Returns to Firm Globalization: Risk Premium or Mispricing?

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Abstract

This paper investigates mispricing (specifically limits to arbitrage) as an alternative to the risk-based explanation of the globalization premium documented by Barrot et al. (2019). We document that the globalization premium is positively correlated with measures of limits to arbitrage. We further show that both displacement risk related to foreign competition and limits to arbitrage exhibit a joint effect on the globalization premium. Interestingly, displacement risk plays an explanatory role only in the presence of limits to arbitrage. Furthermore, when globalization is measured at the firm level, mispricing independently impacts the globalization premium while risk does not. Overall, our evidence is not consistent with a purely risk-based explanation of the globalization premium.

Keywords: Globalization; risk premium; limits-to-arbitrage; mispricing; displacement risk

JEL Classification: F23, F36, F65, G11, G12, G14, M21

1. Introduction

In this paper, we explore a mispricing-based explanation for the globalization premium recently documented by Barrot et al. (2019) (henceforth BLS). BLS find that firms most exposed to globalization earn a 7% annualized risk-adjusted abnormal return over firms with the least globalization exposure.[1] The authors demonstrate, both theoretically and empirically, a positive relation between firms' globalization exposure and abnormal returns and show that the "risk premium emanates from the risk of displacement of least efficient firms triggered by import competition." Their model shows that international risk-sharing frictions are the source of positive excess returns for firms with lower trading costs (i.e., higher globalization exposure). The rational explanation BLS provide for this finding is that abnormal returns are a risk premium for the negative price of globalization risk. However, they leave the exploration of the contribution of other types of financial frictions to the globalization premium to future research. This paper documents empirical evidence suggesting limits-to-arbitrage, as financial market frictions, contribute to the globalization premium found by BLS.

BLS find evidence that the premium comes from the risk of U.S. firms being displaced by foreign competition (i.e. displacement risk). While BLS provide a risk-based explanation for globalization premium, we argue the premium may originate from mispricing. BLS suggest, since firms with high and low globalization exposure have similar reactions to earnings announcements and comparable analysts' forecast errors, the globalization premium is not due to differences in pricing efficiency in the cross-section of firm globalization. Contrarily, we show that there is a positive relation between measures of globalization and limits-to-arbitrage. This suggests that the globalization premium may be attributed to mispricing

[1] Barrot et al. (2019) finds that firms with greater exposure to globalization, e.g., those in industries with lower shipping costs, earn higher abnormal (risk-adjusted) returns. That is, a hedge strategy long in firms with greater exposure to globalization and short in firms with less exposure to globalization yields significant abnormal returns. In their risk-based model, the response of investors' utility to foreign shocks depends on two competing effects: a positive price effect because of the lower price index of consumer goods and an ambiguous wealth effect due to the change in the investors' income (the value of their portfolios). If the reduction in domestic investors' wealth is greater than the gain from a lower price of consumption goods, the response of investors' utility to foreign shocks is negative, yielding a negative price of globalization risk. Like BLS, we refer to "globalization" in the context of international trade flows.

because, due to market frictions, investors might incorporate information more slowly into the stock prices of highly globalized firms.

We contribute to the literature by examining both displacement risk and limits-to-arbitrage as individual sources of the globalization premium in U.S. firms. We also test the two explanations simultaneously to see if one dominates the other. If displacement risk is the source of the globalization premium, there will be a positive relation between the premium and the level of the firms' displacement risk (as in BLS). On the other hand, if the globalization premium is due to limits-to-arbitrage hypothesis proposed by Shleifer and Vishny (1997), then the premium will be more pronounced among stocks with high limits-to-arbitrage.

To measure a firm's globalization level, we follow BLS by focusing on 439 unique manufacturing industries and use two industry-specific proxies: shipping costs (SC) and shipment weight-to-value ratios (WTV). In addition, we employ a firm-level proxy for globalization exposure: the number of unique output countries mentioned in each firm's annual 10-K filings. Hoberg and Moon (2017, 2019) use this measure to identify the intensity of offshoring activities. However, we propose Hoberg and Moon's measure can also proxy for the level of a firm globalization exposure in the same manner that counting the number of states mentioned in the 10-K measures a firm's level of domestic geographic dispersion as in Garcia and Norli (2012). Thus, the firm-level globalization measure allows for more cross-sectional variation in the sample than does the industry-level measures.

To test the risk-based hypothesis, we follow BLS to investigate if displacement risk is the source of the globalization premium. Like BLS, we use return on assets (*ROA*) as a proxy for displacement risk. In addition to *ROA*, we propose three additional measures of displacement risk: growth in total factor productivity (*DTFP*), product market similarity (*Similarity*), and product market fluidity (*Fluidity*). Each of these measures depicts various aspects of firm-level productivity and competition that could directly affect the firm-level risk to be displaced by import competition. Thus, in the same vein as Stambaugh et al. (2015) and Lam et al. (2020), we construct a composite measure of displacement risk that diversifies away some noise in individual displacement measures. Consistent with BLS, when using industry-level globalization measures, our results based on portfolio sorting and Fama and MacBeth (1973) regressions reveal that the globalization premium is higher among firms with higher displacement risk, providing support for the risk-based explanation.

In testing the limits-to-arbitrage hypothesis, we consider arbitrage risk and arbitrage costs measures. To measure arbitrage risk, we use idiosyncratic stock return volatility (e.g., Pontiff 2006, Lam and Wei 2011). To measure arbitrage costs, we follow previous literature (e.g.,) and construct a composite index of various arbitrage costs including bid-ask spread, Amihud (2002) illiquidity measure, trading volume, institutional ownership, number of institutional investors, and short interest ratio. Consistent with the mispricing hypothesis, we find a strong positive relation between measures of globalization exposures and limits-to-arbitrage. Specifically, we use both portfolio sorting and Fama-MacBeth regression approach and show that the globalization premium is more profound as the limits-to-arbitrage become more severe. This finding suggests that limits-to-arbitrage impose significant barriers to exploiting the mispricing associated with the firms' globalization exposure.

After establishing a relation between the globalization premium and both the risk and mispricing explanations, a natural question that arises is: To what extent mispricing and risk explanations contribute to the globalization premium and which explanation may dominate? Using portfolio analyses as in Lam and Wei (2011), we attempt to disentangle these two non-mutually exclusive explanations. Specifically, if globalization premium is mainly due to displacement risk (limits-to-arbitrage), we should see no significant difference in the globalization premium across firms with distinct limits-to-arbitrage (displacement risk) after controlling for the level of displacement risk (limit to arbitrage). Our results reveal that controlling for displacement risk, we still find a relation between limits-to-arbitrage and the globalization premium. Similarly, controlling for limits-to-arbitrage, displacement risk is still positively related to the globalization premium. Additionally, Fama and MacBeth results reveal several important relations. First, measuring globalization exposure at the industry level, the interactions between displacement risk and arbitrage risk explain most of the globalization premium. However, individually, neither displacement risk nor arbitrage risk explains the premium. Thus, the globalization premium appears to be *jointly* reliant on displacement and arbitrage risk. Second, measuring globalization at the firm level, in addition to the joint effect of displacement and arbitrage risk, arbitrage risk affects the globalization premium independently from displacement risk.

While there is an established literature in international business studying the effects of globalization through the lens of labor market (e.g. Autor et al. 2013, Pierce and Schott 2016), corporate finance (e.g. Xu 2012, Zhou et al. 2013, Pierce and Schott 2018), innovation (e.g. Bloom et al. 2016, David et al. 2019), health care (e.g. McManus and Schaur 2016, Pierce and Schott 2020), and public economics (Feler and Senses 2017), the literature on how globalization affects asset prices is limited. Thus, by analyzing the effects of limits-of-arbitrage on the globalization premium, we contribute to the sparse literature on the implications of globalization on asset prices. Firstly, contrary to the findings of BLS, we demonstrate a positive relation between various globalization measures and pricing inefficiencies, specifically limits-to-arbitrage. This is important since it provides a basis to examine such market frictions as a source of the globalization premium and an alternative to a risk-based explanation (such as the one provided by BLS).

Next, we document that both displacement risk and limits-to-arbitrage contribute to the globalization premium. Importantly, we further show that limits-to-arbitrage not only contribute to the globalization premium, but are necessary for displacement risk to affect the globalization premium. Firm-level evidence implies the reverse is not the case and that limits-to-arbitrage contributes to the globalization premium in the absence of displacement risk. Thus, we provide evidence that market frictions are important contributors to the globalization premium and that the premium is not solely derived from risk of foreign shocks.

2. Literature Review and Hypothesis Development

2.1. Globalization Premium and Displacement Risk

The international business and economics literature posits that globalization could have confounding effects on national economics and wealth. On one hand, the extant literature demonstrates beneficial consequences of the surge in international trade over the last two decades. For example, there is evidence that international trade is associated with the expansion of product variety, product price reduction, product quality improvement, and recognition of gains from trade (Broda and Weinstein 2006, Hallak 2006, Baldwin and Gu 2009, Bernard et al. 2011, Amiti and Khandelwal 2013, Ossa 2015). Furthermore, the average industry productivity increases in response to increased sales of the most productive firms and imported intermediate inputs (Pavcnik 2002, Trefler 2004, Bernard et al. 2006a, Amiti and Konings 2007, Goldberg et al. 2010, Melitz and Trefler 2012). Finally, researchers such as Liu and Rosell (2013) and Bloom et al. (2016) report that globalization spurs technology innovation and changes the nature of innovation. Hence, domestic customers and firms can enjoy the benefits of the integration of the global economy. As a result, since consumption and cash flows respond positively to foreign shocks, the price of globalization risk would be positive and the return premium would be negative.

On the other hand, there is alternative evidence that suggests international trade leads to increased import competition in local markets, which forces less-efficient and low-productive domestic firms to exit. For example, Bernard et al. (2006b) document a lower survival rate for firms with greater exposure to import competition from low-wage countries. At the same time, most U.S. multinational firms prefer to outsource or offshore their production to countries with low labor costs, which could adversely affect the U.S. labor market. Autor et al. (2013) and Pierce and Schott (2016) find that U.S. manufacturing firms that are more exposed to imports exhibit a sharper decline in employment. Autor et al. (2014) further show individuals who work in manufacturing industries garner lower cumulative wages, are at elevated risk of exiting the labor force, and becoming dependent on public disability benefits. The displacement of domestic firms and lower-income workers suggests a negative response of consumption and cash flows to foreign shocks. Consequently, the price of globalization risk would be negative and abnormal return associated with high exposure to globalization would be positive. Consistent with a negative price of globalization risk, (Guedhami et al. 2021) show that COVID-19-related shocks to foreign markets caused U.S. multinational corporations to experience significantly worse stock returns than their domestic counterparts.

BLS develop a model that rationalizes the confounding impacts of globalization on asset prices and provide empirical evidence that firms with greater exposure to globalization, e.g., those in industries with lower shipping costs, earn higher abnormal (risk-adjusted) returns. Based on their model, BLS interpret the excess return as a risk premium that compensates for the negative price of globalization risk, e.g., the displacement of domestic firms. If the higher return associated with firms' globalization exposure represents the risk premium associated with the displacement risk of domestic firms, we expect (as BLS demonstrate) the globalization risk premium to be concentrated among firms that are more likely to be displaced by foreign rivals or less likely to be productive enough to benefit from export opportunities. This argument leads to our first hypothesis, which is also proposed and empirically supported by BLS:

Hypothesis 1: The globalization premium is stronger for firms with higher displacement risk.

2.2. Imperfect Capital Markets, Mispricing, and Limits-to-Arbitrage

The literature of corporate finance emphasizes the diversification benefits of corporate globalization. For example, S. Li et al. (2011) show globally diversified firms receive a more favorable valuation from creditors than domestic firms do. Mihov and Naranjo (2019) find international diversification reduces the cost of equity. However, some work provides contrary evidence. For example, Fillat and Garetto (2015) find that multinational firms exhibit higher excess returns than purely domestic firms and develop a real options model of the decision to initiate offshoring to explain this finding. Hoberg and Moon (2019) find U.S. firms offshoring to more central nations in the real trade network have higher expected returns, which supports the theory that idiosyncratic sectoral shocks can create economy-wide aggregate volatility cascades (Acemoglu et al. 2012). The competing evidence on the stock return of multinational firms suggests a further examination of the finding in BLS and, in particular, exploring explanations other than their risk-based hypothesis.

