004. In Panel B of Table OC2 in online appendix, consistent with our results in Table 4, we find that the mean of *F_EBITM* exhibits statistically significant increase across the pre and post regime shift periods for each of the two sample sets. Further, as expected, mean *EBITM* increased over the regime shift significantly, but we couldn't detect significant changes in *D_EBITM* across the regime shift. These results in Table OC2 are consistent with what we obtained in Tables 3 and 4, suggesting that growth in *F_EBITM* across the regime shift established by Tables 3 and 4 are not driven by the materiality conditions imposed by disclosure requirements for geographic segment data such as foreign pretax income, *fpi*.

Table (OC2) Materiality condition for foreign income disclosures

Panel A: Supremum Wald structural break-tests (AR1 models)

	Drop observations where pifo is missing			*pifo is at threshold (5%) if pifo is missing*		
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	*EBITM*	*F_EBITM*	*D_EBITM*	*EBITM*	*F_EBITM*	*D_EBITM*
Lagged EBITM	0.484***			0.521***		
	(0.154)			(0.151)		
Lagged F_EBITM		0.875***			0.936***	
		(0.0919)			(0.0706)	
Lagged D_EBITM			0.318*			0.418**
			(0.164)			(0.158)
Constant	0.0609***	0.0190	0.0720***	0.0568***	0.00962	0.0565***
	(0.0183)	(0.0135)	(0.0176)	(0.0179)	(0.00932)	(0.0155)
Observations	35	35	35	35	35	35
R-squared	0.229	0.733	0.102	0.265	0.842	0.175
Break Date	2004	2003	2001	2003	2004	2010
Chi2	5.014	8.103	3.235	5.657	21.15	1.551
DF	2	2	2	2	2	2
P Value	0.557	0.197	0.853	0.459	0.000689	1

Panel B: Change in mean of aggregate profit margins across regime shift subperiods

	VARIABLES	Average during 1984-2002	Average during 2003-2019	Change %	NW t-statistic
Drop observations where pifo is missing	*EBITM*	11.1%	12.5%	12.6%	2.88
	F_EBITM	13.1%	16.3%	24.4%	4.39
	D_EBITM	10.6%	10.6%	0.0%	0.87
pifo is at threshold (5%) if pifo is missing	*EBITM*	11.1%	12.6%	13.5%	3.25
	F_EBITM	10.5%	15.8%	50.5%	7.86
	D_EBITM	9.5%	9.6%	1.1%	0.87

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Table OC2 – *Continued from previous page*

Note: Panel A shows Supremum Wald test (Andrews, 1993) for endogenous structural break in the time series of aggregate overall EBIT margin, foreign EBIT margin and domestic EBIT margin based on alternate assumptions to treating missing foreign pretax income disclosures during the period 1984-2019, using *AR1 specification.* *EBITM* is the aggregate overall EBIT margin. *F_EBITM* is the aggregate foreign EBIT margin and *D_EBITM* is the aggregate domestic EBIT margin. Panel B shows results for the regression, $y_t = \gamma + \delta \times post + \epsilon_t$, where *post* is a dummy variable taking a value of 1 if $t > 2002$, and zero otherwise, and y_t represents the variable of interest. "Change %" represents the percentage increase in the mean value during the post-globalization period of 2003-2019 relative to the mean during the of pre-globalization period of 1984-2002. Standard errors are shown in parentheses. We use ***, **, and * to denote significance at the 1%, 5%, and 10% level, respectively. All variables are described in Appendix A.

