Trade Credit and International Stock Return Comovement*

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Abstract

We examine trade credit links between firms as a channel of international return comovement. We model firms in different countries connected by trade credit links in segmented stock markets with asymmetrically informed speculators. The model predicts that the cross-serial correlation of country stock returns increases as trade credit increases. Using data from 55 countries from 1993 to 2009, we find evidence consistent with the model. Stock returns of high trade credit firms in exporting (importing) countries are predicted by the returns of the countries that consume this output (supply inputs). A model-implied cross-country long-short portfolio strategy yields 12-15% annualized, after risk adjustment.

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Observers of international financial markets have long sought to understand why ostensibly local shocks to economic fundamentals such as the East Asian crisis of 1997, the Russian crisis of 1998 and the credit crisis of 2007 to 2009 have been accompanied by greater comovement between stock markets around the world. One important channel for comovement that has been identified from analysis of these episodes is the actions of financial intermediaries such as investment managers or banks,[1] and during these episodes, the lack of apparent comovement in fundamentals across markets has been cited as evidence of the intermediaries' role in causing contagion.[2] In this paper, we analyze a source of comovement in international stock returns that arises from the comovement of fundamentals, and has been given rather less attention in the literature, namely, the role of trade credit links between firms in different countries.

Trade credit is an important source of financing for many firms (Mian and Smith, 1992, 1994). Further, it appears particularly important as a source of financing for firms that are bank credit constrained as suggested by evidence in Petersen and Rajan (1994a, 1995) (see also Biais and Gollier, 1997). We take these observations as our starting point, and hypothesize that trade credit between firms in different countries may be a transmission channel for local financial shocks even in the absence of a dependence on external financing. To do so, we build a simple asset pricing model that explores the implications of trade credit for the comovement of stock returns across firms in different countries, and provide empirical evidence that is consistent with the model.

Our simple model consists of two countries with segmented stock markets each consisting of a representative firm. Each stock market is populated by domestic investors, who invest only in their local market, and by privately informed speculators, who invest in both markets. We designate one firm/country as the consumer of outputs and the other firm/country as the producer. Trade credit implies that the dividends of the two firms will be correlated. The investment opportunities available to speculators imply that they trade for information motives and for rebalancing motives, with the latter driven by the induced correlation between the two stock markets' returns.

[1] See, for example, Kaminsky and Reinhart (2000), Kaminsky, Lyons and Schmukler (2004), Broner, Gelos and Reinhart (2006), Boyer, Kumagai and Yuan (2006) and Jotikasthira, Lundblad and Ramadorai (2010) for empirical work, and Calvo (2005) and Pavlova and Rigobon (2008) for theory.

[2] See Forbes and Rigobon (2001), Karolyi (2003), and Claessens and Forbes (2004) for useful surveys.

To see how the model works, consider a positive shock to the fundamentals in the consumer country, about which speculators have private information. In equilibrium some of this information flows to prices, causing a rise in the stock price of the consumer country. If some information remains private, dividends will be higher than anticipated in prices, meaning that returns will be positive again in the future. This causes momentum in countries' stock markets, and since the two dividend processes are positively correlated, there will also be cross-asset serial correlation, i.e., stock returns in the producer country can be predicted from prior movements in consumer country returns. In such an equilibrium, domestic investors in each country increase their holdings of the local asset while speculators decrease their holdings in response to a hedging or rebalancing motive. When speculators sell on account of their rebalancing needs they have to concede some expected return to domestic investors in order to induce them to buy. Higher trade credit leads to a stronger correlation across the two assets and hence, a stronger rebalancing motive. This comparative statics exercise suggests that when trade credit is higher, cross-asset serial correlation is also higher.

Our empirical analysis takes as its starting point the analysis of Rizova (2010), who provides empirical evidence in the international context that mimics the domestic analysis of Menzly and Ozbas (2010a). Rizova finds that high-exporting (or producer) countries' stock returns are predictable in advance using signals about their consumer countries' stock returns (and high-importing countries' stock returns are predictable using the returns of their main suppliers). We extend this analysis by classifying the firms within these country indices by their levels of trade credit (accounts receivable, accounts payable and a net trade credit measure that aggregates the two), and find that the predictable performance of producer countries' stock indices is driven by the firms with high levels of trade credit. Within each tercile of producer countries sorted by their consumer countries' past performance, a strategy that goes long low-trade credit firms and short high-trade credit firms generates significantly positive stock returns. Across these terciles, a strategy that goes long firms in countries with high-performing customers and short high-trade credit firms in countries with poor-performing customers generates returns of between 12 and 15% per annum depending on the method of risk adjustment. Importantly, we find that the trade credit dimension captures essentially all of the returns from the consumer-performance-prediction strategy. Put differently, we find evidence that the proximate driver of the cross-serial correlation in country index returns is the trade credit channel. We also check the robustness of these empirical results to double-sorting firms by our trade credit measures and other attributes that might be correlated with trade credit such as firm size and firm short-term debt levels. The returns on the trading strategy if anything are enhanced by the introduction of these controls.

Our theory and empirical results are related to the extensive literature on trade credit. Fisman and Love (2003) show that firms in countries with less developed financial markets appear to substitute trade credit provided by their suppliers to finance growth. Demirguc-Kunt and Maksimovic (2001) consider the important role played by trade credit in emerging markets with under-developed legal systems and capital markets. Wilner (2000) and Cuñat (2007) suggest that trade credit could provide firms with a shield during financial distress, relative to credit from financial intermediaries. Many papers have also considered the link between credit rationing from formal financial markets and the extent to which firms engage in trade credit (Petersen and Rajan, 1994a, 1994b, 1995, Mian and Smith, 1992, and Biais and Gollier, 1997). Our focus relative to these paper is different in that we are primarily interested in the asset pricing implications of the trade credit links between firms. We find that these links seem to generate significant comovement between the stock returns of such connected firms. In this sense our paper is related to Choi and Kim (2005) who show that trade credit can serve as a mechanism to spread shocks when monetary policy is tightened. Their (empirical) analysis focuses on the U.S. market, whereas our focus is on international return comovement.

The remainder of the paper is organized as follows. Section 1 presents the model and theoretical predictions. Section 2 describes the empirical methodology employed. Section 3 describes the data. Section 4 discusses the results, and Section 5 concludes. The appendix contains the proof of the proposition in the model section.

1. A Simple Model of International Comovement

We present a simple model of international comovement, and in particular of cross-serial correlation in stock markets, due to portfolio rebalancing by some investors. The model has two dates, $t = 1, 2$ and two countries, a 'consumer' country labelled C and 'producer' country labelled P. Each country has one firm that pays a liquidating dividend at date 2. The firm in the consumer country generates a liquidating dividend of

$$D_t^C = \varepsilon_t^C + u_t^C.$$

The two shocks are assumed normally distributed with zero means and variances $\sigma^2_{\varepsilon C}$ and σ^2_{uC}, respectively.

We view trade credit as a mechanism through which a firm can manage or share risks using contractual business links with other firms. For example, a firm may increase its accounts receivables with customers in good times or increase its accounts payables with suppliers in bad times. The evidence is supportive of this view of trade credit: Petersen and Rajan (1995) find that more profitable sellers provide more trade credit and Nilsen (1994) finds that during monetary contractions, small firms react by borrowing more from their suppliers.

Our interpretation does not preclude the idea that credit rationing from formal financial markets (e.g. banks) might underpin the need for firms to engage in trade credit (e.g. Petersen and Rajan, 1994a, 1994b, 1995, Mian and Smith, 1992, or Biais and Gollier, 1997). Instead, the 'risk management' we have in mind arises in these models of trade credit in a manner that is consistent with the evidence indicated above. The main advantage of our reduced form approach is the simplicity with which we can analyze trade credit in an asset pricing model, letting us focus on the asset pricing implications of trade credit. The main limitation is that we leave unmodeled the agency decision to concede trade credit.

We assume that the firm in the producer country has dividends of

$$D_t^P = \alpha D_t^C + \varepsilon_t^P + u_t^P,$$

where $\alpha > 0$. We interpret the parameter α as the level of trade credit but note that α is also identified by the more standard role of the correlation between country dividends, i.e., $\mathrm{E}\left[D_t^P D_t^C\right] = \alpha\sigma^2_{\varepsilon C}$.

Each country has a continuum of investors with unit mass. The fraction $1 - \mu_i$ of investors in country $i = C, P$ invests domestically only, and the fraction μ_i of investors in the same country invests in both countries. We label the μ_i investors as speculators and the rest of the local investors as domestic. This segmentation hypothesis has been used in many papers, most notably in Merton (1987). It is consistent with the home bias in international equity portfolios and with other features of international investing (see Albuquerque et al., 2007). Investors have constant absolute risk aversion of $\gamma > 0$ about their date-2 wealth,

W_2, and start off with wealth $W_1 > 0$. Investors can also borrow and lend at the risk free rate r. We normalize the risk free rate to $r = 0$. There is an exogenous, random supply of shares in each country, z^i, with mean zero and variance σ^2_{zi}, with $i = C, P$. We solve for a rational expectations equilibrium where investors take prices as given when solving for their asset demands. The equilibrium price in turn is such that total stock demands equal the stock supply.