Unlike the risk-based explanation provided by BLS, return predictability associated with globalization possibly occurs due to market mispricing. In a completely efficient market, rational arbitrageurs correct mispricing that does not reflect fundamental value when arbitrage profits exceed the related costs (Shleifer and Vishny 1997). If there are barriers or limits-to-arbitrage that prevent implementable arbitrage opportunities, risk-averse arbitrageurs either avoid or are prevented from trading promptly. Thus, the lack of arbitrage activity allows mispricing to persist for some period of time. Previous studies show that limits-to-arbitrage are possible explanations for the persistence in the relation between the cross-section of returns and various firm characteristics such as earnings (Mendenhall 2004); book-to-market ratio (Ali et al. 2003), asset growth (Lam and Wei 2011), accruals (Mashruwala et al. 2006), S&P 500 index membership (Wurgler and Zhuravskaya 2002), firm profitability (DeLisle et al. 2020), and left-tail momentum (Atilgan et al. 2020). If investors fail or are too slow to incorporate relevant information implied in firms' exposure to globalization into stock prices, we should observe a stronger globalization premium when arbitrage is more limited. Thus, our second hypothesis is as follows:

Hypothesis 2: The globalization premium is more pronounced in stocks that are difficult to arbitrage than in stocks that are easy to arbitrage.

In this paper, we not only test the mispricing explanation for the return premium of globalization but also compare its relative importance with the risk-based explanation by BLS. To better understand the contributions of the risk and mispricing explanations to the globalization premium, we investigate the two distinct explanations simultaneously and test the flowing hypotheses:

Hypothesis 3 (Risk-Based Explanation): Controlling for the level of limits-to-arbitrage, the positive relation between globalization exposure and subsequent stock returns is stronger for firms that have higher exposure to displacement risk than those with lower exposure.

Hypothesis 4 (Limits-to-arbitrage Explanation): Controlling for displacement risk, the positive relation between globalization exposure and subsequent stock returns is more pronounced for firms that are difficult to arbitrage than firms that are easy to arbitrage.

3. Variable Constructions, Sample Selection, and Summary Statistics

3.1. Measures of Globalization Exposure

We use three measures of globalization exposure: shipping costs (*SC*), shipment weight-to-value ratios (*WTV*), and the number of output countries (*#OC*). Following BLS, we compute shipping costs (*SC*) as the percent difference between the cost-insurance-freight value and the free-on-board value of imports and weight-to-costs as the ratio of the weight in kilograms to the free-on-board value of imports. Firms with greater exposure to international trade flows have lower shipping costs and lower weight-to-costs (Hummels et al. 2014, Barrot et al. 2019), and as a result, are subject to greater exposure to international trade competition and, therefore, greater globalization exposure. While intuitive, one disadvantage of these measures is that they are constructed at the industry-year levels. To overcome this obstacle, we propose an additional firm-level measure based on the number of output countries (*#OC*). Garcia and Norli (2012) use the number of states mentioned in a firm's 10-K as a measure of domestic geographic dispersion. Hoberg and Moon (2017, 2019) use country counts in 10-K reports to measure import and export activities. Thus, applying the same logic as Garcia and Norli (2012), we use these country counts (particularly the export country counts) as a proxy for firm-level global dispersion and, thus, globalization exposure.[2,3]

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[2] We thank Gerard Hoberg and S. Katie Moon for providing their country count data on their website: http://faculty.marshall.usc.edu/Gerard-Hoberg/HobergMoonDataSite/index.html.

[3] This measure is not without its own pitfalls in the context in which we are using it. In addition to globalization risk (exposure to foreign shocks), globalization is also associated with the international diversification of assets. Asset diversification reduces risk exposure. Thus, our firm-level measure not only captures globalization risk but also international diversification. These competing forces might offset each other in our analyses and bias against finding

3.2. Measures of Displacement Risk

BLS offer a risk-based rational explanation for the documented globalization premium. Specifically, the authors argue that the return premium between the firms in the extreme quintiles of globalization exposure (*SC* and *WTV*) exists because these measures are related to the displacement risk. They further argue that if this is the case, globalization premium should be higher among firms with low profitability and low productivity. This is because U.S. firms operating in the industries with high shipping costs are more likely to be adversely affected by foreign competition than benefit from increased export opportunities. Moreover, firms with low productivity and low profitability are at a disadvantage when faced with intensified import competition and therefore at risk to be displaced. Consistent with this, using ROA as a proxy for firm profitability and productivity, BLS show the globalization premium is concentrated among low productivity and low profitability firms – a piece of evidence consistent with the risk-based explanation.

In addition to ROA used by BLS, we propose three additional measures to test the risk-based explanation of globalization premium: growth of total factor productivity (*DTFP*), product market similarity (*Similarity*), and product market fluidity (*Fluidity*).[4] For example, the growth of total factor productivity (*DTFP*), and calculated the change in the logarithm of the 5-factor productivity estimated from a product function of capital, production worker hours, non-production workers, energy, and non-energy materials between current and last year.[5] In addition, firms whose products are very similar to rivals or whose rivals update products frequently face greater competitive threats and more likely to be affected by import competition. The next two alternative measures of displacement risk are product market similarity

any significant relations. However, in additional tests (results available upon request), we find that international diversification is not a significant contributor to our main results.

[4] BLS also use firm size as a proxy for displacement risk. However, in our context, size is also related to limits to arbitrage. Thus, we exclude size from both displacement and limits to arbitrage proxies.

[5] *DTFP* reflects the ability of an average firm in the industry to convert a given level of inputs (e.g., labor, capital, and materials) into outputs (e.g., goods or services) (Del Gatto et al. 2011). *DTFP* is obtained come from the NBER-CES Manufacturing Database (Bartlesman and Gray 1996) over 1958-2011.

(*Similarity*) and product market fluidity (*Fluidity*). *Similarity* captures the total pairwise similarity between a firm and its competitors while *Fluidity* measures the structure and evolution of product market space occupied by firms (Hoberg and Phillips 2010, Hoberg et al. 2014, Hoberg and Phillips 2016).[6]

Since each of these measures portray various aspects of firm-level productivity and competition that could directly affect firm-level risk to be displaced by import competition, we construct a composite rank for displacement risk, *DispRisk*, by combining *ROA*, *DTFP*, *Similarity*, and *Fluidity* as follows: at the end of June *t*, all stocks in our sample are independently ranked into quintiles based on each type of displacement risk measure such that a higher quintile rank indicates a greater relative degree of displacement risk.[7] Lastly, we compute the arithmetic average of quintile ranks across all displacement risk measures.

3.3. Measures of Limits-to-Arbitrage

In general, limits-to-arbitrage includes two categories: arbitrage risk and arbitrage costs. To proxy for arbitrage risk, we use idiosyncratic stock return volatility (ArbRisk), which is obtained based on the Fama and French (1993) three-factor model estimated over the previous 36 months (minimum of 30 months) ending at the end of June *t* (e.g., Ali et al. 2003, Stambaugh et al. 2015, DeLisle et al. 2020).[8]

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[6] Product similarity and product market fluidity are measures of product market competition (domestic) constructed based on the Text-based Network Industry classification (TNIC), developed by Hoberg and Phillips (2016). TNIC is based on textual analysis of product descriptions in firms' 10-K filings and are updated annually. Under TNIC, each firm has its distinct sphere of rivals. Similarity is calculated as the total pairwise similarity score between a firm and its competitors in TNIC industries. Fluidity identifies threats coming from changes in rival firms' products relative to the firm's products. Data on TNIC, Similarity, and Fluidity are provided in the Hoberg-Phillips Data Library and can be downloaded from http://hobergphillips.usc.edu/.

[7] We sort *ROA* and *DTFP* (e.g., high *ROA* represents low displacement risk and, accordingly, receives a low displacement risk rank), and *Similarity* and *Fluidity* in ascending order (e.g., a high *Similarity* represents large displacement risk and, thus, receives a high displacement risk rank). See Appendix Table A3 for descriptive statistics for each variable.

[8] We also confirm that our results are robust to alternative specifications of idiosyncratic volatility that are based on either standard market model (CRSP value-weighted market index) or the Carhart (1997) four-factor model using daily (obtained over the previous 250 days with a minimum 200 days at the end of June t) or monthly stock returns (obtained over the previous 36 months with a minimum of 30 months). All alternative risk measures have high correlation coefficients (see Table A2 in Appendix A).

To proxy for arbitrage costs, we use variables common in limits-to-arbitrage literature, such as measures of information uncertainty, transaction costs, and institutional ownership (Lam et al. 2017). Since arbitrageurs require sufficient information to identify arbitrage opportunities, greater uncertainty about firm's underlying fundamentals prevents them from reasonably estimating the true value making arbitrage more difficult (Zhang 2006, Lam and Wei 2011). Furthermore, transaction costs reduce the profitability of arbitrage trades and make arbitrage opportunities difficult to exploit (Ali et al. 2003, Mashruwala et al. 2006, Lam and Wei 2011). Finally, previous studies show that institutional ownership is associated with arbitrage costs in a variety of ways such as investor awareness, liquidity, and/or short-sale supply (Gompers and Metrick 2001, D'avolio 2002, Ali et al. 2003, Asquith et al. 2005, Nagel 2005, Lam and Wei 2011).

We construct a composite rank for arbitrage costs by combining information uncertainty, transaction costs, and institutional ownership measures as follows.[9] Our composite rank measure, $ArbCost$, is in the spirit of the mispricing measure by Stambaugh et al. (2015) and the composite index of arbitrage and investment friction measures by Lam and Wei (2011), Lam et al. (2017), and DeLisle et al. (2020).[10] Combining various elements of arbitrage costs into a composite index allows us to reduce noise in each of them and to have a more precise measure of overall arbitrage costs. First, at the end of June *t*, all firms are independently ranked into quintiles based on each type of arbitrage costs such that a higher quintile rank indicates a greater relative degree of limits-to-arbitrage associated with a specific type of arbitrage cost.[11] Second, we compute the arithmetic average of all arbitrage costs quintile ranks.

3.4. Sample Selection and Summary Statistics

We use the Center for Research in Security Prices (CRSP) dataset merged with COMPUSTAT to derive main variables based on firm-level characteristics. Our sample covers common stocks with share

[9] See Table A1 in the Appendix for each variable construction.
[10] As shown in Table A2 in the Appendix, the variables are highly correlated with each other and arbitrage risk (ArbRisk). Note that because of data availability, institutional ownership and analysts following appear in the arbitrage costs index starting in 1983.
[11] We sort Volume, IOWN, NOINST, and Analysts in descending order (e.g., high trading volume represents low arbitrage costs and, accordingly, receives a low arbitrage costs rank), and BidAsk and Illiquidity in ascending order (e.g., a high bid–ask spread represents large arbitrage costs and, thus, receives a high arbitrage costs rank).

codes 10 or 11 in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and listed on the NYSE, AMEX, and NASDAQ. The sample is similar to that used in BLS. Stocks whose market capitalization is below the 10th percentile of NYSE/Amex stocks are excluded. Size is market capitalization. B/M is the book-to-market ratio, defined as book equity at the end of each June divided by the market value of equity from December of the prior year. Profitability is measured as the gross profit minus SG&A expenses scaled by the book value of equity. Investment is measured as the annual change in total assets. $r_{1,0}$ is the prior 1-month return. $r_{12,2}$ is the cumulative return from months *t*-12 to *t*-2 with 1 month lagged.