Online Appendix D: Additional Figures and Tables

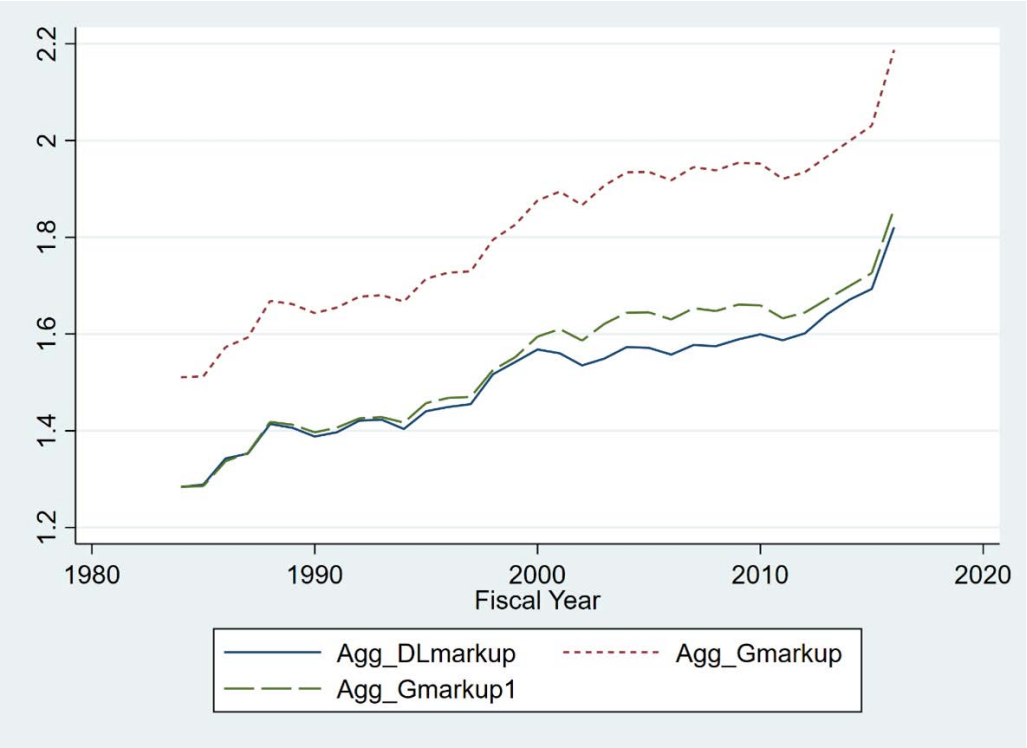

Figure (OD1) De Loecker et al. (2020) markups vs. Aggregate gross markups

Note: This figure illustrates the time-series of the aggregate De Loecker et al. (2020) markup and aggregate gross margin-based markups estimated from our sample during the period 1984-2016 for the S&P 500 firms. Agg_DLmarkup is the sales-weighted De Loecker et al. (2020) markup measure, defined as the product of output elasticity and the inverse of variable input's revenue share. We estimate these markups based on the code provided at Harvard dataverse (`https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/5GH8XO`). Agg_Gmarkup is the sales-weighted average of gross markup, computed as $1/(1\text{-}gm)$, where gm is the gross margin of a firm year (Assumes a time-invariant output elasticity of 1 for all firm years). Agg_Gmarkup1 is the sales-weighted average of gross markup computed as the product of time-invariant fixed output elasticity of 0.85 (The average estimate in De Loecker et al. (2020) and $1/(1\text{-}gm)$.

Figure (OD2) Number of S&P 500 firms (non-financial) in the S&P 500 fixed-composition sample

Note: In this sample, we fix the composition of the S&P 500 index in the year 2003 and restrict our S&P 500 sample before and after the year 2002 to availability of only these firms in our panel.

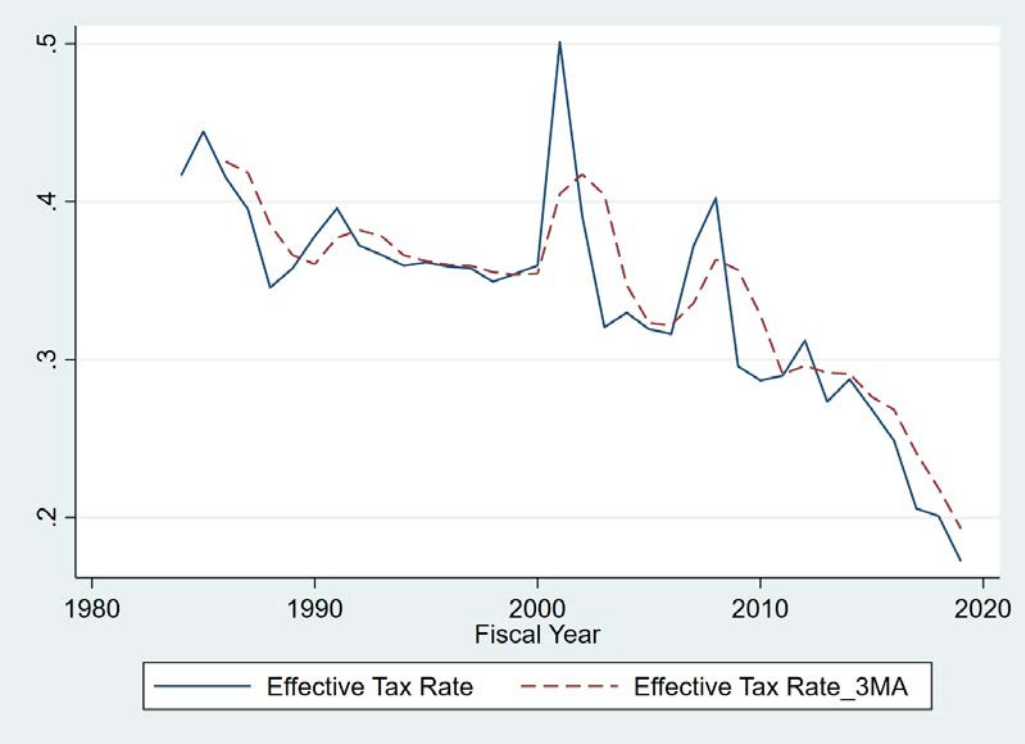

Figure (OD3) Time series of aggregate Effective Tax Rates of S&P 500 firms

Note: *ETR* is the time-series of the aggregate Effective Tax Rates and *ETR_3MA* is the three-year moving average of the Effective Tax Rates for S&P 500 firms. All variables are described in Appendix A.