The final aspect to consider in the model is the information available to each investor. Speculators hold assets from the two countries and have better information than domestic investors. For simplicity, we assume that speculators learn both shocks, ε^C and ε^P. Let $\bar{D}^C_t = \varepsilon^C_t$ and $\bar{D}^P_t = \alpha\varepsilon^C_t + \varepsilon^P_t$ and write

$$\begin{aligned} D^C_t &= \bar{D}^C_t + u^C_t \\ D^P_t &= \bar{D}^P_t + \alpha u^C_t + u^P_t. \end{aligned}$$

This decomposition of dividends can be derived from a model where speculators receive signals about future dividends. In that setting, $\bar{D}^i_t$ is the expectation of the future dividend conditional on the signal and u^i is the forecast error made by speculators. Domestic investors learn only from their local price as there is no additional public information. That domestic investors learn from prices separates this model from the model of investor inattention of Menzly and Ozbas (2010b). However, we maintain the assumption that domestic investors in each country invest only domestically, and learn only from local prices.

We now turn to the derivation of the equilibrium and refer the reader to the Appendix for details.

A. Investor asset demands and equilibrium prices

From the domestic investors' optimization problem, we obtain their local-asset demands, θ^i, for $i = C, P$:

$$\theta^i_t = \frac{\mathrm{E}^d_t\left[D^i_{t+1} - P^i_t\right]}{\gamma \mathrm{Var}^d_t\left[D^i_{t+1} - P^i_t\right]}.$$

The upperscript letter d means that the conditional moments use the information available to the domestic investors. According to the asset demand, domestic investors in country i face a mean-variance trade-off and buy more of country i's stock if they expect a higher return for the same conditional variance.

Likewise, from the speculators' optimization problem we obtain η^i, their asset demand for country i's stock:

$$\begin{bmatrix} \eta^C \\ \eta^P \end{bmatrix} = \frac{1}{\gamma\sigma_{uP}^2} \begin{bmatrix} \frac{\sigma_{uP}^2+\alpha^2\sigma_{uC}^2}{\sigma_{Cu}^2}\left(\bar{D}_{t+1}^C - P_t^C\right) - \alpha\left(\bar{D}_{t+1}^P - P_t^P\right) \\ \bar{D}_{t+1}^P - P_t^P - \alpha\left(\bar{D}_{t+1}^C - P_t^C\right) \end{bmatrix}. \quad (1)$$

Speculators buy more of country's i stock if the expected return on the country's stock is high, or if the expected return on the other country's stock is low. The former trading motive is driven primarily by information whereas the latter trading motive is a rebalancing effect that obtains because of the trade credit linkage. The size of the rebalancing effect is determined by the magnitude of trade credit α which also determines the positive conditional correlation between the two stocks.

The equilibrium in the C and P countries requires market clearing:

$$\begin{aligned} z_C &= \mu_C\eta^C + (1-\mu_C)\,\theta^C \\ z_P &= \mu_P\eta^P + (1-\mu_P)\,\theta^P. \end{aligned}$$

In the appendix we show that the stock markets clear with the following stock prices:

Proposition 1 *The date-1 stock market equilibrium is characterized by the following prices:*

$$\begin{aligned} P_t^C &= \bar{D}_{t+1}^C - b_{CC}\left(\bar{D}_{t+1}^C - \mathrm{E}_t^d\left(\bar{D}_{t+1}^C\right)\right) - b_{CP}\left(\bar{D}_{t+1}^P - \mathrm{E}_t^d\left(\bar{D}_{t+1}^P\right)\right) - h_{CC}z_t^C - h_{CP}z_t^P \\ P_t^P &= \bar{D}_{t+1}^P - b_{PP}\left(\bar{D}_{t+1}^P - \mathrm{E}_t^d\left(\bar{D}_{t+1}^P\right)\right) - b_{PC}\left(\bar{D}_{t+1}^C - \mathrm{E}_t^d\left(\bar{D}_{t+1}^C\right)\right) - h_{PP}z_t^P - h_{PC}z_t^C. \end{aligned}$$

The stock price in country i equals the present value of speculators' dividend forecast in that country, $\bar{D}_{t+1}^i$, adjusted for the presence of private information as illustrated by the forecast error made by domestic investors about the country's dividend, $\bar{D}_{t+1}^i - \mathrm{E}_t^d\left(\bar{D}_{t+1}^i\right)$, as well as by the random supply of the country's stock. A positive forecast error means that prices are below future expected dividends provided $b_{ii} > 0$ because a fraction of investors fails to recognize the ability of the stock to pay dividends. Country i's stock price also depends on the forecast error made by domestic investors in the *foreign* country about their own dividend, $\bar{D}_{t+1}^j - \mathrm{E}_t^d\left(\bar{D}_{t+1}^j\right)$, for $j \neq i$, as well as the random supply in that foreign country. This last feature of equilibrium prices is due to the fact that the pricing in one market affects speculators' rebalancing trades in the other market. Specifically, if the forecast error in C is large and expected returns there are high then speculators may sell in P for rebalancing purposes forcing a lower price, hence $b_{PC} > 0$. Likewise, noise supply in either market is likely to contribute to low prices, $h_{ii}, h_{ij} > 0$.

Given equilibrium prices, we can solve the learning problem of the domestic investors. After observing the equilibrium prices, domestic investors in country i learn $\Pi_t^i \equiv P_t^i - b_{ii}\mathrm{E}_t^d\left(\bar{D}_t^i\right)$ or

$$\begin{aligned} \Pi_t^C &= (1-b_{CC})\,\bar{D}_t^C - b_{CP}\left(\bar{D}_t^P - \mathrm{E}_t^d\left(\bar{D}_t^P\right)\right) - h_{CC}z^C - h_{CP}z^P \\ \Pi_t^P &= (1-b_{PP})\,\bar{D}_t^P - b_{PC}\left(\bar{D}_t^C - \mathrm{E}_t^d\left(\bar{D}_t^C\right)\right) - h_{PP}z^P - h_{PC}z^C. \end{aligned}$$

That is, Π_t^i serves as noisy signal for $\bar{D}^i$ for domestic investors in country i. The conditional means and variances used by domestic investors to determine their asset demands have to be consistent with equilibrium prices and Π_t^i. For brevity we leave the construction of these moments to the Appendix, where we also show how to find the conditional forecast errors, $\bar{D}_t^i - \mathrm{E}_t^d\left(\bar{D}_t^i\right)$. This concludes the derivation of the equilibrium.

B. The cross-serial covariance in stock returns

In the Appendix we show that the equilibrium is characterized by a non-linear system of equations which can be solved numerically. We use comparative statics on the numerical equilibrium to study the properties of the theoretical cross-serial covariance $\mathrm{Cov}\left(P_t^C, D_{t+1}^P - P_t^P\right)$. This covariance constitutes the relevant moment for our hypothesis because its sign is the sign of the slope coefficient in a cross-predictability regression of producer country returns on consumer country returns. That is, in the model:

$$\mathrm{E}\left[D_{t+1}^P - P_t^P | P_t^C\right] = \frac{\mathrm{Cov}\left(P_t^C, D_{t+1}^P - P_t^P\right)}{\mathrm{Var}\left(P_t^C\right)} P_t^C.$$

The unconditional covariance indicates how producer country future returns co-move with consumer country current returns (notice that P_{t-1}^C should be interpreted as zero in order to interpret P_t^C as a return in this model with just two dates). Besides being interested in the sign of this covariance, we are also interested in how it changes with the size of trade credit, α.

Figure 1 gives the value of this covariance in each equilibrium as we vary α and consider two possible levels for $\sigma_{\varepsilon C}^2$. The two values of $\sigma_{\varepsilon C}^2$ are meant to illustrate how the model behaves when the effect of rebalancing trades dominates the value of this covariance (low $\sigma_{\varepsilon C}^2$) vis-à-vis when the effect of information trades dominates the value of the covariance (high $\sigma_{\varepsilon C}^2$).