Our final sample includes 4,475 distinct firms. The sample period for shipping costs is from 1974:07 and 2018:12, for the natural logarithm of shipments' weight to value, *Log(WTV)*, is from 1990:07 – 2018:12, and for *#OC* is from 1998:07-2018:12. **Table 1** reports the summary descriptive statistics for the industry- and firm-level measures of globalization and firm characteristics. On average, the number of output countries is 7.66 and, consistent with BLS, *SC* is 6.4% of the price of shipments and the average *Log(WTV)* is -2.3.

4. Empirical Results

4.1. Globalization Premium

We begin our investigation by confirming the existence of globalization premium documented in BLS during our sample period. We follow BLS in replicating the globalization premium. Specifically, at the end of June, we form equal-weighted quintile portfolios based on each measure of globalization exposure. BLS perform their analyses on hedge portfolios that long high *SC* or *Log(WTV)* firms and short low *SC* or *Log(WTV)* firms. Alternatively, in our analyses, we sort portfolios based on globalization exposure. That is, firms in the bottom (top) quintile are those with least (most) globalization exposure as they have the highest (lowest) levels of *SC* or *Log(WTV)*. Similarly, the higher (lower) the number of output countries (*#OC*), the greater (less) firms' exposure to globalization. Sorting in this manner yields positive globalization premiums in high-minus-low hedge portfolios for all three globalization exposure measures.

For each quintile portfolio, Table 2 reports the average monthly returns in excess of the risk-free rate (R_e), and the average monthly risk-adjusted returns using the Fama and French (1993) three-factor (α^{3F}), Carhart (1997) four-factor (α^{4F}), and Fama and French (2015) five-factor models (α^{5F}). Table 2 also reports the differences between extreme Q5 and Q1, Q5 and Middle, and Middle and Q1 quintiles.[12] BLS defines the hedge returns between extreme portfolios as the "globalization risk premium." In this and further tables, we refer to the difference between top (highest globalization rank) and bottom (lowest globalization rank) portfolios as the "globalization premium."

Consistent with BLS**, Table 2** shows that stocks with greater globalization exposure (i.e, firms in the top quintile, Q5) outperform those with lesser globalization exposure (i.e., firms in the bottom quintile, Q1) in all return measures, as the returns increase monotonically from the bottom to top quintile. For example, based on shipping costs as a measure of globalization exposure in Panel A, stocks in the top quintile (Q5) significantly outperform those in the bottom quintile (Q1) by 0.354% (t = 1.77) in excess returns, R_e, and 1.005% (t = 4.11) per month in risk-adjusted returns based on Fama and French (2015) 5-factor model, α^{5F}. Similarly, based on Log(WTV) measure in Panel B, the excess return and five-factor alpha of long-short (Q5-Q1) portfolio (i.e., the globalization premium) is 0.701 (t = 1.72) and 1.366 (t = 3.28), respectively. These estimates are comparable with those reported in BLS. Table V but also suggest that globalization premium remains significant in our extended sample period.

While intuitive, *SC* and *Log(WTV)* are measured at the industry level and, as a result, do not capture cross-sectional differences among firms in the same industry with varying levels of globalization exposure. As noted earlier, we propose additional measure *#OC* that is computed at the firm level. Consistent with the notion that the greater globalization exposure (i.e., the highest level of *#OC* or the lowest quintile),

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[12] The middle-quintile portfolio is defined as an equally-weighted portfolio created using the second-, third-, and fourth-quintile portfolios of the corresponding measure of globalization exposure.

Panel C further documents that the differences in risk-adjusted performance between extreme quintiles are significantly negative. The globalization premium in terms of excess returns between most and least exposed quintiles is 0.261 (t = 1.96) and in terms of five-factor alpha is 0.214 (t = 2.01). Moreover, comparing the contribution of the long leg (Q5 vs. middle) and short leg (middle vs. Q1), Table 2 shows that the results are mainly driven by firms with greater globalization exposure, rather than stocks with lesser globalization exposure.

Overall, using three different measures of globalization exposure, our results confirm the presence of globalization premium documented by BLS. Moreover, the portfolio results show that the return spreads are driven mainly by firms with greater exposure to globalization.[13] In the following sections, we first explore the risk-based explanation proposed by BLS and then investigate the mispricing-based explanation of the documented globalization premium.

4.2. Displacement Risk as a source of Globalization Premium

Next, we perform portfolio analyses to investigate the risk-based explanation of the globalization premium. Specifically, at the end of each June, all stocks in the sample are ranked into five quintiles portfolios based on one of the three globalization exposure measures: Shipping Cost (*SC*), *Log(WTV)*, or *#OC*. Once again, quintile sorting of SC and *Log(WTV)* is in ascending order and *#OC* is in descending order. We independently rank stocks into quintile groups based on the composite displacement risk measure, *DispRisk*.

Table 3 reports the globalization premium, defined as the average monthly return difference between the highest and lowest globalization exposure quintiles (measured by SC in Panel A, log(WTV) in

[13] Although not tabulated for brevity, we confirm the positive relation between measures of globalization exposure using *SC*, *Log(WTV)*, and *#OC* and future stock returns using the Fama and MacBeth (1973) cross-sectional regressions of monthly stock returns.

Panel B, and #OC in Panel C), for firms in the extreme terciles of *DispRisk*. This table also reports the differences in the globalization premium between the two *DispRisk* groups. The difference in the premiums is measured by excess returns as well as risk-adjusted returns based on the capital asset pricing model (α^{CAPM}), Fama and French (1993) three-factor model ($\alpha^{3\text{F}}$), Carhart (1997) four-factor model ($\alpha^{4\text{F}}$), and Fama and French (2015) five-factor model ($\alpha^{5\text{F}}$). For example, the results of SC show that the globalization premium is particularly pronounced in the highest *DispRisk* group (5-factor monthly alpha of 1.023%, *t* = 2.28). We obtain similar results using *Log(WTV)* and *#OC* in Panels B and C, respectively. Overall, consistent with BLS and Hypothesis 1, these findings provide support for the risk-based explanation of the globalization premium.

While the portfolio approach is transparent and easy to interpret, it is a univariate and non-parametric method. Next, utilizing Fama and MacBeth (1973) methodology, we explore the relation between the globalization premium and displacement risk in a multivariate setting by estimating the following model:

$$r_{i,t} = \alpha_t + \beta_{1,t} Glob_{i,t-1}^{\text{Rank}} \times Disp_{i,t-1}^{\text{Rank}} + \beta_{2,t} DispRisk_{i,t-1}^{\text{Rank}} + \beta_{3,t} Glob_{i,t-1}^{\text{Rank}} + \beta_{4,t} \text{Log(ME)}_{i,t-1} + \beta_{5,t} \text{Log(B/M)}_{i,t-1} + \beta_{6,t} r_{i,t-1} + +\beta_{7,t} r_{i,t-12:t-2} + \varepsilon_{i,t} \quad (1)$$

$r_{i,t}$ is the monthly stock return. $Glob_{i,t-1}^{\text{Rank}}$ and $DispRisk_{i,t-1}^{\text{Rank}}$ are the scaled annual quintile rank of stock *i* at the end of June *t* for globalization exposure and sources of displacement, respectively. Similar to our portfolio analysis, at the end of June *t*, all stocks in the sample are ranked into quintile portfolios based on globalization exposure measures (descending order in *SC*, *Log(WTV)*, and ascending order in *#OC*), and each stock *i* is assigned a rank from 1 to 5. We then transform the rank measure by subtracting 1 and dividing 4 so that rank now ranges from 0 to 1. Thus, the rank of 0 (1) indicates firms with the lowest (highest) exposure to globalization. This procedure allows us to interpret the coefficient on $Glob_{i,t-1}^{\text{Rank}}$ as the return on a zero-investment hedge portfolio (Mashruwala et al. 2006, DeLisle et al. 2020). Similarly, $DispRisk_{i,t-1}^{\text{Rank}}$ are scaled quintile portfolios based on the composite rank for displacement risk, where the highest *DispRisk* quintile represents the highest displacement risk stocks. Control variables include size (*Log(ME)*), book-to-market (*Log(B/M)*), and past performance measured at horizons of 1 month ($r_{i,t-1}$), and 12 to 2 months ($r_{i,t-12:t-2}$).

The results from the Fama and MacBeth (1973) regressions of equation (1) are displayed in Table 4. Panels A, B, and C are consistent with the portfolio results in that the interaction between globalization exposure (as determined by all three measures) and displacement risk has positive and statistically significant (at least at the 10% level) coefficients. This suggests that displacement risk is a contributing factor to the globalization premium. The higher the displacement risk, the greater the globalization premium is. Thus, the regression results further support Hypothesis 1 and the findings of BLS in that displacement risk is an important component of the globalization premium. Although, the coefficients on $Glob^{Rank}$ are positive and statistically significant (at least at the 10% level) in all the models, the displacement risk does not appear to completely explain the globalization premium, as suggested by statistically significant coefficient on $Glob^{Rank}$.

4.3. Globalization Premium and Limits-to-arbitrage: Mean Quintile Rankings

In this section, we explore whether mispricing can serve as an alternative explanation for globalization premium. Mispricing could occur when investors are too slow to incorporate relevant information regarding firms with greater globalization exposure into stock prices. Therefore, if globalization premium is indeed due to mispricing and the market's inability to exploit arbitrage opportunities, then we should observe large barriers, i.e., higher level arbitrage risks and arbitrage costs, among firms in extreme quintiles of globalization exposure. While BLS find no pricing efficiency differences related to earnings announcement returns among firms with varying levels of globalization, they do not directly examine limits-to-arbitrage. Thus, we begin our empirical analysis by examining the relation between our measures of globalization exposure and two proxies of limits-to-arbitrage: arbitrage risk ($ArbRisk$) and arbitrage costs ($ArbCost$). At the end of each June, we independently sort all stocks in our sample into quintiles based on either SC, *Log(WTV)*, and *#OC* measure and one of the two measures of limits-to-arbitrage. For each globalization exposure quintile, we calculate the average of assigned quintile rank values across their corresponding limits-to-arbitrage quintiles ($ArbRisk^{\text{Quintile}}$ or $ArbCost^{\text{Quintile}}$). **Table 5** reports the time-series means of cross-sectional averages of $ArbRisk^{\text{Quintile}}$ and $ArbCost^{\text{Quintile}}$ rankings, respectively, in each of the five quintile portfolios based on our proxies for globalization exposure. For example, in Panel A the average quintile rank of *ArbRisk* in the highest quintile based on *SC* measure is 3.555.

As shown in Table 5, regardless of which proxy for globalization exposure is used, we find that the average ranks of *ArbRisk* and *ArbCost* generally increase monotonically from firms with the lowest rank of globalization exposure to those with the highest rank of globalization exposure. The differences in the average quintile rank values for limits-to-arbitrage measures between Q5 and Q1 (Q5 and middle, middle and Q1) portfolios are significant at the 1% level. For example, the difference in $ArbRisk^{\text{Quintile}}$ rankings between the extreme SC quintiles is 1.035. In other words, firms with greater exposure to globalization (low *SC*, Q5), have larger arbitrage costs and risk than firms with lesser exposure to globalization (high *SC*, Q1). Similar results are observed using the alternative measures of globalization exposure of *Log(WTV)* and *#OC*. The positive relation between globalization and limits-to-arbitrage provides the first important indication of the potential role that limits-to-arbitrage may play in explaining the globalization premium, and is consistent with Hypothesis 2.