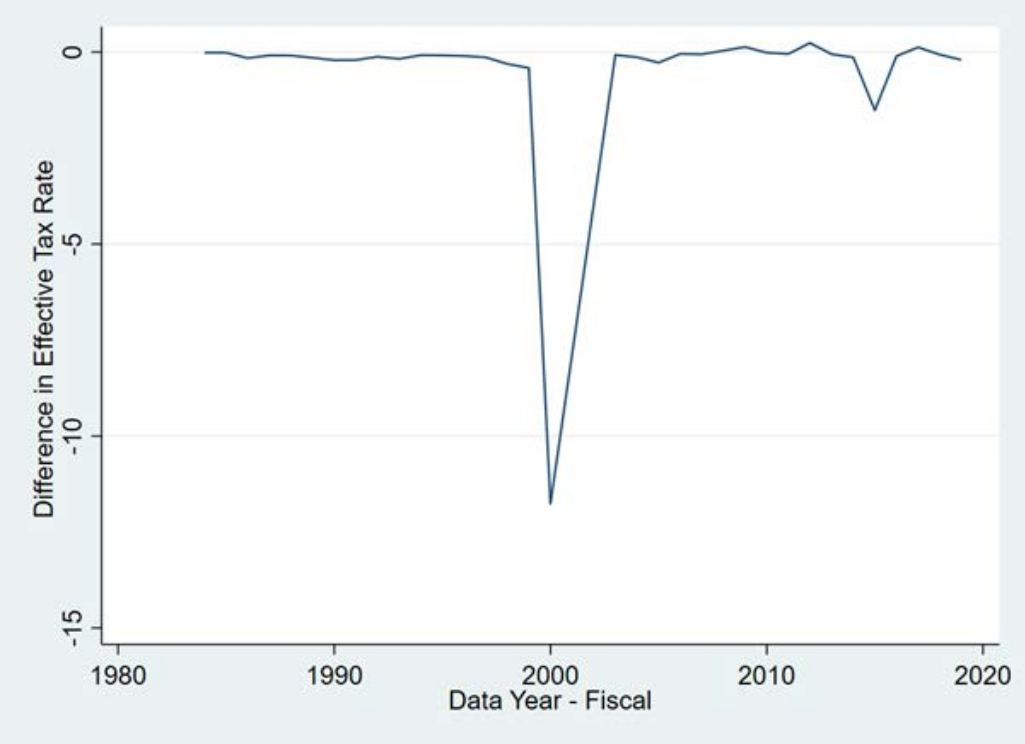

Figure (OD4) Time series of difference in aggregate Effective Tax Rates of S&P 500 and ex-S&P 500 firms

Note: ETR_diff is the time series of the difference in aggregate Effective Tax Rates of S&P 500 and ex-S&P 500 firms. All variables are described in Appendix A.

Table (OD1) Intangible Capital – Fama French sectors

VARIABLES	Average during 1984-2002	Average during 2003-2019	Change %	NW t-statistic	Average during 1984-2002	Average during 2003-2019	Change %	NW t-statistic
		Consumer				Manufacturing		
R&D/SALE	1.0%	1.0%	-1.0%	-0.12	1.4%	1.1%	-16.4%	-3.94
MainSG&A/SALE	15.6%	15.7%	0.6%	0.46	8.7%	7.6%	-11.8%	-3.26
Bookintan/SALE	8.3%	16.0%	92.5%	5.23	5.5%	19.9%	259.5%	5.54
Capitalizedintan/SALE	21.4%	24.0%	12.4%	4.64	17.2%	15.8%	-8.1%	-1.5
Totalintan/SALE	29.7%	40.0%	34.8%	5.38	22.7%	35.7%	57.0%	4.15
		HighTech				Healthcare		
R&D	5.0%	6.3%	25.2%	3.38	7.7%	11.2%	46.3%	4.8
MainSG&A	18.0%	18.8%	4.2%	1.91	24.1%	21.0%	-13.1%	-2.99
Bookintan	16.8%	60.1%	258.2%	6.29	12.9%	62.6%	386.8%	7.38
Capitalizedintan	38.5%	49.8%	29.4%	6.27	55.0%	74.9%	36.2%	9.01
Totalintan	55.2%	109.8%	98.9%	6.65	67.9%	137.6%	102.7%	8.36

Note: This table shows results for the regression, $y_t = \gamma + \delta \times post + \epsilon_t$, where *post* is a dummy variable taking a value of 1 if $t > 2002$, and zero otherwise, and y_t represents the variable of interest. *SALE, R&D* and *MainSG&A* are aggregate sale, aggregate R&D expenses and aggregate SG&A expenses excluding R&D expenses respectively. *Bookintan* is the aggregate intangible assets reported by firms on their balance sheets. *Capitalizedintan* is the aggregate intangible assets computed by capitalizing past R&D and SG&A expenses into Knowledge Capital (KC) and Organizational Capital (OC) respectively using perpetual inventory models. *Totalintan* is the sum of *Bookintan* and *Capitalizedintan*. "Change %" represents the percentage increase in the mean value during the post-globalization period of 2003-2019 relative to the mean during the of pre-globalization period of 1984-2002. All variables are described in Appendix A.