First we describe how rebalancing trades and information trades affect this covariance. Consider good private information about consumer country dividends. When some, though not all, of this information is

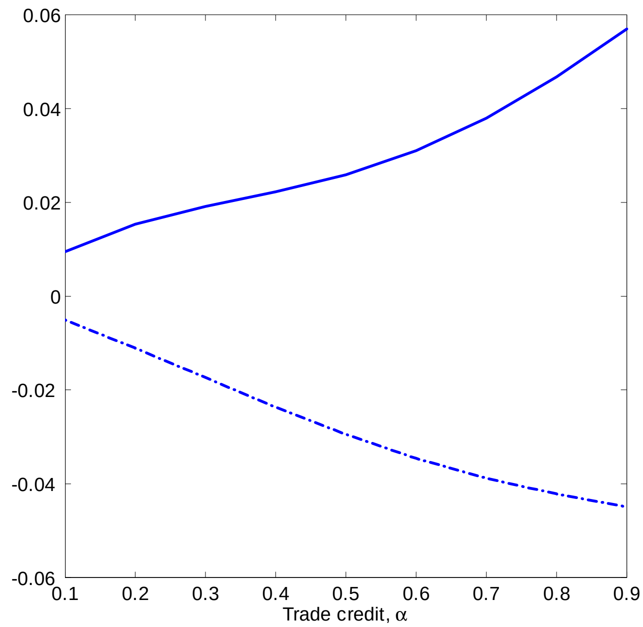

Figure 1: **Cross-serial return covariance.** The figure plots the equilibrium value of Cov $\left(D^P_{t+1} - P^P_t, P^C_t\right)$ against several values of α. The solid line has $\sigma^2_{\varepsilon C} = 2$ and the dashed-dotted line has $\sigma^2_{\varepsilon C} = 1$. The remaining parameters are $\sigma^2_{\varepsilon P} = \sigma^2_{uC} = \sigma^2_{uP} = 1$ and $\sigma^2_{zC} = \sigma^2_{zP} = 0.1$, $\gamma = 5$, $\mu_P = \mu_C = 0.5$.

revealed in the stock price, the price increases. However, domestic investors have a positive forecast error and the price is below the expected value of dividends. This means that a high price today is followed by a high dividend in the future and tends to generate momentum. Further, when the producer country stock correlates positively with the consumer country stock, we also have positive cross-serial correlation. In such an equilibrium, domestic investors in each country increase their holdings of the local asset following this good information while speculators decrease their holdings in response to a hedging or rebalancing motive.

Consider now the effect of rebalancing trades, which, say, come from a low supply realization. The presence of random supply acts as a confounding source of noise for domestic investors trying to learn the private information of speculators: Low supply drives prices up mimicking good private information. However, because dividends are not expected to be high in the future, expected returns must be low following a low supply realization, which leads to negative serial correlation in stock returns and negative cross-asset serial correlation.

The size of each of these effects is determined by the relative size of the variances $\sigma^2_{\varepsilon C}$ and σ^2_{zi}. Increasing $\sigma^2_{\varepsilon C}$ relative to σ^2_{zi} strengthens the effect of information trades, and vice-versa, decreasing $\sigma^2_{\varepsilon C}$ relative to σ^2_{zi} strengthens the effect of rebalancing trades. Turning to Figure 1 we see that a high (low) $\sigma^2_{\varepsilon C}$ leads to a positive (negative) cross-asset covariance. Moreover, the figure also shows that for high $\sigma^2_{\varepsilon C}$, higher trade credit leads to a stronger correlation across the two assets. Intuitively, speculators care more about the rebalancing motive because the conditional correlation across the two assets is stronger (see equation 1). Good news in the consumer country still implies higher expected returns in the consumer country, but generates a stronger rebalancing motive in the producer country. Domestic investors in the producer country are only willing to accommodate these trades if the price is low enough, or if the expected return is high enough.

Finally, because α is also the covariance between country dividends, the same results above apply to $\text{Cov}\left(D^C_{t+1} - P^C_t, P^P_t\right)$. That is, high producer country returns forecast high consumer country returns and this implied covariance is higher for higher levels of trade credit. We test these additional predictions below by looking at importer/supplier connections.

2. Empirical Methodology

Our empirical methodology to test the model takes as its starting point the analysis of Rizova (2010), who finds evidence of return predictability across economically linked countries. The economic links she explores are the customer-producer and producer-supplier relationships across countries. These relationships are identified using trade flows across countries. 'Producer' countries are those with greater than or equal to 20% of GDP in exports and their associated 'consumers' are those consuming 5% or more of the producers' exports in any given year. Similarly for the producer-supplier relationships, 'producers' are designated as those countries with 20% or more of GDP in imports and their suppliers are those providing 5% or more of these imports. Each month, consumer (supplier) countries are sorted into terciles based on their stock index performance and the subsequent monthly stock index performance of the producers linked to these consumers (suppliers) in the bottom, middle and top terciles computed. Rizova conducts the analysis entirely at the country index level, and finds that there is an approximately 70 basis point per month difference between equal-weighted portfolios formed from the top and bottom terciles of producer country index returns (these country indices are value-weighted across firms in each country). Menzly and Ozbas (2010a) conduct a similar analysis for domestic stocks in the U.S. market. Rizova attributes her results to investor inattention, in the spirit of Menzly and Ozbas (2010b).

A. Testing the trade credit hypothesis

Our sample period extends from January 1993 to December 2009. We replicate Rizova's results over the sample period using the sample of firms for which we have corporate finance data (see below), and then customize the methodology to investigate the role of the direct, trade credit links between firms in different countries. Our approach is as follows: We gather firm-level data for the firms in each one of the producer, consumer and supplier countries, and compute several trade-credit ratios for each firm i in each year t. These ratios are:

$$
\begin{aligned}
ARTurnover_{i,t} &= \frac{AR_{i,t}}{TotalSales_{i,t}}, \\
APTurnover_{i,t} &= \frac{AP_{i,t}}{COGS_{i,t}}, \\
NetTradeCredit_{i,t} &= \frac{AR_{i,t} - AP_{i,t}}{TotalSales_{i,t}},
\end{aligned}
$$

where AR is the accounts receivable amount and AP is the accounts payable amount at the end of the year, and $COGS$ is the cost of goods sold for the firm. Note that AR Turnover and AP Turnover used here correspond to the reciprocals of the standard accounting definition. Our next step is to create indices of firms *within* each of the terciles, that are sorted by these ratios.

Take, for example, the bottom tercile of customer countries in a given month in year t. We gather all of the firms in the associated producer countries, and then sort them by the three trade credit measures at the end of the year $t-1$. We then create two value-weighted indices of stock returns from this firm level data, respectively for firms with higher and lower than the median trade credit measure. These indices are subsequently re-created each month as the countries in each of the terciles vary, using trade credit data that varies each year.

We then evaluate the performance of these trade-credit-sorted indices. If our theoretical model is correct, the predictability of stock returns in producer countries should be driven by the returns of the high-trade credit indices. Put differently, the cross-serial correlation that the model predicts should be higher as α increases, i.e., when trade credit measures are higher. Translated into a portfolio strategy, this implies that a portfolio which is long low-trade credit firms and short high-trade credit firms should have positive returns when consumer (supplier) returns are low, and negative returns when consumer (supplier) returns are high. Note that this is a strategy that operates *within* terciles sorted by consumer (supplier) country returns.

Another trading strategy implied by the model uses the differences *across* terciles sorted by consumer (supplier) country returns. This strategy consists of going long high-trade-credit firms in the high consumer (supplier) return tercile, and short high-trade-credit firms in the low consumer (supplier) return tercile. We also evaluate the returns to these long-short strategies.

One obvious criticism of our empirical approach is that trade credit may be correlated with other firm attributes that generate return spreads across firms. For example, if firm size is correlated with levels of trade credit, then our results could just be picking up a size effect in stock returns; and another potentially correlated attribute, namely, the level of short-term debt, is a well-known indicator of the financial fragility of a firm (see Rodrik and Velasco, 1999, for example, about the association of short-term debt levels with the impacts of financial crises). As a robustness check, therefore, we independently double-sort firms within the customer (supplier) induced terciles by our trade credit measures and by these two firm attributes. This results in four portfolios of firms within each tercile, and we compare the returns across the dimensions of trade credit and each of the attributes. If our results are robust to this issue, then we would expect to see return spreads across the trade credit dimension within each of the bins sorted by size or short-term debt levels.

B. Risk adjustment

When we compute returns for the long-short portfolios, we also risk-adjust these returns to ensure that we are not picking up differences in systematic risk across the portfolios. We do so using three risk-adjustment models in addition to presenting excess return differences. All of these models are factor models of the form:

$$r_{p,t} - r_{f,t} = \alpha_p + \sum_{j=1}^{J} \beta_{p,j} F_{j,t} + \varepsilon_{p,t}.$$

Here, the excess returns on portfolio p are regressed on J factors. The first model sets $J = 1$, with the excess return on the MSCI world index as the factor. The second model, with $J = 2$, adds a momentum (MOM) factor to the MSCI world index, this momentum factor is constructed from terciles of developed country returns, sorted by their past twelve month returns. The MOM factor is then obtained by subtracting the bottom tercile return from the top tercile return, and rebalancing monthly. Finally, the third model, with $J = 3$, adds a value factor (HML), which is constructed by sorting countries into terciles based on their value-weighted firm-level book-to-market ratios, and subtracting the bottom tercile portfolio returns from the top tercile's portfolio returns. Countries are equal-weighted within terciles in both MOM and HML factors.

Throughout the empirical analysis we employ Newey-West (1983) standard errors, which are robust to heteroskedasticity and autocorrelation, to assess the significance of portfolio returns.