4.4. Globalization Premium and Limits-to-arbitrage: Portfolio Analysis

To better understand the role of limits-to-arbitrage in globalization premium, we next perform portfolio analyses. Specifically, if mispricing plays a role in explaining the globalization premium, we expect the globalization premium to be more pronounced for stocks that are more difficult to arbitrage than for stocks that are easier to arbitrage (i.e. Hypothesis 2). To test this hypothesis, similar to the displacement risk portfolio analyses, we independently sort all stocks into quintile portfolios based on a measure of globalization exposure (*SC*, *Log(WTV)*, or *#OC*) and proxy for limit-to-arbitrage ($ArbRisk$ or $ArbCost$). **Table 6** reports the globalization premium, defined as the average monthly return difference between the highest and lowest *Glob* quintiles (measured by *SC*, *Log(WTV)*, or *#OC*), for firms in the extreme quintiles of limits-to-arbitrage (*ArbRisk* in Panel A and *ArbCost* in Panel B). Table 6 also reports the differences in the globalization premium between the two limits-to-arbitrage groups. The difference in the premiums is measured by excess returns as well as risk-adjusted returns based on the capital asset pricing model (α^{CAPM}), Fama and French (1993) three-factor model ($\alpha^{3\mathrm{F}}$), Carhart (1997) four-factor model ($\alpha^{4\mathrm{F}}$), and Fama and French (2015) five-factor model ($\alpha^{5\mathrm{F}}$).

As displayed in Table 6, we find that globalization premium is more pronounced in the high limit-to-arbitrage portfolio. For example, consistent with Hypothesis 2, the result of SC in Panel A1 shows that the globalization premium is 1.179% (*t* = 2.02) in the portfolio with high arbitrage risk, while it is 0.170% (*t* = 1.15) in the portfolio with low arbitrage risk. This difference in globalization premiums between the high and low *ArbRisk* groups is economically and statistically significant. For example, the high-minus-low *ArbRisk* portfolio of globalization premium based on SC generates the 5-factor alpha of 1.344% per month (*t* = 2.95). Similar patterns are observed in the portfolio returns using either *Log(WTV)* or *#OC* as a measure of globalization exposure.

Panel B shows the results of portfolio formation based on high and low arbitrage costs. The results are qualitatively similar. However, notably, the comparison between Panels A and B demonstrates that the effect of limits-to-arbitrage on globalization premium is more pronounced for arbitrage risk than for arbitrage costs, which is consistent with the literature (Ali et al. 2003, Mashruwala et al. 2006, Pontiff 2006, Au et al. 2009, Lam and Wei 2011, Lam et al. 2017, DeLisle et al. 2020).

4.5. Globalization Premium and Limits-to-arbitrage: Fama-MacBeth Regressions

Next, we evaluate the mispricing explanation of the globalization premium using the Fama and MacBeth (1973) cross-sectional regressions of individual stock returns. In the spirit of D. Li and Zhang

(2010), Lam and Wei (2011), and DeLisle et al. (2020), we estimate the slope coefficients on globalization exposure measure separately for each quintile of limit-to-arbitrage measure, as follows:

$$r_{i,t} = \alpha_t + \beta_{1,t} Glob_{i,t-1}^{\text{Rank}} + \beta_{2,t}\text{Log(ME)}_{i,t-1} + \beta_{3,t}\text{Log(B/M)}_{i,t-1} + \beta_{4,t} r_{i,t-1} + \beta_{5,t} r_{i,t-12:t-2} + \varepsilon_{i,t}, \tag{2}$$

$r_{i,t}$ is the monthly stock return. $Glob_{i,t-1}^{\text{Rank}}$ is the annual quintile rank for each of the globalization exposure measures: *SC*, *Log(WTV)*, or *#OC*. At the end of June *t*, all stocks in the sample are ranked into quintile portfolios based on globalization exposure measures (descending order in *SC*, *Log(WTV)*, and ascending order in *#OC*), and each stock *i* is assigned a rank from 1 to 5. We then transform the rank measure by subtracting 1 and dividing 4 so that rank now ranges from 0 to 1. Thus, the rank of 0 (1) indicates firms with the lowest (highest) exposure to globalization. This procedure allows us to interpret the coefficient on $Glob_{i,t-1}^{\text{Rank}}$ as the return on a zero-investment hedge portfolio (Mashruwala et al. 2006, DeLisle et al. 2020). Control variables include size (*Log(ME)*), book-to-market (*Log(B/M)*), and past performance measured at horizons of 1 month ($r_{i,t-1}$), and 12 to 2 months ($r_{i,t-12:t-2}$). We estimate Eq. (2) for each quintile of *ArbRisk* and *ArbCost*. Under the limits-to-arbitrage hypothesis, we expect that the slope parameter estimates of globalization exposure measures should be greater in magnitude in the high limit-to-arbitrage subsample than those in the low limit-to-arbitrage subsample.

Table 7 reports the average magnitudes of slope coefficients of globalization exposure, $Glob_{i,t-1}^{\text{Rank}}$, for each arbitrage risk quintile in Panel A and arbitrage costs quintile in Panel B, as well as the differences in the slope coefficients between the highest and lowest quintiles of limits-to-arbitrage. We document the striking difference between the extreme limits-to-arbitrage subsamples. For example, the coefficient for *SC* is 1.153 (*t*=2.79) in the high arbitrage risk quintile and 0.240 (*t*=1.38) in the low arbitrage risk quintile. This suggests that as firms' exposure to globalization decreases (lower rank for $Glob_{i,t-1}^{\text{Rank}}$ means higher *SC* and, thus, less globalization exposure), returns become less positive, and this relation is more pronounced in the case of high limits-to-arbitrage than in the case of low limits-to-arbitrage. The results with alternative measures of $Glob_{i,t-1}^{\text{Rank}}$ are consistent. Figure 1 reports a graphical representation of these results. Figure 1 shows a distinguishable pattern of decreasing slope coefficient estimates as globalization exposure measures decrease. The slope estimates are positive and mostly statistically significant, especially in Q5, suggesting that globalization premium is largest when limits-to-arbitrage are the most severe. Furthermore, Table 7 and Figure 1 demonstrate that arbitrage risk has a more severe impact on the globalization premium than arbitrage costs do.

To further investigate the incremental roles of arbitrage risk and arbitrage costs in explaining the globalization premium, we use the following framework:

$$r_{i,t} = \alpha_t + \beta_{1,t} Glob_{i,t-1}^{\text{Rank}} \times ArbRisk_{i,t-1}^{Rank} + \beta_{2,t} Glob_{i,t-1}^{\text{Rank}} \times ArbCost_{i,t-1}^{Rank} + \beta_{3,t} Glob_{i,t-1}^{\text{Rank}}$$
$$+ \beta_{4,t} ArbRisk_{i,t-1}^{Rank} + \beta_{5,t} ArbCost_{i,t-1}^{Rank} \ \ \beta_{6,t} \text{Log(ME)}_{i,t-1}$$
$$+\beta_{7,t} \text{Log(B/M)}_{i,t-1} + \beta_{8,t} r_{i,t-1} + \beta_{9,t} r_{i,t-12:t-2} + \varepsilon_{i,t}, \quad (3)$$

where $ArbRisk_{i,t-1}^{Rank}$ ($ArbCost_{i,t-1}^{Rank}$) is the scaled annual quintile rank of stock *i* at the end of June *t* for the arbitrage risk (arbitrage cost) measure. We transform both rank measures by subtracting 1 and dividing 4 so that ranks now range from 0 to 1. Thus, the rank of 0 (1) for $ArbRisk_{i,t-1}^{Rank}$ and $ArbCost_{i,t-1}^{Rank}$ indicates the lowest (highest) limit-to-arbitrage. The rank of 0 (1) for $Glob_{i,t-1}^{\text{Rank}}$ indicates firms with the lowest (highest) exposure to globalization. $ArbRisk_{i,t-1}^{Rank}$ is measured by $IVOL$. $ArbCost_{i,t-1}^{Rank}$ is the composite measure described in Section 3. The remaining variables are defined as in Section 3.

Table 8 reports the results for each measure of globalization exposure in separate panels. In the first two models of each Panel, we find that globalization premium is amplified by both arbitrage risk and arbitrage costs. For example, in Column (1) the coefficient on the interaction term is 0.681 (*t*=2.47). This suggests that when arbitrage risk is most severe ($ArbRisk^{Rank}$=1) the average monthly returns are -0.582% for stocks with the least globalization exposure ($Glob^{Rank}$= 0, highest *SC*) as opposed to 0.395% (= 0.681 + (-0.582) + 0.296) for stocks with the greatest globalization exposure ($Glob^{Rank}$= 1, lowest *SC*). Thus, consistent with our portfolio analysis in Table 6, the hedging portfolio strategy of highest minus lowest globalization exposure (i.e., globalization premium) yields 0.977% per month in returns when faced with high arbitrage risk.

In the last column of each Panel, we compare the incremental role of arbitrage risk and arbitrage costs. By including both measures of limits of arbitrage and its interaction terms with $Glob^{\text{Rank}}$, we find that the interaction term between $Glob_i^{\text{Rank}} \times ArbCost_i^{\text{Rank}}$ becomes insignificant. This finding suggests that arbitrage risk subsumes the explanatory power of arbitrage costs and therefore seems to be a more pronounced deterrent of arbitrage activity (e.g., Lam and Wei 2011, DeLisle et al. 2020).

Using industry-level measures of globalization, Panels A and B show that, while limits-to-arbitrage explain a portion of the globalization premium, globalization exposure measures still carry positive and statistically significant coefficients. In contrast, using a firm-level measure of globalization, Panel C shows that arbitrage risk subsumes globalization exposure entirely. Additionally, comparing Panel C of Table 8 to Panel C of Table 4, arbitrage risk renders globalization exposure statistically insignificant, while displacement risk does not.

Taken together, these results suggest that the strong predictive power of globalization exposure interacted with limit-to-arbitrage raises further doubts about the globalization premium deriving solely from displacement risk.

4.6. Sources of Globalization Premium: Displacement Risk vs Limits-to-arbitrage

Thus far, we provide evidence that the globalization premium is related to both market mispricing and risk-based explanations. In this section, our goal is to test these two non-mutually exclusive explanations to see if one dominates the other. To disentangle the mispricing and risk-based explanations, we follow Lam and Wei (2011) and contrast the effects of displacement risk and limits-to-arbitrage. The intuition for this analysis is as follows: If globalization premium is indeed solely driven by displacement risk (i.e. risk explanation), we expect to see no significant difference in the globalization premium across firms with different levels of limits-to-arbitrage after controlling for the level of displacement risk (Hypothesis 3). Similarly, if mispricing is the dominant explanation for globalization premium, then we should see no significant difference in globalization premium across firms with differing levels of displacement risk after controlling for the level of limits-to-arbitrage (Hypothesis 4). To test these hypotheses, we conduct portfolio analysis with triple sorts and multivariate analysis with triple interactions.

Similar to our earlier analyses, we independently sort all stocks into terciles based on one of three proxies for globalization exposure (i.e., *SC*, *Log(WTV)*, or *#OC*), our arbitrage risk measure (*ArbRisk*), and the composite measure of displacement risk (*DispRisk*).[14,15] We focus only on extreme terciles for each sorting measure. Similar to our prior definition, globalization premium is defined as the high-minus-low monthly returns between the highest and lowest terciles of globalization exposure measures. The results using *SC*, *Log(WTV)*, and *#OC* and are reported in Panel A, B, and C of **Table 9**, respectively.

Table 9 displays the globalization premium of portfolios containing stocks double-sorted into terciles of *DispRisk* and *ArbRisk*. For example, Panel A Column (1) reports a monthly globalization premium of 0.999% (*t*=2.27) for stocks that have both high *DispRisk* and high *ArbRisk*. Column (4) of Table 9 (portfolios in the highest *DispRisk* tercile) tests the mispricing explanation and reports the difference in risk-adjusted (α^{5F}) globalization premium between High and Low *ArbRisk* terciles while controlling for High *DispRisk*. We find that globalization premium is particularly pronounced among firms with the highest *ArbRisk* tercile. These results suggest that risk-based rational explanation is not the sole explanation for globalization premium. Mispricing also plays an important role in explaining globalization premium. We find similar results when using alternative measures of displacement risk as well as alternative measures for globalization premium in Panels B and C.

Analogously, Column (5) of Table 9 (portfolios in the highest *ArbRisk* tercile) reports the differences in globalization premium between High and Low *DispRisk* terciles while controlling for High *ArbRisk*. In other words, Column (5) reports the risk-adjusted (α^{5F}) differences between columns (1) and (3). Column (5) in each Panel shows that globalization premium is particularly pronounced among firms

[14] Note, our sample contains only manufacturing firms over a limited number of years. Due to data constraints the displacement measures are derived at the industry level and thus it does not provide sufficient variation for forming quintile or decile portfolios.
[15] Per our previous analysis, we demonstrate arbitrage risk has a stronger relation with the globalization premium than does arbitrage costs (Ali et al. 2003, Mashruwala et al. 2006, Lam and Wei 2011, DeLisle et al. 2020). Thus, we focus on arbitrage risk as the limit-to-arbitrage in all further analyses.

with the highest displacement risk. These results suggest that even after controlling for arbitrage risk, the risk-based explanation appears to be an important factor in explaining globalization premium. Overall, consistent with both Hypotheses 3 and 4, the joint tests reported in Table 9 suggest that globalization premium is driven by both limits-to-arbitrage and displacement risk.

Finally, we investigate the roles of mispricing and risk in explaining the globalization premium in a multivariate setting. **Table 10** reports the estimates of Fama and MacBeth (1973) regressions of the following model:

$$r_{i,t} = \alpha_t + \beta_{1,t} Glob_{i,t-1}^{\text{Rank}} \times DispRisk_{i,t-1}^{\text{Rank}} \times ArbRisk_{i,t-1}^{\text{Rank}} + \beta_{2,t} DispRisk_{i,t-1}^{\text{Rank}} \times ArbRisk_{i,t-1}^{\text{Rank}}$$
$$+ \beta_{3,t} Glob_{i,t-1}^{\text{Rank}} \times DispRisk_{i,t-1}^{\text{Rank}} + \beta_{4,t} Glob_{i,t-1}^{\text{Rank}} \times ArbRisk_{i,t-1}^{\text{Rank}} + \beta_{5,t} ArbRisk_{i,t-1}^{\text{Rank}}$$
$$+ \beta_{6,t} DispRisk_{i,t-1}^{\text{Rank}} + \beta_{7,t} Glob_{i,t-1}^{\text{Rank}} + \beta_{8,t} \text{Log(ME)}_{i,t-1}$$
$$+ \beta_{9,t} \text{Log(B/M)}_{i,t-1} + \beta_{10,t} r_{i,t-1} + \beta_{11,t} r_{i,t-12:t-1} + \varepsilon_{i,t}, \quad (3)$$

where $Glob_{i,t-1}^{\text{Rank}}$, $DispRisk_{i,t-1}^{\text{Rank}}$, and $ArbRisk_{i,t-1}^{Rank}$ is the scaled annual quintile rank of stock i at the end of June t for globalization exposure, sources of displacement, and arbitrage risk cost measure, respectively. Similar to Table 7, we transform all rank measures by subtracting 1 and dividing 4 so that ranks now range from 0 to 1. For example, the rank of 0 (1) for $ArbRisk_{i,t-1}^{\text{Rank}}$ indicates the lowest (highest) limit-to-arbitrage.

Table 10 reports the results for each measure of globalization exposure in separate panels. Once again, supporting our portfolio results, we find that globalization premium is related to both arbitrage and displacement risks. For example, in Column (2), the coefficient of the triple interaction term is 0.645 (t=2.52). Columns (2), (4), and (6) tell a similar story with respect to *DispRisk*: If *ArbRisk* is low (i.e. *ArbRisk*=0) then *DispRisk* affects neither overall returns nor the globalization premium. Conversely, Columns (2) and (4) show that *DispRisk* must be present for *ArbRisk* to affect the globalization premium. However, the results displayed in Column (6) demonstrate that *ArbRisk* still impacts the globalization premium even when *DispRisk* is absent (i.e. *DispRisk*=0). Additionally, as shown in Columns (4) and (6), the globalization premium can be completely explained by *DispRisk* and *ArbRisk*, as the coefficients on

Glob are no longer statistically significant. Thus, we find support for both Hypotheses 3 and 4 in that *DispRisk* and *ArbRisk* are both contributors to the globalization premium. However, *DispRisk* actually requires *ArbRisk* to be present in order to make such a contribution. While the reverse is true for *ArbRisk* at the industry level, at the firm-level *ArbRisk* does not require *DispRisk* to affect the globalization premium.

5. Conclusions

BLS focus on a risk-based explanation of the globalization premium, as they do not find pricing inefficiencies among firms with varying levels of globalization. However, they do not study important aspects of mispricing, in particular limits-to-arbitrage. In this study, we extensively examine the limits-to-arbitrage hypothesis as an alternative to the risk-based hypothesis. We find evidence supporting both explanations.

Altogether, the results indicate that both mispricing and displacement risk matter in explaining the globalization premium. It appears that the effect of displacement risk and arbitrage risk reinforce each other's effect on the globalization premium. The results suggest that limits-to-arbitrage and risk-based explanations play complementary roles in almost completely explaining the globalization premium. Furthermore, displacement risk is not related to the globalization premium in the absence of limits to arbitrage. In other words, using industry-level measures of globalization, limits to arbitrage must be present for displacement risk to play a role in the globalization premium (and vice-versa). However, when globalization is measured at the firm level, limits to arbitrage independently impacts the globalization premium while displacement risk does not. Thus, the evidence is not consistent with a purely risk-based explanation of the globalization premium. Our analyses contribute to the discussion surrounding the globalization premium by challenging the notion it arises purely from risk. The evidence we present suggests further research is required to disentangle the determinants of the globalization premium.

References

Acemoglu D, Carvalho VM, Ozdaglar A, Tahbaz‐Salehi A (2012) The network origins of aggregate fluctuations. *Econometrica* 80(5):1977-2016.
Ali A, Hwang L-S, Trombley MA (2003) Arbitrage risk and the book-to-market anomaly. *Journal of Financial Economics* 69(2):355-373.
Amihud Y (2002) Illiquidity and stock returns: cross-section and time-series effects. *Journal of financial markets* 5(1):31-56.
Amiti M, Khandelwal AK (2013) Import competition and quality upgrading. *The Review of Economics and Statistics* 95(2):476-490.
Amiti M, Konings J (2007) Trade liberalization, intermediate inputs, and productivity: Evidence from Indonesia. *American Economic Review* 97(5):1611-1638.
Asquith P, Pathak PA, Ritter JR (2005) Short interest, institutional ownership, and stock returns. *Journal of Financial Economics* 78(2):243-276.
Atilgan Y, Bali TG, Demirtas KO, Gunaydin AD (2020) Left-tail momentum: Underreaction to bad news, costly arbitrage and equity returns. *Journal of Financial Economics* 135(3):725-753.
Au AS, Doukas JA, Onayev Z (2009) Daily short interest, idiosyncratic risk, and stock returns. *Journal of Financial Markets* 12(2):290-316.
Autor D, Dorn D, Hanson G (2013) The China syndrome: Local labor market effects of import competition in the United States. *American Economic Review* 103(6):2121-2168.
Autor D, Dorn D, Hanson G, Song J (2014) Trade Adjustment: Worker-Level Evidence. *Quarterly Journal of Economics* 129(4).
Baldwin J, Gu W (2009) *15. The Impact of Trade on Plant Scale, Production-Run Length, and Diversification* (university of Chicago Press).
Barrot JN, Loualiche E, Sauvagnat J (2019) The globalization risk premium. *The Journal of Finance* 74(5):2391-2439.
Bartlesman E, Gray WB (1996) The NBER manufacturing productivity database. National Bureau of Economic Research Cambridge, Mass., USA.
Bernard AB, Jensen JB, Schott PK (2006a) Trade costs, firms and productivity. *Journal of monetary Economics* 53(5):917-937.
--- (2006b) Survival of the best fit: Exposure to low-wage countries and the (uneven) growth of US manufacturing plants. *Journal of International Economics* 68(1):219-237.
Bernard AB, Redding SJ, Schott PK, (2011) Multiproduct Firms and Trade Liberalization. *Quarterly Journal of Economics* 126(3):1271-1318.
Bloom N, Draca M, Van Reenen J (2016) Trade induced technical change? The impact of Chinese imports on innovation, IT and productivity. *The Review of Economic Studies* 83(1):87-117.
Broda C, Weinstein DE (2006) Globalization and the Gains from Variety. *The Quarterly journal of economics* 121(2):541-585.
Carhart MM (1997) On persistence in mutual fund performance. *The Journal of finance* 52(1):57-82.
D'avolio G (2002) The market for borrowing stock. *Journal of financial economics* 66(2-3):271-306.
David H, Dorn D, Hanson GH, Pisano G, Shu P (2019) Foreign Competition and Domestic Innovation: Evidence from US Patents. Report.
Del Gatto M, Di Liberto A, Petraglia C (2011) Measuring productivity. *Journal of Economic Surveys* 25(5):952-1008.
DeLisle RJ, Yüksel HZ, Zaynutdinova GR (2020) What's in a name? A cautionary tale of profitability anomalies and limits to arbitrage. *Journal of Financial Research* 43(2):305-344.
Fama EF, French KR (1993) Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics* 33:3-56.
--- (2015) A five-factor asset pricing model. *Journal of financial economics* 116(1):1-22.
Fama EF, MacBeth JD (1973) Risk, return, and equilibrium: Empirical tests. *Journal of political economy* 81(3):607-636.

Feler L, Senses MZ (2017) Trade shocks and the provision of local public goods. *American Economic Journal: Economic Policy* 9(4):101-43.
Fillat JL, Garetto S (2015) Risk, returns, and multinational production. *The Quarterly Journal of Economics* 130(4):2027-2073.
Garcia D, Norli Ø (2012) Geographic dispersion and stock returns. *Journal of Financial Economics* 106(3):547-565.
Goldberg PK, Khandelwal AK, Pavcnik N, Topalova P (2010) Imported intermediate inputs and domestic product growth: Evidence from India. *The Quarterly journal of economics* 125(4):1727-1767.
Gompers PA, Metrick A (2001) Institutional investors and equity prices. *The quarterly journal of Economics* 116(1):229-259.
Guedhami O, Knill AM, Megginson WL, Senbet LW (2021) The Dark Side of Globalization: Evidence from the Impact of COVID-19 on Multinational Companies. *University of South Carolina Working Paper*.
Hallak JC (2006) Product quality and the direction of trade. *Journal of international Economics* 68(1):238-265.
Hoberg G, Moon SK (2017) Offshore activities and financial vs operational hedging. *Journal of Financial Economics* 125(2):217-244.
--- (2019) The offshoring return premium. *Management Science* 65(6):2876-2899.
Hoberg G, Phillips G (2010) Product market synergies and competition in mergers and acquisitions: A text-based analysis. *Review of Financial Studies* 23(10):3773-3811.
--- (2016) Text-based network industries and endogenous product differentiation. *Journal of Political Economy* 124(5):1423-1465.
Hoberg G, Phillips G, Prabhala N (2014) Product market threats, payouts, and financial flexibility. *The Journal of Finance* 69(1):293-324.
Hummels D, Jørgensen R, Munch J, Xiang C (2014) The wage effects of offshoring: Evidence from Danish matched worker-firm data. *American Economic Review* 104(6):1597-1629.
Lam FE, Wei KJ (2011) Limits-to-arbitrage, investment frictions, and the asset growth anomaly. *Journal of Financial Economics* 102(1):127-149.
Lam FE, Wei C, Wei KJ (2017) Dissecting arbitrage costs. *Asian Finance Association (AsianFA) 2017 Conference*.
Lam FE, Li Y, Prombutr W, Wei KJ (2020) Limits‐to‐arbitrage, investment frictions, and the investment effect: New evidence. *European Financial Management* 26(1):3-43.
Li D, Zhang L (2010) Does q-theory with investment frictions explain anomalies in the cross section of returns? *Journal of Financial Economics* 98(2):297-314.
Li S, Qiu J, Wan C (2011) Corporate globalization and bank lending. *Journal of International Business Studies* 42(8):1016-1042.
Liu R, Rosell C (2013) Import competition, multi-product firms, and basic innovation. *Journal of International Economics* 91(2):220-234.
Mashruwala C, Rajgopal S, Shevlin T (2006) Why is the accrual anomaly not arbitraged away? The role of idiosyncratic risk and transaction costs. *Journal of Accounting and Economics* 42(1-2):3-33.
McManus TC, Schaur G (2016) The effects of import competition on worker health. *Journal of International Economics* 102:160-172.
Melitz MJ, Trefler D (2012) Gains from trade when firms matter. *Journal of Economic Perspectives* 26(2):91-118.
Mendenhall RR (2004) Arbitrage risk and post‐earnings‐announcement drift. *The Journal of Business* 77(4):875-894.
Mihov A, Naranjo A (2019) Corporate internationalization, subsidiary locations, and the cost of equity capital. *Journal of International Business Studies* 50(9):1544-1565.
Nagel S (2005) Short sales, institutional investors and the cross-section of stock returns. *Journal of financial economics* 78(2):277-309.