3. Data

In the study, we use balance sheet data, firm equity total return data, and country-level data from January 1993 to March 2009. We consider firms in the countries shown in Table I, where the classification into emerging and developed categories is as in Froot and Ramadorai (2008). The table shows all the countries that are designated as producers in either the export or import links categories (to qualify, a country has to have at least 20% of its GDP in exports or imports over the sample period), and whether these countries also appear as 'trade partners,' i.e., those countries consuming (supplying) at least 5% of the exports (imports) of one of the producers over the sample period. There are 39 countries that we designate as producers in either of the customer (export) or supplier (import) links strategies, and a total of 55 countries that are either producers or trade partners. To arrive at this final sample of producers, we first took all countries in the MSCI world and MSCI emerging markets indices, and then narrowed down the set by restricting the analysis to only those countries for which corporate finance data was available for firms on Worldscope. Applying the 20% of GDP criterion as described above results in the final set of 39 countries. At the firm-level, we focus only on the industrial firms, filtering on the basis of the firm's general industry classification (this excludes firms in the transportation, utility, banking, insurance and other financial industries). For the trade partners, we included all countries for which we were able to find country index returns data from either MSCI or S&P/IFC.

A. Price and Returns Data

Stock price, dividend and market capitalization data for all firms in the producer countries are from Worldscope. This source is meant to contain data for all listed firms in a country from the initial date of listing, however, we find return data to be severely incomplete before January 1993 for several countries and therefore use only data after this period. Return data for Czech Republic, Hungary, Poland, Russia, Brazil and Israel is available beginning later, as shown in Table I. Table I also presents some summary statistics on monthly country index returns. We filter out extreme values in the return data from Worldscope, removing data points showing monthly returns in excess of 1000% for any firm (there are very few such observations). The country indices are constructed by weighting firms by their previous year end market capitalization. The

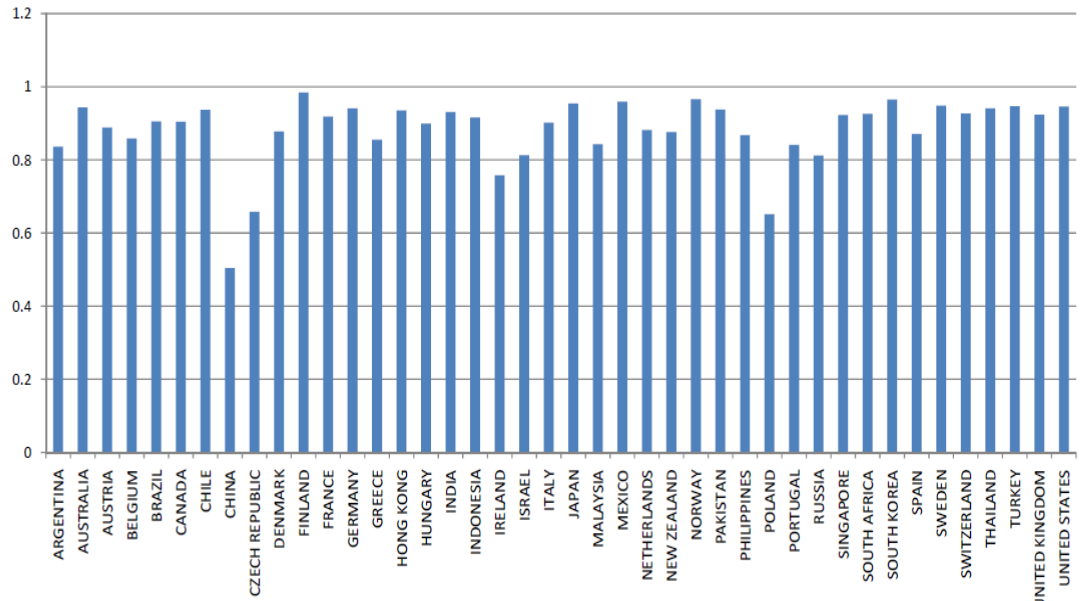

Figure 2: **Correlations between MSCI and constructed indices.** The figure shows the country-level correlations between the indices of industrial firms that we construct from Worldscope data and the MSCI indices where available for these countries.

correlation between these indices constructed using firm-level data from Worldscope and the corresponding MSCI country indices is high, as can be seen in Figure 2.

The return data for firms in the producer countries expressed in the tables are always in USD terms. The signal from trade partners is generated based on the local currency returns of the corresponding MSCI or S&P/IFC country indices. The column with the total number of firms in Table I shows the number of unique industrial firms available per country over the entire period. The average number of firms indicates how many stocks on average constitute the country index in each month.

B. Accounting data

We use annual accounting data from Worldscope on Datastream for all firms in the producer set of countries identified in Table I. We obtain the following accounting variables at an annual frequency: accounts receivable (from trade), accounts payable (from trade), net sales, cost of goods sold (COGS), and short-term debt. We use these accounting variables to construct measures of a firm's trade credit exposure similar to previous studies such as Demirguc-Kunt and Maksimovic (2001). Firm-level accounting data is unavailable in our data source for Egypt, Morocco, Columbia and Peru and hence, these drop out of the possible producer set in our analysis. Table II shows descriptive statistics for the value-weighted index for each of the measures defined in the empirical methodology section, namely, Net Trade Credit, AR Turnover and AP turnover. We filter extreme values above 50 in any of these ratios at the firm level. Table II shows descriptive statistics for value-weighted indices of the trade-credit measures for all possible producer countries, and for the United States for comparison purposes. For developed countries, accounts receivable amounts to 22% of sales, and accounts payable amounts to 23% of COGS in any given year, taking the mean across the average values reported in the table. For the emerging markets, these values are 25% and 20% respectively, suggesting that there is no real difference between the developed and emerging countries along this dimension. However, there is substantial cross-sectional and time-series variation in the levels of AR and AP turnover, suggesting that there may be periods where these links between firms assume a great deal of importance to their future prospects.

C. Macroeconomic data

We obtain annual bilateral trade (import and export) data from IMF Direction of Trade Statistics and annual GDP data from the IMF World Economic Outlook Database in order to classify countries as producers and trade partners. Our factor regressions use monthly USD T-Bill rates from the Kenneth French Data library to calculate excess returns, and the factor returns that we employ for risk adjustment (described in the empirical methodology section) are all sourced from country indices of the MSCI.

4. Results

A. Main results

Tables III and IV present the main results of the paper. Panel A of both tables show Rizova's (2010) results replicated in our dataset. In Panel A of Table III, as in her study, when producer countries are sorted into terciles based on their consumer countries' prior month stock returns, producer countries in the top tercile deliver higher average returns than those in the bottom tercile. However, unlike Rizova, we do not find that the difference between these tercile returns is statistically significant, either in the raw return difference, or in terms of differences in alpha estimated using the one, two and three factor models that we employ for risk-adjustment. This could be attributed to differences in the sample period employed (her data extends from 1981 to 2009, whereas ours begins in 1993), or in the set of firms employed to generate the return indices (we employ all industrial firms for which corporate finance information is available from Worldscope, and construct indices from these data rather than employing the MSCI indices directly).

Panel B of Table III applies the trade credit sort to the firm-level data within each of the terciles, and shows the value-weighted index returns of high and low trade credit producer firms. Within the bottom tercile (producer countries with consumers in the lowest tercile of stock returns), the table shows that firms with low net trade credit have average stock returns of approximately 50 basis points per month, while firms with high net trade credit have negative average stock returns of about -13 basis points per month. The difference, which is the return on a long-short portfolio *within* the bottom tercile, is statistically significant, at 64 basis points per month over the sample period, which translates to an annualized return of approximately 7.7%. Risk-adjusting using the factor models slightly increases this return to a statistically significant annualized level of 8.3% using the two-factor model (the three-factor return is not directly comparable, since it is over a truncated sample period, ending in 2007).

Turning to the top tercile of consumer returns, the difference between low and high trade credit firms within this tercile is positive, although not statistically significant. However, the model would predict a *negative* difference between low and high trade credit firms when consumer returns are high. This suggests that the effect that we identify in the model, namely that there is a symmetric response in good and bad times for consumer firms, may not be the entire explanation. One explanation for the non-linearity we observe is that during bad times consumer firms are reluctant to pay AR's to their producers, whereas when times are good for consumer firms, there is no higher payment of AR's to producers. Such an explanation would hinge on customers possessing all of the bargaining power in negotiations with producers. Another possibility is that sorting into terciles based on consumer countries' returns does not capture the full picture. Conditional on positive returns for consumer countries, we might find results more fully consistent with the model. In other words, the top tercile that we capture may include periods in which consumer countries are doing poorly in absolute terms, but better in relative terms, and our results do not distinguish these cases as they currently stand.

In terms of long-short portfolio returns, a portfolio which is long low trade credit firms in the top tercile and short high trade credit firms in the bottom tercile of countries yields about 12% per annum irrespective of the method of risk adjustment. These returns are always statistically significant at the 5% level or better using the net trade credit measure. For the long-short portfolio favoured by the model, i.e., long top tercile high trade credit firms and short bottom tercile high trade credit firms, monthly excess returns are positive as expected but not statistically significant. Again, this evidence is consistent with the non-linearity described above. Importantly, it is also the case that the next two rows, i.e., long low trade credit top tercile and short low trade credit bottom tercile, and long high trade credit top tercile and short low trade credit bottom tercile returns are not statistically significant. This provides evidence that the cross-serial correlation across countries is driven by the trade credit channel, and emphasizes the role of the direct trade credit links between firms that we model.