Ossa R (2015) Why trade matters after all. *Journal of International Economics* 97(2):266-277.
Pavcnik N (2002) Trade liberalization, exit, and productivity improvements: Evidence from Chilean plants. *The Review of Economic Studies* 69(1):245-276.
Pierce JR, Schott PK (2016) The surprisingly swift decline of US manufacturing employment. *American Economic Review* 106(7):1632-62.
--- (2018) Investment responses to trade liberalization: Evidence from US industries and establishments. *Journal of International Economics* 115:203-222.
--- (2020) Trade liberalization and mortality: evidence from US counties. *American Economic Review: Insights* 2(1):47-64.
Pontiff J (2006) Costly arbitrage and the myth of idiosyncratic risk. *Journal of Accounting and Economics* 42(1-2):35-52.
Shleifer A, Vishny RW (1997) The limits of arbitrage. *The Journal of finance* 52(1):35-55.
Stambaugh RF, Yu J, Yuan Y (2015) Arbitrage asymmetry and the idiosyncratic volatility puzzle. *The Journal of Finance* 70(5):1903-1948.
Trefler D (2004) The long and short of the Canada-US free trade agreement. *American Economic Review* 94(4):870-895.
Wurgler J, Zhuravskaya E (2002) Does arbitrage flatten demand curves for stocks? *The Journal of Business* 75(4):583-608.
Xu J (2012) Profitability and capital structure: Evidence from import penetration. *Journal of Financial Economics* 106(2):427-446.
Zhang XF (2006) Information uncertainty and stock returns. *The Journal of Finance* 61(1):105-137.
Zhou J, Booth L, Chang B (2013) Import competition and disappearing dividends. *Journal of International Business Studies* 44(2):138-154.

Table 1. Summary statistics and correlation matrix of key variables

This table reports summary statistics for stock characteristics. Panel A presents the time series averages of the cross-sectional means, medians, and standard deviations of shipping costs (*SC*), the natural logarithm of weight to value (*Log(WTV)),* the number of output countries (*#OC*), firm size, book-to-market ratio, operating profit, asset growth, and past returns. *SC* and *Log(WTV)* are measured at the industry-level, #OC is measured at the firm-level, and defined in Section 3.1. *Size* is the market value of equity at the end of each June. The book-to-market ratio, *B/M*, is defined as the book equity at the end of each June divided by market value of equity from December of the prior year. *Profitability* is measured as the gross profit minus SG&A expenses scaled by book value of equity. *Investment* is measured as the annual change in total assets. $r_{1,0}$ is the prior 1-month return. $r_{12,2}$ is the cumulative return over months 2 through 12 with 1 month lagged. All variables are winsorized at the 1 and 99% level. Panel B presents the time series mean cross-sectional correlation between *SC*, *Log(WTV),* and *#OC*. Spearman (Pearson) correlations reported above (below) the diagonal. The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10th percentile of NYSE/Amex stocks are excluded. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

Panel A. Summary Statistics

	Mean	Median	Stdev
Shipping Costs (SC)	0.064	0.040	0.304
Log(WTV)	-2.309	-2.096	1.770
Output Countries (#OC)	7.66	6.20	6.18
Size ($millions)	3595.35	597.35	12598.81
B/M	0.592	0.514	0.392
Profitability	0.173	0.177	0.126
Investment	0.208	0.099	0.411
$r_{1,0}$ (%)	1.58	0.58	12.99
$r_{12,2}$ (%)	24.19	14.43	51.34

Panel B. Correlation Matrix

	Shipping Costs (SC)	Log(WTV)	#OC
Shipping Costs	1	0.834	0.023
Log(WTV)	0.833	1	0.012
#OC	0.021	0.014	1

Table 2. Globalization exposure and cross-section of expected stock returns: Portfolio analysis

This table reports monthly equally-weighted average excess returns (R_e), Fama and French (1993) three-factor (α^{3F}), Carhart (1997) four-factor (α^{4F}), and Fama and French (2015) five-factor (α^{5F}) alphas to quintile portfolios sorted on the globalization exposure measure using either *SC*, *Log(WTV)*, or *#OC*, described in Section 3.1, as well as the differences in excess and risk-adjusted returns between various quintiles. The middle quintile portfolio is calculated as the equally-weighted portfolio created using the second, third, and fourth quintile portfolios. Quintile sorting of *SC* and *Log(WTV)* is in descending order, while *#OC* is sorted in ascending order. The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and are listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10th percentile of NYSE/Amex stocks are excluded. The *t*-statistics, reported in parentheses, are computed from standard errors that are adjusted for heteroskedasticity and serial correlation following Newey and West (1987), with a lag of 12. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

	Panel A. Shipping Costs				*Panel B. Log(WTV)*				*Panel C. #OC*			
	R_e (%)	α^{3F} (%)	α^{4F} (%)	α^{5F} (%)	R_e (%)	α^{3F} (%)	α^{4F} (%)	α^{5F} (%)	R_e (%)	α^{3F} (%)	α^{4F} (%)	α^{5F} (%)
Q5	1.025***	0.218	0.373**	0.553***	1.250***	0.327	0.490*	0.745**	0.794*	0.082	0.222*	0.119
	(2.99)	(1.16)	(1.99)	(3.14)	(2.78)	(1.05)	(1.66)	(2.51)	(1.92)	(0.76)	(1.96)	(1.02)
Q4	0.670**	-0.249*	-0.083	-0.073	0.790*	-0.145	0.051	0.061	0.784*	0.060	0.183	0.111
	(2.19)	(-1.80)	(-0.64)	(-0.67)	(1.95)	(-0.81)	(0.27)	(0.39)	(1.91)	(0.55)	(1.60)	(0.95)
Q3	0.608**	-0.311**	-0.109	-0.117	0.829**	-0.149	0.067	0.086	0.723*	0.003	0.130	0.051
	(2.09)	(-2.52)	(-0.87)	(-0.89)	(2.25)	(-0.95)	(0.46)	(0.53)	(1.79)	(0.02)	(1.33)	(0.41)
Q2	0.785***	-0.172	-0.026	-0.203*	0.730**	-0.306**	-0.079	-0.384**	0.607	-0.070	0.036	-0.065
	(3.27)	(-1.39)	(-0.24)	(-1.65)	(2.17)	(-2.09)	(-0.61)	(-2.57)	(1.64)	(-0.83)	(0.51)	(-0.71)
Q1	0.671***	-0.309**	-0.158	-0.452***	0.549	-0.481*	-0.327	-0.620***	0.532	-0.131	-0.015	-0.095
	(2.76)	(-2.29)	(-1.28)	(-3.46)	(1.51)	(-1.94)	(-1.48)	(-2.77)	(1.47)	(-1.40)	(-0.18)	(-0.86)
					Differences							
Q5-Q1	0.354*	0.526**	0.532**	1.005***	0.701*	0.807*	0.817**	1.366***	0.261*	0.213*	0.237**	0.214**
	(1.77)	(2.05)	(2.24)	(4.11)	(1.72)	(1.86)	(1.99)	(3.28)	(1.96)	(1.81)	(2.00)	(2.01)
Q5-Mid.	0.352*	0.474***	0.458***	0.694***	0.477	0.537*	0.486*	0.839***	0.088	0.082	0.102*	0.080
	(1.73)	(2.62)	(2.66)	(3.78)	(1.65)	(1.93)	(1.95)	(3.08)	(1.53)	(1.64)	(1.89)	(1.53)
Mid.-Q1	0.003	0.053	0.074	0.311**	0.225	0.270	0.331	0.526**	0.173*	0.131	0.135	0.135*
	(0.02)	(0.36)	(0.54)	(2.43)	(0.87)	(1.15)	(1.43)	(2.39)	(1.87)	(1.51)	(1.60)	(1.83)

Table 3. Displacement risk as a source of globalization premium: Portfolio analysis

Panel A (Panel B or Panel C) reports the performance of an equally-weighted long–short hedge strategy based on Shipping Cost (*Log(WTV)* or *#OC*) measures for stocks with high and low composite displacement risk measure. At the end of each June, all stocks in the sample are ranked into quintile portfolios based on one of three measures of globalization exposure: *SC*, *Log(WTV),* or *#OC.* The construction of these measures is described in Section 3.1. Quintile sorting of *SC* and *Log(WTV)* is in descending order, while *#OC* is sorted in ascending order. Independently, stocks are also ranked into five groups based on the composite displacement risk measure described in Section 3.2. For extreme quintiles of displacement risk measure, we report the average monthly excess returns as well as risk-adjusted performance based on the Fama and French (1993) three-factor (α^{3F}), Carhart (1997) four-factor (α^{4F}), and Fama and French (2015) five-factor (α^{5F}) model. The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10th percentile of NYSE/Amex stocks are excluded. The *t*-statistics, reported in parentheses, are computed from standard errors that are adjusted for heteroskedasticity and serial correlation following Newey and West (1987), with a lag of 12. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

	High Displacement Risk, *DispRisk*	Low Displacement Risk, *DispRisk*	High - Low *DispRisk*			
			R_e (%)	α^{3F} (%)	α^{4F} (%)	α^{5F} (%)
Panel A. Shipping Costs						
High (Q5)-Low(Q1)	0.781*	-0.023	0.804*	0.973**	0.776*	1.023**
t-stat	(1.81)	(-0.66)	(1.78)	(2.09)	(1.77)	(2.28)
Panel B. Log(WTV)						
High (Q5)-Low(Q1)	1.238**	-0.011	1.249*	1.413**	1.312**	1.663**
t-stat	(2.12)	(-0.03)	(2.22)	(2.27)	(2.07)	(2.48)
Panel C. #OC						
High (Q5)-Low(Q1)	0.666	-0.076	0.742*	1.122***	1.083***	0.803**
t-stat	(1.52)	(-0.32)	(1.96)	(3.33)	(3.51)	(2.13)

Table 4. Displacement risk as a source of globalization premium: Fama-MacBeth regressions

This table reports the results from Fama and MacBeth (1973) regressions of monthly stock returns on globalization exposure, *Glob*, using *SC*, *Log(WTV),* and *#OC* in columns (1), (2), and (3), respectively. Globalization exposure measures are described in Section 3.1, the composite displacement risk measure, *DispRisk*, is described in Section 3.2, and the control variables are described in Table 1. At the end of each June, all stocks in the sample are ranked into quintile portfolios based on SC, Log(WTV) or #OC measures. Quintile sorting of *SC* and *Log(WTV)* is in descending order, while *#OC* is sorted in ascending order. Independently, stocks are also ranked into five groups based on the composite displacement risk measure (*DispRisk*). SC^{Rank} (WTV^{Rank}, $\#OC^{Rank}$, $DispRisk^{Rank}$) is the scaled annual quintile rank for SC (Log(WTV), #OC, *DispRisk*) measure. The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and are listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10^{th} percentile of NYSE/Amex stocks are excluded. The *t*-statistics, reported in parentheses, are computed from standard errors that are adjusted for heteroskedasticity and serial correlation following Newey and West (1987), with a lag of 12. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07-2018:12.

	Shipping Costs	Log(WTV)	#OC
	(1)	(2)	(3)
$Glob^{Rank} \times DispRisk^{Rank}$	0.714*	1.232**	0.669*
	(1.85)	(2.45)	(1.75)
$Glob^{Rank}$	0.436**	0.624**	0.474*
	(2.19)	(2.34)	(1.74)
$DispRisk^{Rank}$	0.096	0.342	0.378
	(0.40)	(1.13)	(0.78)
Controls	Yes	Yes	Yes
Adj. R^2	0.061	0.072	0.060
Avg N	620	664	567

Table 5. Globalization exposure and limits-to-arbitrage: Mean quintile rankings

At the end of each June, all stocks in the sample are ranked into quintiles separately based on globalization exposure using *SC*, *Log(WTV)*, and *#OC* measures, described in Section 3.1. Quintile sorting of *SC* and *Log(WTV)* is in descending order, while *#OC* is sorted in ascending order. Independently, stocks are also ranked into five groups based on either an arbitrage risk ($ArbRisk^{Quintile}$) or a composite arbitrage costs ($ArbCost^{Quintile}$) measure. The constructions of arbitrage risk and arbitrage costs are described in Section 3.3. Panel A (Panel B) reports the time-series averages of the cross-sectional mean of $ArbRisk^{Quintile}$ ($ArbCost^{Quintile}$) across five globalization exposure using *SC*, *Log(WTV),* and *#OC* quintiles, as well as the differences in average quintile ranks for the measures of limits-to-arbitrage between various portfolio quintiles. The medium portfolio is an equally-weighted portfolio created using the second, third, and fourth quintile portfolios. The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and are listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10th percentile of NYSE/Amex stocks are excluded. The *t*-statistics, reported in parentheses, are computed from standard errors that are adjusted for heteroskedasticity and serial correlation following Newey and West (1987), with a lag of 12. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

	Q5 (High)	Q4	Q3	Q2	Q1 (Low)	Differences		
						High-Low	High-Med.	Med.-Low
Panel A. Arbitrage Risk ($ArbRisk^{Quintile}$)								
Shipping Cost	3.555	3.310	3.024	2.652	2.519	1.035***	0.564***	0.471***
Log(weight-to-value)	3.675	3.339	3.060	2.392	2.614	1.061***	0.765***	0.295***
#OC	3.401	3.075	2.982	2.757	2.565	0.836***	0.460***	0.376***
Panel B. Arbitrage Cost ($ArbCost^{Quintile}$)								
Shipping Cost	3.777	3.196	3.016	2.811	2.799	0.977***	0.772***	0.205***
Log(weight-to-value)	3.980	3.249	2.985	2.692	2.851	1.129***	1.014***	0.115*
#OC	3.540	3.075	2.969	2.850	2.863	0.677***	0.572***	0.105*

Table 6. Limits-to-Arbitrage as a source of globalization premium: Portfolio analysis

Panel A (Panel B) reports performance of equally-weighted long–short hedge strategy based on *SC*, *Log(WTV),* and *#OC* measures for stocks with high and low arbitrage risk (arbitrage costs). At the end of each June, all stocks in the sample are ranked into quintile portfolios based on one of the globalization exposure measures: *SC*, *Log(WTV),* or *#OC*. The construction of globalization measures is described in Section 3.1. Quintile sorting of *SC* and *Log(WTV)* is in descending order, while *#OC* is sorted in ascending order. Independently, stocks are also ranked into five groups based on either an *ArbRisk* or *ArbCost* measures described in Section 3.3. For the extreme quintile of limits-to-arbitrage measure (*ArbRisk* in Panel A and *ArbCost* in Panel B), we report the average monthly excess returns as well as risk-adjusted performance based on the Fama and French (1993) three-factor (α^{3F}), Carhart (1997) four-factor (α^{4F}), and Fama and French (2015) five-factor (α^{5F}) model. The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and are listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10th percentile of NYSE/Amex stocks are excluded. The *t*-statistics, reported in parentheses, are computed from standard errors that are adjusted for heteroskedasticity and serial correlation following Newey and West (1987), with a lag of 12. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

Panel A. Arbitrage Risk

	High Arbitrage Risk	Low Arbitrage Risk	High - Low *ArbRisk*			
			R_e (%)	α^{3F} (%)	α^{4F} (%)	α^{5F} (%)
Shipping Costs (SC)						
High (Q5)-Low(Q1)	1.179**	0.170	1.010**	1.011**	0.996**	1.344***
t-stat	(2.02)	(1.15)	(2.32)	(2.54)	(2.54)	(2.95)
Log(WTV)						
High (Q5)-Low(Q1)	1.760**	0.497**	1.263*	1.241**	1.403**	1.776***
t-stat	(2.00)	(2.38)	(1.87)	(2.13)	(2.33)	(2.74)
#OC						
High (Q5)-Low(Q1)	0.825**	0.251	0.574	0.596*	0.729*	1.064**
t-stat	(2.18)	(1.31)	(1.60)	(1.69)	(1.84)	(2.35)

Panel B. Arbitrage Cost

	High Arbitrage Costs	Low Arbitrage Costs	High - Low *ArbCost*			
			R_e (%)	α^{3F} (%)	α^{4F} (%)	α^{5F} (%)
Shipping Costs (SC)						
High (Q5)-Low(Q1)	0.975***	0.350**	0.624*	0.635*	0.753**	1.061***
t-stat	(2.62)	(2.26)	(1.81)	(1.95)	(2.23)	(3.04)
Log(WTV)						
High (Q5)-Low(Q1)	1.472**	0.665***	0.807	0.705	0.791*	1.266***
t-stat	(2.52)	(2.90)	(1.60)	(1.65)	(1.85)	(2.84)
#OC						
High (Q5)-Low(Q1)	0.694**	0.138	0.557	0.767**	0.788**	0.609
t-stat	(2.38)	(0.74)	(1.48)	(2.06)	(2.09)	(1.51)

Table 7. Globalization premium across various limits-to-arbitrage quintiles: Fama-MacBeth regressions

Panels A (Panel B) reports the estimated slopes for each quintile portfolio of arbitrage risk (arbitrage costs), respectively. At the end of each June, all stocks in the sample are ranked into quintile portfolios based on limit-to-arbitrage measures. The slopes are estimated using the following Fama and MacBeth (1973) regressions performed separately for each quintile of limits-to-arbitrage measure:

$$r_{i,t} = \alpha_t + \beta_{1,t}\text{Glob}_{i,t-1}^{\text{Rank}} + \beta_{2,t}\text{Controls}_{i,t-1} + \varepsilon_{i,t},$$

where $r_{i,t}$ is monthly stock returns. Globalization exposure measures include *SC*, *Log(WTV),* or *#OC* measures described in Section 3.1. The construction of arbitrage risk and arbitrage costs measures are described in Section 3.3. The control variables described in Table 1. At the end of each June, all stocks in the sample are ranked into five quintile portfolios based on SC, Log(WTV) or #OC measures. Quintile sorting of *SC* and *Log(WTV)* is in descending order, while *#OC* is sorted in ascending order. SC^{Rank} (WTV^{Rank}, $\#OC^{Rank}$) is the scaled annual quintile rank for *SC (Log(WTV), #OC*) measure. The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and are listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10^{th} percentile of NYSE/Amex stocks are excluded. The *t*-statistics, reported in parentheses, are computed from standard errors that are adjusted for heteroskedasticity and serial correlation following Newey and West (1987), with a lag of 12. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

	Limit-to-Arbitrage Quantiles					Difference
	5 (High)	4	3	2	1 (Low)	High – Low
Panel A. Arbitrage Risks						
Shipping Costs	1.153***	0.994***	0.292	0.364***	0.240	0.912***
	(2.79)	(2.95)	(1.00)	(2.93)	(1.38)	(2.73)
Log(WTV)	1.802***	1.533***	0.602	0.621***	0.563**	1.239**
	(2.68)	(2.95)	(1.33)	(3.68)	(2.21)	(2.44)
#OC	0.720**	0.398*	0.396*	0.256	0.135	0.585*
	(2.18)	(1.70)	(1.76)	(1.50)	(0.68)	(1.86)
Panel B. Arbitrage Costs						
Shipping Costs	0.896**	0.764**	0.664**	0.323**	0.179	0.717**
	(2.58)	(2.27)	(2.19)	(2.37)	(0.92)	(2.55)
Log(WTV)	1.292**	1.083**	1.032**	0.657***	0.690**	0.602*
	(2.36)	(2.14)	(2.25)	(3.76)	(2.33)	(1.73)
#OC	0.756**	0.438*	0.311*	0.336*	0.178	0.578*
	(2.05)	(1.75)	(1.70)	(1.78)	(0.94)	(1.71)

Table 8. Globalization premium and limits-to-Arbitrage: Fama-MacBeth regressions

This table reports the results from Fama and MacBeth (1973) regressions of monthly stock returns on globalization exposure, *Glob*, using *SC*, *Log(WTV),* and *#OC* in Panels A, B, and Panel C, respectively, and described in Section 3.1. Limits-to-arbitrage (*ArbRisk* and *ArbCost*) measures described in Section 3.3, and the control variables described in Table 1. At the end of each June, all stocks in the sample are ranked into quintile portfolios based on *SC*, *Log(WTV)* or *#OC* measures. Quintile sorting of *SC* and *Log(WTV)* is in descending order, while *#OC* is sorted in ascending order. Independently, stocks are also ranked into five groups based on *ArbRisk* or *ArbCost*. $Glob^{Rank}$ is the scaled annual quintile rank for globalization exposure (*SC*, *Log(WTV), #OC*). $ArbRisk^{Rank}(ArbCost^{Rank})$ is the scaled annual quintile rank for the arbitrage risk (arbitrage cost) measure. The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and are listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10^{th} percentile of NYSE/Amex stocks are excluded. The *t*-statistics, reported in parentheses, are computed from standard errors that are adjusted for heteroskedasticity and serial correlation following Newey and West (1987), with a lag of 12. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

	Panel A. Shipping Costs			Panel B. Log(WTV)			Panel C. #OC		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Glob^{Rank} \times ArbRisk^{Rank}$	0.681**		0.562**	0.977**		0.963**	0.600*		0.693*
	(2.47)		(2.04)	(2.34)		(2.35)	(1.75)		(1.87)
$Glob^{Rank} \times ArbCost^{Rank}$		0.628**	0.439		0.689*	0.195		0.436	0.170
		(2.33)	(1.55)		(1.78)	(0.54)		(1.30)	(0.46)
$Glob^{Rank}$	0.296**	0.313**	0.277**	0.568***	0.690***	0.548**	0.225	-0.298*	0.223
	(2.30)	(2.01)	(2.00)	(2.89)	(2.80)	(2.57)	(1.43)	(1.71)	(1.27)
$ArbRisk^{Rank}$	-0.582**		-0.508*	-0.337		-0.194	-0.644*		-0.362
	(-2.19)		(-1.85)	(-0.87)		(-0.51)	(-1.66)		(-0.92)
$ArbCost^{Rank}$		-0.247	-0.096		-0.199	-0.265		-0.132	-0.020
		(-1.07)	(-0.45)		(-0.62)	(-0.97)		(-0.30)	(-0.05)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	621	621	621	667	667	667	567	567	567
Adj. R^2	0.062	0.057	0.063	0.074	0.069	0.076	0.064	0.059	0.065

Table 9. Source of globalization premium: Displacement Risk vs. Limits-to-Arbitrage. Portfolio analysis