Turning to the components of the net trade credit measure, it appears that the return is driven by accounts receivable rather than accounts payable. For AR turnover, the long top tercile low trade credit-short bottom tercile high trade credit return is also significantly positive, and the magnitude is higher than the net trade credit measure, at an annualized level of close to 14%. However there are no significant effects for accounts payable. This suggests that the primary mechanism through which trade credit connects customer and producer firms, is that firms with high levels of accounts receivable are likely to be at-risk of their trading partners choking off payment to them in bad times.

Table IV presents results from the supplier momentum strategy. Here, rather than sorting by customer countries' returns, we sort by supplier country returns, and examine the returns of importing countries in different terciles. Panel A of the table shows baseline results that do not condition on the level of trade credit. These results are significant (at the 10% level) only on the two factor model and have an annualized return of 8% over our sample period. Turning to Panel B, a portfolio which is long low net trade credit firms in the top tercile of supplier returns and short high net trade credit firms in the bottom tercile of supplier returns yields a statistically significant positive return of about 11% per annum irrespective of the method of risk adjustment. Again, the AR turnover results are even stronger, yielding 15% per annum regardless of risk adjustment. Furthermore, the model-implied strategy which is long high trade credit firms in the top tercile and short high trade credit firms in the bottom tercile yields returns that are generally around the same magnitude, providing further support to the model. Again, as in the customer momentum strategy, the low trade credit top tercile less low trade credit bottom tercile, and high trade credit top tercile less low trade credit bottom tercile returns are not statistically significant at the 10% level.

B. Robustness checks

Table V double sorts the firms within each customer momentum tercile by size and the trade credit measures. For ease of exposition, we present only the excess returns in each of the bins, but the results are broadly the same regardless of the method of risk adjustment employed. The table shows that in the bottom tercile of customer returns, it is always the case that the high trade credit firms underperform low trade credit firms, regardless of the size of the firms under consideration. As before, these results are primarily driven by AR turnover, and in three out of four cases in the net trade credit and AR turnover bins, these results are statistically significant at the 5% level or better. In the top tercile of customer country returns, there does not seem to be any distinguishable pattern of returns, and the differences between high and low trade credit firms are not statistically significant.

The long-short portfolio returns are computed at the bottom of the table, and show that in six of eight cases for the net trade credit and AR turnover measures, the returns are positive and statistically significant. Conditioning on size seems to improve the performance of these strategies, but they are not dependent on size. For AP turnover, the returns are now statistically significant when small firms in the top tercile with low trade credit are employed. Another interesting conclusion from the table pertains to the size effect. Small firms do seem to have higher average returns than large firms, as has been found in studies using U.S. data (see, for example, Fama and French, 1993), but the effect does not seem to be statistically strong, consistent with broader studies using international data such as Fama and French (1998). Table VI conducts the same analysis for the supplier momentum sorts, with essentially similar results.

Tables VII and VIII double sort firms within each customer and supplier momentum tercile by the trade credit measures and by the level of short-term debt expressed as a percentage of sales. The table shows that the trade credit effect in the bottom tercile continues to persist even after controlling for the level of short-term debt that firms take on. In firms with low and high levels of short-term debt, the trade credit effects are clearly visible. There is also a perceptible impact of high levels of short-term debt on the performance of the portfolios. Firms with high levels of short-term debt have lower returns than those with low levels of short-term debt even after controlling for the level of trade credit. The magnitudes of the two effects (trade credit and short-term debt) are roughly similar in the bottom tercile of firms. It is also the case that the trade credit effect is much stronger for firms which also have high levels of short-term debt, suggesting that a strategy that conditions on both these firm attributes will perform better than one which considers these attributes separately. Indeed, the bottom of both Tables VII and VIII show that the long-short portfolio returns are highest when both the top tercile firms and the bottom tercile firms have high levels of short-term debt. The best strategy that conditions on both these attributes simultaneously uses AR turnover as the measure of trade credit, in the supplier momentum sorts, and yields a very high and statistically significant 23% per annum return over the sample period.

5. Conclusion

We build a simple model of trade credit between firms in different countries, and derive asset pricing implications from the model which we then test on data from 55 countries over the 1993 to 2009 period. The model predicts that high levels of trade credit between firms in different countries should be associated with high levels of cross-serial correlation of their stock returns. Our empirical results provide strong support to the predictions of the theory, and suggest that trade credit is an important source of international stock return comovement.

The role of financial intermediaries such as banks and mutual funds in transmitting shocks across borders has been extensively studied, and the relationships between these intermediaries and the firms to which they lend has been the focus of significant attention. However, trade credit relationships between firms have not been given quite as much visibility in debates about the sources of the international propagation of shocks. Our results suggest that this channel may be equally important, and consequently our analysis raises interesting policy questions about the optimal structuring of trade credit agreements across borders.

Appendix

This Appendix provides the proof of the proposition in the text.

Proof of Proposition 1 . Consider the equilibrium prices as given in the proposition:

$$P_t^C = \bar{D}_{t+1}^C - b_{CC}\left(\bar{D}_{t+1}^C - \mathrm{E}_t^d\left(\bar{D}_{t+1}^C\right)\right) - b_{CP}\left(\bar{D}_{t+1}^P - \mathrm{E}_t^d\left(\bar{D}_{t+1}^P\right)\right) - h_{CC}z_t^C - h_{CP}z_t^P$$

$$P_t^P = \bar{D}_{t+1}^P - b_{PP}\left(\bar{D}_{t+1}^P - \mathrm{E}_t^d\left(\bar{D}_{t+1}^P\right)\right) - b_{PC}\left(\bar{D}_{t+1}^C - \mathrm{E}_t^d\left(\bar{D}_{t+1}^C\right)\right) - h_{PP}z_t^P - h_{PC}z_t^C.$$

Domestic investors in country i learn $\Pi^i \equiv P_t^i - a_i - b_{ii}\mathrm{E}_t^d\left(\bar{D}_t^i\right)$, a noisy signal for $\bar{D}_t^i$ for domestic investors in country i. Using this information, a domestic investor in country i solves at time $t = 1$:

$$\max_{\theta^i} \mathrm{E}_t^d\left[\exp^{-\gamma W_{t+1}^i}\right]$$

subject to

$$W_{t+1}^i = W_t^i + \theta^i\left(D_{t+1}^i - P_t^i\right).$$

The first order necessary and sufficient condition for this problem yields

$$\theta^i = \frac{\mathrm{E}_t^d\left[D_{t+1}^i - P_t^i\right]}{\gamma \mathrm{Var}_t^d\left[D_{t+1}^i - P_t^i\right]}.$$

Likewise, speculators from either country face the problem of

$$\max_{\eta^C,\eta^P} \mathrm{E}_t^s\left[\exp^{-\gamma W_{t+1}^i}\right]$$

subject to

$$W_{t+1}^i = W_t^i + \eta^C\left(D_{t+1}^C - P_t^C\right) + \eta^P\left(D_{t+1}^P - P_t^P\right).$$

This problem is solved by setting

$$\begin{bmatrix} \eta^C \\ \eta^P \end{bmatrix} = \gamma^{-1}V_t^{-1}\begin{bmatrix} \bar{D}_{t+1}^C - P_t^C \\ \bar{D}_{t+1}^P - P_t^P \end{bmatrix},$$

where

$$V_t = \begin{bmatrix} \sigma_{uC}^2 & \alpha\sigma_{uC}^2 \\ \alpha\sigma_{uC}^2 & \sigma_{uP}^2 + \alpha^2\sigma_{uC}^2 \end{bmatrix}$$

which gives

$$\tilde{V}_t^{-1} = \frac{1}{\sigma_{uP}^2}\begin{bmatrix} \frac{\sigma_{uP}^2+\alpha^2\sigma_{uC}^2}{\sigma_{Cu}^2} & -\alpha \\ -\alpha & 1 \end{bmatrix}.$$

After multiplying the two matrices we obtain the expression in equation (1). With the asset demands we can now solve for market clearing:

$$z_C = \mu_C \frac{1}{\gamma\sigma_{uP}^2}\left[\frac{\sigma_{uP}^2+\alpha^2\sigma_{uC}^2}{\sigma_{Cu}^2}\left(\bar{D}_{t+1}^C - P_t^C\right) - \alpha\left(\bar{D}_{t+1}^P - P_t^P\right)\right] + (1-\mu_C)\frac{\mathrm{E}_t^d\left[D_{t+1}^C - P_t^C\right]}{\gamma \mathrm{Var}_t^d\left[D_{t+1}^C - P_t^C\right]}$$

$$z_P = \mu_P \frac{1}{\gamma\sigma_{uP}^2}\left[\bar{D}_{t+1}^P - P_t^P - \alpha\left(\bar{D}_{t+1}^C - P_t^C\right)\right] + (1-\mu_P)\frac{\mathrm{E}_t^d\left[D_{t+1}^P - P_t^P\right]}{\gamma \mathrm{Var}_t^d\left[D_{t+1}^P - P_t^P\right]}.$$