This table displays the risk-adjusted (α^{5F}) globalization premium of portfolios containing stocks double-sorted into terciles of *DispRisk* and *ArbRisk*. At the end of each June, all stocks in the sample are independently ranked into terciles portfolios based on globalization exposure measure (*SC, Log(WTV), #OC)* described in Section 3.1, the composite displacement risk measure, *DispRisk,* described in Section 3.2, the limits-to-arbitrage risk measure, *ArbRisk,* described in Section 3.3. For each globalization exposure measure *(SC in Panel A, Log(WTV)* in Panel B, and *#OC* in Panel C) and the extreme terciles of *DispRisk* and *ArbRisk*, we report the average monthly excess returns as well as risk-adjusted performance based on the Fama–French (2015) five-factor model (α^{5F}). Column (1) reports the average monthly excess return of stocks within high *DispRisk* and high *ArbRisk*. Column (2) reports the average monthly excess return of stocks within high *DispRisk* and low *ArbRisk*. Column (4) reports the risk-adjusted (α^{5F}) difference between columns (1) and (2). Column (5) reports the risk-adjusted (α^{5F}) difference between columns (1) and (3). The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and are listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10th percentile of NYSE/Amex stocks are excluded. The *t*-statistics, reported in parentheses, are computed from standard errors that are adjusted for heteroskedasticity and serial correlation following Newey and West (1987), with a lag of 12. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

	High *DispRisk* High *ArbRisk*	High *DispRisk* Low *ArbRisk*	Low *DispRisk* High *ArbRisk*	Differences:	
	R_e (%)	R_e (%)	R_e (%)	α^{5F} (%)	α^{5F} (%)
	(1)	(2)	(3)	(4) = (1)-(2)	(5) = (1)-(3)
Panel A. SC					
High (T3)-Low (T1)	0.999**	0.112	0.430	1.019**	1.106**
t-stat	(2.27)	(0.44)	(0.98)	(2.33)	(2.44)
Panel B. Log(WV)					
High (T3)-Low (T1)	1.206**	0.262	0.399	1.458***	1.301**
t-stat	(2.13)	(0.69)	(0.80)	(2.72)	(2.32)
Panel C. #OC					
High (T3)-Low (T1)	1.032**	0.136	0.349	0.850**	0.743*
t-stat	(2.30)	(0.96)	(1.29)	(2.29)	(1.86)

Table 10. Source of globalization premium: Displacement Risk vs. Limits-to-Arbitrage. Fama-MacBeth Regressions

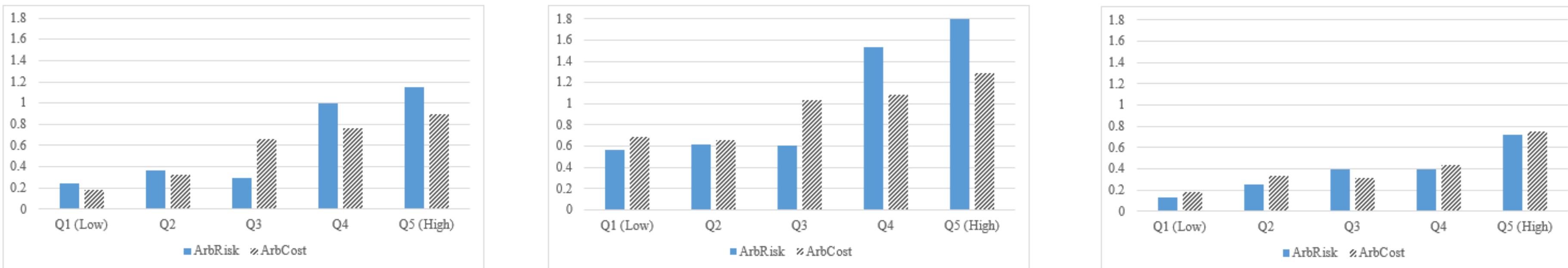
This table reports the results from Fama and MacBeth (1973) regressions of monthly stock returns on globalization exposure using *SC, Log(WTV),* and *#OC* measure in Panels A, B, and C, respectively, and described in Section 3.1. The composite displacement risk measure, *DispRisk*, described in Section 3.1. The limits-to-arbitrage, *ArbRisk*, measure described in Section 3.3. The control variables described in Table 1. At the end of each June, all stocks in the sample are ranked into terciles portfolios based on *SC, Log(WTV), #OC, DispRisk,* and *ArbRisk* measures. $Glob^{\text{Rank}}$, $DispRisk^{\text{Rank}}$, and $ArbRisk^{Rank}$ is the scaled annual quintile rank of stock i at the end of June t for globalization exposure, sources of displacement, and arbitrage risk cost measure, respectively. The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and are listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10^{th} percentile of NYSE/Amex stocks are excluded. The *t*-statistics, reported in parentheses, are computed from standard errors that are adjusted for heteroskedasticity and serial correlation following Newey and West (1987), with a lag of 12. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

	Panel A. Shipping Costs		*Panel B. Log(WTV)*		*Panel C. #OC*	
	(1)	(2)	(3)	(4)	(5)	(6)
$Glob^{Rank} \times DispRisk^{Rank} \times ArbRisk^{Rank}$		0.645**		1.244***		0.723**
		(2.52)		(3.53)		(2.40)
$DispRisk^{Rank} \times ArbRisk^{Rank}$		-0.179		-0.287		-0.232
		(-0.95)		(-1.21)		(-1.13)
$Glob^{Rank} \times DispRisk^{Rank}$	0.498**	0.190	0.977***	0.090	0.247	0.396
	(2.03)	(0.78)	(2.61)	(0.26)	(1.32)	(1.61)
$Glob^{Rank} \times ArbRisk^{Rank}$	0.193*	0.155	0.422**	0.229	0.283**	0.386*
	(1.85)	(1.02)	(2.44)	(1.50)	(2.02)	(1.67)
$DispRisk^{Rank}$	0.230	0.134	0.555**	-0.063	0.259	0.025
	(1.50)	(0.74)	(2.47)	(-0.26)	(1.30)	(0.11)
$ArbRisk^{Rank}$	-0.356***	-0.373**	-0.326*	-0.530**	-0.395**	-0.487**
	(-2.90)	(-2.50)	(-1.85)	(-2.53)	(-2.03)	(-2.11)
$Glob^{Rank}$	0.311**	0.302*	0.580***	0.273	0.117	0.118
	(2.15)	(1.85)	(3.24)	(1.45)	(1.10)	(1.10)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	620	620	667	667	567	567
Avg. N	0.069	0.071	0.083	0.084	0.070	0.072

Figure I. Regression Slopes on Globalization Measures across Various Limits-to-arbitrage Quintiles.

This figure illustrates the estimated slopes (β_1) on globalization exposure measures from the following Fama and MacBeth (1973) regressions performed separately for each quintile of limits-to-arbitrage measure: $r_{i,t} = \alpha_t + \beta_{1,t}\text{Glob}_{i,t-1}^{\text{Rank}} + \beta_{2,t}\text{Controls}_{i,t-1} + \varepsilon_{i,t}$, as described in Table 7. Each panel for each globalization exposure measure shows slopes for two measures of limits-to-arbitrage: arbitrage risk (solid bar) and arbitrage costs (pattern bar), as described in Section 3.3. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

Panel A. Shipping Costs *Panel B. Log(WTV)* *Panel C. #OC*



Appendix.

Table A1. Description of arbitrage costs proxies used to construct the composite arbitrage costs (*ArbCost*) measure.

Name	Acronym	Ranking Order	Data Source	Definition	Related Studies
Number of institutions	NOINST	Descending	2018 Thomson Reuters Institutional (13F) holdings	Number of institutions at the end of June. Zero number of institutions is assigned if a firm is not in the 13F database	Bartov, Radhakrishan, and Krinsky (2000); Ali, Hwang, and Trombley (2003); Mashruwala, Rajgopal, and Shevlin (2006)
Analysts following	Analysts	Descending	IBES	Number of analysts following at the end of June. Zero number of institutions is assigned if a firm is not in IBES	Hong, Lim, and Stein (2000); Ali, Hwang, and Trombley (2003); Lam and Wei (2011)
Bid-ask spread	BidAsk	Ascending	CRSP	Average daily bid–ask spread divided by the average of daily spread over three most recent months before the end of June	Stoll (2000); Mashruwala, Rajgopal, and Shevlin (2006)
Short Interest	Short	Descending	COMPUSTAT and CRSP	Short interest as a fraction of shares outstanding	Asquith, Pathak, and Ritter (2005)
Amihud illiquidity	Illiquidity	Ascending	CRSP	Average Amihud illiquidity measure over three most recent months before the end of June	Amihud (2002)
Trading volume	Volume	Descending	CRSP	Average of daily dollar trading volume over three most recent months at the end of June	Bhushan (1994); Datar, Naik, and Radcliffe (1998)
Institutional ownership	IOWN	Descending	2018 Thomson Reuters Institutional (13F) holdings	Percentage of shares outstanding held by institutional investors at the end of June	Ali, Hwang, and Trombley (2003); Lam and Wei (2011)

Table A2. Summary statistics and correlation matrix of arbitrage costs proxies used to construct the composite arbitrage costs (*ArbCost*) measure.

This table reports summary statistics for the arbitrage costs proxies used to construct the composite arbitrage costs measure, *ArbCost*. Panel A presents the time series averages of the cross-sectional means, medians, and standard deviations of Amihud illiquidity (*Ill*), bid-ask spread (*Bid-Ask*), trading volume (*Volume*), institutional ownership (*IOWN*), the number of institutions (*NOINST*), short interest ratio (*Short*), and the number of analysts following (*Analysts*). All variables described in Table A1. Panel B reports the Pearson correlation among the arbitrage costs proxies. The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and are listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10^{th} percentile of NYSE/Amex stocks are excluded. The *t*-statistics, reported in parentheses, are computed from standard errors that are adjusted for heteroskedasticity and serial correlation following Newey and West (1987), with a lag of 12. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

Panel A. Summary Statistics

	Mean	Median	Stdev
Ill (x 10,000)	0.008	0.000	0.074
Bid-Ask	0.036	0.032	0.019
Volume (millions)	33.62	6.01	90.78
IOWN	0.457	0.514	0.368
NOINST	119	70	168
Short	0.035	0.002	0.096
Analysts	4.750	2.330	6.210

Panel B. Correlation Matrix

	ArbRisk	ArbCost	Ill	Bid-Ask	Volume	IOWN	NOINST	Short
ArbCost	0.553							
Ill	0.120	-0.282						
Bid-Ask	0.736	0.725	0.315					
Volume	0.230	0.503	0.227	0.148				
IOWN	0.268	0.768	-0.318	0.169	0.649			
NOINST	0.399	0.795	-0.099	0.384	0.855	0.819		
Short	0.210	0.651	-0.277	0.234	0.456	0.625	0.597	
Analysts	0.219	0.604	-0.111	0.098	0.749	0.692	0.795	0.539

Table A3. Summary statistics and correlation matrix of displacement risk proxies used to construct the composite displacement risk (*DispRisk*) measure.

This table reports summary statistics for displacement risk proxies used to construct the composite displacement risk measure, *DispRisk*. Panel A presents the time series averages of the cross-sectional means, medians, and standard deviations of return on assets (*ROA*), the growth of total factor productivity (*DTFP*), product market similarity (*Similarity*), and product market fluidity (*Fluidity*) described in Section 3.2. Panel B reports the Pearson correlation among the displacement risk proxies. The sample covers common stocks in 439 unique manufacturing industries (with four-digit SIC codes between 2000 and 3999) and are listed on the NYSE, AMEX, and NASDAQ. Stocks whose market capitalization is below the 10^{th} percentile of NYSE/Amex stocks are excluded. The *t*-statistics, reported in parentheses, are computed from standard errors that are adjusted for heteroskedasticity and serial correlation following Newey and West (1987), with a lag of 12. ***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively. The sample period for *Log(WTV)* is from 1990:07 – 2018:12, for *#OC* is from 1998:07-2018:12, and for all other variables are from 1974:07- 2018:12.

Panel A. Summary Statistics

	Mean	Median	Stdev
ROA	0.037	0.045	0.644
DTFP	0.017	0.007	0.099
Fluidity	7.198	6.586	3.616
Similarity	9.439	2.288	18.118

Panel B. Correlation Matrix

	DispRisk	ROA	DTFP	Fluidity
ROA	0.433			
DTFP	0.187	-0.006		
Fluidity	0.318	0.166	0.026	
Similarity	0.304	0.152	0.051	0.821