Using the price functions to substitute for the values of P_t^i and combining terms associated with the various state variables $\left(\bar{D}_t^C - \mathrm{E}_t^d\left(\bar{D}_t^C\right), \bar{D}_t^P - \mathrm{E}_t^d\left(\bar{D}_t^P\right), z^C, z^P\right)$ we obtain eight equilibrium conditions (four from each market clearing condition):

$$\begin{aligned}
0 &= \mu_C \frac{1}{\gamma\sigma_{uP}^2}\frac{\sigma_{uP}^2+\alpha^2\sigma_{uC}^2}{\sigma_{Cu}^2} b_{CC} - \mu_C \frac{1}{\gamma\sigma_{uP}^2}\alpha b_{PC} + (1-\mu_C)\frac{b_{CC}-1}{\gamma \mathrm{Var}_t^d\left[D_{t+1}^C - P_t^C\right]} \\
0 &= \mu_C \frac{1}{\gamma\sigma_{uP}^2}\frac{\sigma_{uP}^2+\alpha^2\sigma_{uC}^2}{\sigma_{Cu}^2} b_{CP} - \mu_C \frac{1}{\gamma\sigma_{uP}^2}\alpha b_{PP} + (1-\mu_C)\frac{b_{CP}}{\gamma \mathrm{Var}_t^d\left[D_{t+1}^C - P_t^C\right]}
\end{aligned}$$

$$\begin{aligned}
1 &= \mu_C \frac{1}{\gamma\sigma_{uP}^2}\frac{\sigma_{uP}^2+\alpha^2\sigma_{uC}^2}{\sigma_{Cu}^2} h_{CC} - \mu_C \frac{1}{\gamma\sigma_{uP}^2}\alpha h_{PC} + (1-\mu_C)\frac{h_{CC}}{\gamma \mathrm{Var}_t^d\left[D_{t+1}^C - P_t^C\right]} \\
0 &= \mu_C \frac{1}{\gamma\sigma_{uP}^2}\frac{\sigma_{uP}^2+\alpha^2\sigma_{uC}^2}{\sigma_{Cu}^2} h_{CP} - \mu_C \frac{1}{\gamma\sigma_{uP}^2}\alpha h_{PP} + (1-\mu_C)\frac{h_{CP}}{\gamma \mathrm{Var}_t^d\left[D_{t+1}^C - P_t^C\right]}
\end{aligned}$$

and

$$\begin{aligned}
0 &= \mu_P \frac{1}{\gamma\sigma_{uP}^2} b_{PP} - \mu_P \frac{1}{\gamma\sigma_{uP}^2}\alpha b_{CP} + (1-\mu_P)\frac{b_{PP}-1}{\gamma \mathrm{Var}_t^d\left[D_{t+1}^P - P_t^P\right]} \\
0 &= \mu_P \frac{1}{\gamma\sigma_{uP}^2} b_{PC} - \mu_P \frac{1}{\gamma\sigma_{uP}^2}\alpha b_{CC} + (1-\mu_P)\frac{b_{PC}}{\gamma \mathrm{Var}_t^d\left[D_{t+1}^P - P_t^P\right]}
\end{aligned}$$

$$\begin{aligned}
1 &= \mu_P \frac{1}{\gamma\sigma_{uP}^2} h_{PP} - \mu_P \frac{1}{\gamma\sigma_{uP}^2}\alpha h_{CP} + (1-\mu_P)\frac{h_{PP}}{\gamma \mathrm{Var}_t^d\left[D_{t+1}^P - P_t^P\right]} \\
0 &= \mu_P \frac{1}{\gamma\sigma_{uP}^2} h_{PC} - \mu_P \frac{1}{\gamma\sigma_{uP}^2}\alpha h_{CC} + (1-\mu_P)\frac{h_{PC}}{\gamma \mathrm{Var}_t^d\left[D_{t+1}^P - P_t^P\right]}.
\end{aligned}$$

These equations can be used to solve for the eight unknowns: $b_{CC}, b_{CP}, b_{PC}, b_{PP}, h_{PC}, h_{PP}, h_{CC}, h_{CP}$. This is a non-linear system of equations because the conditional variances $\mathrm{Var}_t^d\left[D_{t+1}^P - P_t^P\right]$ and $\mathrm{Var}_t^d\left[D_{t+1}^C - P_t^C\right]$ depend on these price parameters as well. We turn to the calculation of these conditional variances now.

From the properties of conditional normal distributions:

$$\begin{aligned}
\mathrm{E}^d\left(\bar{D}_t^C|\Pi^C\right) &= \frac{\mathrm{Cov}\left(\bar{D}_t^C, \Pi^C\right)}{\mathrm{Var}\left(\Pi^C\right)}\Pi^C \\
\mathrm{Var}^d\left(\bar{D}_t^C|\Pi^C\right) &= \sigma_{\varepsilon C}^2 - \frac{\mathrm{Cov}\left(\bar{D}_t^C, \Pi^C\right)^2}{\mathrm{Var}\left(\Pi^C\right)}.
\end{aligned}$$

These moments are harder to calculate then in more standard models of asymmetric information because domestic investors in each country do not form expectations about fundamentals in the other country. Specifically, the unconditional covariance between forecast errors is not an output from investor learning behavior. Using these moments and the definition of Π^i we can write the expressions for the forecast errors of each domestic investor:

$$\begin{aligned}\bar{D}_t^C - \mathrm{E}_t^d\left(\bar{D}_t^C\right) &= \left[1 - \frac{\mathrm{Cov}\left(\bar{D}_t^C, \Pi^C\right)}{\mathrm{Var}\left(\Pi^C\right)}\left(1 - b_{CC}\right)\right]\bar{D}_t^C + \frac{\mathrm{Cov}\left(\bar{D}_t^C, \Pi^C\right)}{\mathrm{Var}\left(\Pi^C\right)} b_{CP}\left(\bar{D}_t^P - \mathrm{E}_t^d\left(\bar{D}_t^P\right)\right) \\ &\quad + \frac{\mathrm{Cov}\left(\bar{D}_t^C, \Pi^C\right)}{\mathrm{Var}\left(\Pi^C\right)} h_{CC} z^C + \frac{\mathrm{Cov}\left(\bar{D}_t^C, \Pi^C\right)}{\mathrm{Var}\left(\Pi^C\right)} h_{CP} z^P\end{aligned}$$

$$\begin{aligned}\bar{D}_t^P - \mathrm{E}_t^d\left(\bar{D}_t^P\right) &= \left[1 - \frac{\mathrm{Cov}\left(\bar{D}_t^P, \Pi^P\right)}{\mathrm{Var}\left(\Pi^P\right)}\left(1 - b_{PP}\right)\right]\bar{D}_t^P + \frac{\mathrm{Cov}\left(\bar{D}_t^P, \Pi^P\right)}{\mathrm{Var}\left(\Pi^P\right)} b_{PC}\left(\bar{D}_t^C - \mathrm{E}_t^d\left(\bar{D}_t^C\right)\right) \\ &\quad + \frac{\mathrm{Cov}\left(\bar{D}_t^P, \Pi^P\right)}{\mathrm{Var}\left(\Pi^P\right)} h_{PP} z^P + \frac{\mathrm{Cov}\left(\bar{D}_t^P, \Pi^P\right)}{\mathrm{Var}\left(\Pi^P\right)} h_{PC} z^C.\end{aligned}$$

Solving this system of two equations in two unknowns (the forecast errors) gives:

$$\begin{aligned}\bar{D}_t^C - \mathrm{E}_t^d\left(\bar{D}_t^C\right) &= f_{cc}\bar{D}_t^C + f_{cp}\bar{D}_t^P + f_{czp} z^P + f_{czc} z^C \\ \bar{D}_t^P - \mathrm{E}_t^d\left(\bar{D}_t^P\right) &= g_{pp}\bar{D}_t^P + g_{pc}\bar{D}_t^C + g_{pzc} z^C + g_{pzp} z^P.\end{aligned}$$

We can now solve for five unconditional moments, $\mathrm{E}\left[\left(\bar{D}_t^P - \mathrm{E}_t^d\left(\bar{D}_t^P\right)\right)\left(\bar{D}_t^C - \mathrm{E}_t^d\left(\bar{D}_t^C\right)\right)\right]$, $\mathrm{Cov}\left(\bar{D}_t^C, \Pi^C\right)$, $\mathrm{Cov}\left(\bar{D}_t^P, \Pi_t^P\right)$, $\mathrm{Var}\left(\Pi^P\right)$ and $\mathrm{Var}\left(\Pi^C\right)$, from which we finally get the conditional variances:

$$\begin{aligned}\mathrm{Var}_t^d\left[D_{t+1}^i\right] &= \mathrm{Var}\left[D_{t+1}^i | \Pi^i\right] \\ &= \mathrm{Var}\left(u\right) + \mathrm{Var}^d\left[\bar{D}_{t+1}^i | \Pi^i\right] \\ &= \mathrm{Var}\left[D_{t+1}^i\right] - \frac{\mathrm{Cov}^2\left(\bar{D}_t^i, \Pi^i\right)}{\mathrm{Var}\left(\Pi^i\right)}.\end{aligned}$$

■

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Table I
Country-Level Descriptive Statistics

This table shows information for the countries included in our analysis. The “Producer Set” shows the countries with export (import) levels of ≥20 of GDP at any time during the period in the study. The “Trade Partner Set” comprises those countries which consume (supply) ≥5 of these exports (imports) of the producers. The descriptive statistics shown for corresponding country indices are for percentage monthly (value-weighted, simple) USD returns. For countries only in the trade partner set, these data are the MSCI indices, and for all others, these indices are built from industrial-firm-level Worldscope data, and the total number of unique firms and the average number of firms per year used to construct these indices is presented in the columns. Unless otherwise shown, the return data begins on January 1993.

Country	Region	Export (Customer) Links		Import (Supplier) Links		Median	Mean	Std Dev	Total Num Firms	Average Num Firms	Data Begin Date
		Producer Set	Trade Partner Set	Producer Set	Trade Partner Set						
Developed											
Japan	East Asia	N	Y	N	Y	0.313	0.247	5.963	4053	3070	
Canada	North America	Y	Y	Y	Y	1.256	0.889	5.822	1657	1165	
United States	North America	N	Y	N	Y	1.194	0.596	4.858	10034	6949	
Australia	Oceania	N	Y	Y	Y	1.504	1.020	6.708	1825	991	
New Zealand	Oceania	Y	N	Y	N	1.123	1.001	6.686	123	81	
Denmark	Scandinavia	Y	Y	Y	Y	1.358	0.949	5.091	155	128	
Finland	Scandinavia	Y	Y	Y	Y	1.582	1.596	9.431	135	98	
Norway	Scandinavia	Y	Y	Y	Y	1.822	1.174	7.538	242	137	
Sweden	Scandinavia	Y	Y	Y	Y	1.801	1.164	8.514	467	257	
Austria	Western Europe	Y	Y	Y	Y	1.377	0.681	6.204	104	83	
Belgium	Western Europe	Y	Y	Y	Y	1.443	0.673	5.451	144	94	
France	Western Europe	Y	Y	Y	Y	1.311	0.815	6.220	238	168	
Germany	Western Europe	Y	Y	Y	Y	1.526	0.754	6.067	941	649	
Ireland	Western Europe	Y	Y	Y	Y	1.926	0.686	7.633	79	60	
Italy	Western Europe	Y	Y	Y	Y	0.610	0.713	6.862	293	189	
Netherlands	Western Europe	Y	Y	Y	Y	1.540	0.826	4.927	207	173	
Spain	Western Europe	N	Y	Y	Y	0.778	0.715	5.630	134	105	
Switzerland	Western Europe	Y	Y	Y	Y	1.053	0.927	4.388	220	170	
United Kingdom	Western Europe	Y	Y	Y	Y	0.816	0.637	4.405	2797	1925	

Emerging												
Egypt	Africa	N	N	N	Y	0.746	1.809	9.778			1/31/1995
Nigeria	Africa	N	N	N	Y	2.308	1.515	10.379			6/28/2002
South Africa	Africa	Y	Y	Y	N	1.100	0.887	7.742	509	380	
China	East Asia	Y	Y	Y	Y	-0.156	1.002	13.396	1360	724	
Hong Kong	East Asia	Y	Y	Y	Y	1.459	0.980	8.453	755	496	
South Korea	East Asia	Y	N	Y	Y	-0.358	1.259	12.851	1178	738	
Czech Republic	Eastern Europe	Y	Y	Y	N	1.645	1.189	7.373	52	50	1/31/1996
Hungary	Eastern Europe	Y	Y	Y	Y	1.461	0.893	10.489	34	27	1/31/1994
Poland	Eastern Europe	Y	Y	Y	Y	0.986	0.627	10.681	300	130	1/31/1994
Romania	Eastern Europe	N	N	N	Y	1.231	-1.273	15.719			12/30/2005
Russia	Eastern Europe	Y	Y	N	Y	3.303	2.262	14.453	103	40	1/31/1997
Slovakia	Eastern Europe	N	Y	N	Y	1.677	1.148	8.648			2.28.1997
Ukraine	Eastern Europe	N	N	N	Y	-4.246	-4.935	11.805			6/30/2006
Argentina	Latin America	Y	Y	N	Y	0.657	0.573	8.895	52	47	
Brazil	Latin America	N	Y	N	Y	2.881	2.064	13.446	185	136	8/31/1994
Chile	Latin America	Y	Y	Y	Y	0.983	1.023	7.184	110	96	
Colombia	Latin America	N	N	N	Y	2.098	1.485	9.534			
Ecuador	Latin America	N	N	N	Y	0.244	0.865	10.615			1/31/1996
Mexico	Latin America	Y	N	Y	Y	1.929	0.871	9.153	118	94	
Peru	Latin America	N	N	N	N	2.046	1.776	9.606			
India	South Asia	N	Y	Y	N	1.818	0.878	9.056	877	640	
Pakistan	South Asia	N	N	Y	N	0.209	1.128	9.228	91	80	
Indonesia	Southeast Asia	Y	Y	Y	Y	1.421	1.000	12.673	253	123	
Malaysia	Southeast Asia	Y	Y	Y	Y	0.229	0.783	10.797	913	593	
Philippines	Southeast Asia	Y	N	Y	N	0.195	0.474	9.972	117	92	
Singapore	Southeast Asia	Y	Y	Y	Y	1.161	0.688	8.635	597	342	
Thailand	Southeast Asia	Y	Y	Y	Y	-0.263	0.243	9.877	439	312	
Israel	Southwest Asia	Y	Y	Y	N	1.374	0.913	8.058	122	95	1/31/1994
Jordan	Southwest Asia	N	N	N	Y	0.001	0.662	5.654			
Kuwait	Southwest Asia	N	N	N	Y	2.110	0.907	6.819			6/28/2002
Qatar	Southwest Asia	N	N	N	Y	1.002	1.785	12.673			6/28/2002
Saudi Arabia	Southwest Asia	N	Y	N	Y	1.356	1.178	8.011			1/30/1998
Turkey	Southwest Asia	N	Y	Y	N	3.176	2.474	16.744	192	160	
U. A. E.	Southwest Asia	N	N	N	Y	0.876	1.732	12.985			6/28/2002
Greece	Western Europe	N	N	Y	N	1.438	1.062	9.072	305	224	
Portugal	Western Europe	Y	N	Y	N	1.457	1.098	6.418	88	77	

Table II
Country-Level Trade Credit Summary Statistics

This table shows descriptive statistics for the time series of the value-weighted cross-sectional means of the variables listed in the columns for each country in the possible producers set which have firm-level data available on Worldscope. These ratios are calculated from annual firm-level sales, cost of goods sold, accounts receivable and accounts payable data from 1992 to 2009.

Country	Region	Net Trade Credit			AR Turnover			AP Turnover		
		Median	Mean	Std Dev	Median	Mean	Std Dev	Median	Mean	Std Dev
Developed										
Canada	North America	-0.005	-0.014	0.039	0.193	0.197	0.023	0.390	0.425	0.128
United States	North America	0.065	0.064	0.008	0.153	0.155	0.011	0.217	0.222	0.041
Australia	Oceania	0.049	0.046	0.018	0.174	0.180	0.025	0.193	0.194	0.051
New Zealand	Oceania	0.065	0.032	0.123	0.164	0.165	0.024	0.192	0.329	0.363
Denmark	Scandinavia	0.147	0.143	0.030	0.219	0.223	0.027	0.177	0.183	0.055
Finland	Scandinavia	0.102	0.110	0.026	0.199	0.202	0.025	0.134	0.136	0.018
Norway	Scandinavia	0.088	0.086	0.034	0.189	0.201	0.037	0.147	0.153	0.027
Sweden	Scandinavia	0.132	0.141	0.040	0.223	0.237	0.037	0.128	0.130	0.016
Austria	Western Europe	0.096	0.149	0.164	0.195	0.267	0.181	0.146	0.159	0.073
Belgium	Western Europe	0.084	0.086	0.040	0.209	0.209	0.035	0.168	0.208	0.095
France	Western Europe	0.099	0.103	0.028	0.250	0.256	0.029	0.253	0.242	0.033
Germany	Western Europe	0.145	0.156	0.044	0.249	0.245	0.050	0.149	0.144	0.026
Ireland	Western Europe	0.074	0.075	0.023	0.178	0.176	0.023	0.186	0.217	0.103
Italy	Western Europe	0.151	0.140	0.041	0.340	0.352	0.074	0.507	0.505	0.089
Netherlands	Western Europe	0.067	0.065	0.012	0.147	0.154	0.027	0.125	0.133	0.019
Spain	Western Europe	0.057	0.061	0.028	0.248	0.252	0.038	0.281	0.279	0.063
Switzerland	Western Europe	0.142	0.137	0.019	0.212	0.212	0.015	0.220	0.207	0.036
United Kingdom	Western Europe	0.075	0.076	0.011	0.181	0.178	0.016	0.205	0.210	0.070
Emerging										
South Africa	Africa	0.045	0.060	0.062	0.161	0.206	0.089	0.173	0.245	0.131
China	East Asia	0.139	0.165	0.154	0.359	0.362	0.156	0.255	0.428	0.578
Hong Kong	East Asia	0.126	0.081	0.099	0.239	0.241	0.048	0.214	0.243	0.082
South Korea	East Asia	0.121	0.126	0.045	0.209	0.224	0.054	0.131	0.133	0.017
Czech Republic	Eastern Europe	0.151	0.414	0.980	0.239	0.477	0.878	0.137	0.150	0.059
Hungary	Eastern Europe	0.084	0.092	0.031	0.171	0.179	0.036	0.153	0.156	0.051
Poland	Eastern Europe	0.088	0.209	0.349	0.203	0.241	0.124	0.168	0.195	0.076
Russia	Eastern Europe	0.159	0.192	0.136	0.230	0.312	0.190	0.252	0.295	0.143
Argentina	Latin America	0.121	0.127	0.057	0.235	0.245	0.051	0.215	0.218	0.021
Chile	Latin America	0.129	0.150	0.085	0.218	0.241	0.089	0.151	0.158	0.047
Mexico	Latin America	0.078	0.075	0.055	0.174	0.176	0.050	0.163	0.166	0.023
India	South Asia	0.096	0.106	0.034	0.254	0.257	0.030	0.196	0.206	0.036
Pakistan	South Asia	0.024	0.065	0.077	0.121	0.136	0.058	0.102	0.096	0.035
Indonesia	Southeast Asia	0.073	0.089	0.042	0.154	0.171	0.057	0.120	0.132	0.033
Malaysia	Southeast Asia	0.207	0.212	0.078	0.363	0.351	0.110	0.165	0.164	0.043
Philippines	Southeast Asia	0.063	0.065	0.042	0.229	0.233	0.048	0.270	0.300	0.112
Singapore	Southeast Asia	0.151	0.166	0.065	0.262	0.282	0.064	0.176	0.170	0.018
Thailand	Southeast Asia	0.067	0.090	0.064	0.162	0.191	0.076	0.182	0.212	0.114
Israel	Southwest Asia	0.189	0.197	0.061	0.309	0.318	0.056	0.201	0.219	0.061
Turkey	Southwest Asia	0.120	0.114	0.026	0.217	0.212	0.031	0.147	0.190	0.177
Greece	Western Europe	0.221	0.303	0.381	0.342	0.400	0.323	0.176	0.188	0.072
Portugal	Western Europe	0.089	0.082	0.033	0.219	0.212	0.040	0.161	0.161	0.018

Table III
Customer Momentum Strategy, Trade Credit Sort

This table shows returns produced by the customer momentum strategy. Panel A shows baseline results where producer countries are sorted solely based on their previous month major customer (purchases ≥5 of total exports of a producer country) returns. The "Top" Trade index consist of countries in the top 30th percentile, the "Bottom" Trade index consists of countries in the bottom 30th percentile. Panel B shows results with indices created from sorting firms in countries within Top and Bottom by their trade credit level (for each of the measures Net Trade Credit, AR Turnover, or AP Turnover) into two indices (above and below the median trade credit level for each baseline index). This creates 4 indices: Bottom Trade & Low Trade-Credit, Bottom Trade & High Trade-Credit, Top Trade & Low Trade-Credit, and Top Trade & High Trade-Credit. Excess Return is in excess of the monthly US T-Bill rate. One factor is the alpha from regressing the portfolio on the MKT factor, two factor return is with MKT and MOM, three factor is with MKT, MOM, and HML. Percentage monthly (value-weighted, simple) USD returns are shown for the 4 regressions. Standard errors are shown within brackets below the return estimates, and computed using the Newey-West method.

Panel A: Baseline Results, no Trade Credit Sort

Regression	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)
Top	0.728	0.488	0.543	0.511
	[0.501]	[0.283]	[0.282]	[0.275]
Bottom	0.281	0.037	0.167	0.110
	[0.529]	[0.403]	[0.362]	[0.418]
Top - Bottom	0.447	0.451	0.376	0.401
	[0.441]	[0.445]	[0.428]	[0.455]

Panel B: Benchmark Trade Credit Results

Measure	**Net Trade Credit**				**AR Turnover**				**AP Turnover**			
Regression	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)
Bottom Trade												
Low TC	0.513 [0.525]	0.271 [0.417]	0.427 [0.382]	0.391 [0.426]	0.582 [0.506]	0.348 [0.399]	0.502 [0.368]	0.482 [0.401]	0.181 [0.533]	-0.048 [0.425]	0.078 [0.388]	-0.088 [0.431]
High TC	-0.127 [0.569]	-0.368 [0.438]	-0.264 [0.403]	-0.354 [0.479]	-0.281 [0.636]	-0.538 [0.496]	-0.427 [0.447]	-0.518 [0.553]	0.297 [0.553]	0.045 [0.417]	0.176 [0.370]	0.174 [0.434]
Difference	0.640 [0.304]	0.640 [0.303]	0.691 [0.335]	0.745 [0.380]	0.863 [0.354]	0.885 [0.347]	0.929 [0.363]	1.000 [0.439]	-0.116 [0.251]	-0.093 [0.241]	-0.099 [0.229]	-0.261 [0.242]
Top Trade												
Low TC	0.910 [0.503]	0.688 [0.329]	0.723 [0.326]	0.647 [0.284]	0.892 [0.493]	0.670 [0.309]	0.721 [0.308]	0.715 [0.275]	0.738 [0.522]	0.494 [0.315]	0.639 [0.315]	0.527 [0.307]
High TC	0.574 [0.537]	0.322 [0.309]	0.389 [0.303]	0.416 [0.332]	0.549 [0.552]	0.294 [0.332]	0.368 [0.322]	0.358 [0.355]	0.711 0.503]	0.479 [0.293]	0.462 [0.284]	0.471 [0.283]
Difference	0.336 [0.296]	0.367 [0.299]	0.334 [0.279]	0.231 [0.278]	0.343 [0.273]	0.376 [0.272]	0.352 [0.251]	0.357 [0.291]	0.027 [0.214]	0.015 [0.214]	0.177 [0.192]	0.056 [0.232]
Long Top - Short Bottom												
Low TC - High TC	1.037 [0.494]	1.057 [0.501]	0.988 [0.486]	1.001 [0.511]	1.173 [0.526]	1.208 [0.530]	1.147 [0.504]	1.233 [0.557]	0.441 [0.475]	0.449 [0.478]	0.463 [0.467]	0.353 [0.504]
High TC - High TC	0.701 [0.494]	0.690 [0.495]	0.653 [0.480]	0.770 [0.535]	0.829 [0.541]	0.832 [0.546]	0.795 [0.525]	0.876 [0.599]	0.414 [0.455]	0.434 [0.461]	0.285 [0.435]	0.297 [0.454
Low TC - Low TC	0.397 [0.435]	0.417 [0.442]	0.296 [0.434]	0.256 [0.445]	0.310 [0.449]	0.323 [0.455]	0.219 [0.449]	0.233 [0.458]	0.557 [0.469]	0.542 [0.467]	0.561 [0.455]	0.615 [0.500]
High TC - Low TC	0.061 [0.506]	0.050 [0.507]	-0.038 [0.484]	0.025 [0.515]	-0.033 [0.488]	-0.053 [0.482]	-0.134 [0.462]	-0.124 [0.504]	0.530 [0.474]	0.527 [0.473]	0.384 [0.436]	0.559 [0.459]

Table IV
Supplier Momentum Strategy, Trade Credit Sort

This table shows returns produced by the supplier momentum strategy. Panel A shows baseline results where producer countries are sorted solely based on their previous month major supplier (supplies ≥5 of total imports of a producer country) returns. The "Top" Trade index consist of countries in the top 30th percentile, the "Bottom" Trade index consists of countries in the bottom 30th percentile. Panel B shows results with indices created from sorting firms in countries within Top and Bottom by their trade credit level (for each of the measures Net Trade Credit, AR Turnover, or AP Turnover) into two indices (above and below the median trade credit level for each baseline index). This creates 4 indices: Bottom Trade & Low Trade-Credit, Bottom Trade & High Trade-Credit, Top Trade & Low Trade-Credit, and Top Trade & High Trade-Credit. Excess Return is in excess of the monthly US T-Bill rate. One factor is the alpha from regressing on the MKT factor, two factor return is with MKT and MOM, three factor is with MKT, MOM, and HML. Percentage monthly (value-weighted, simple) USD alpha returns are shown for the 4 regressions. Standard errors are shown within brackets below the return estimates, and computed using the Newey-West method.

Panel A: Baseline Results, no Trade Credit Sort

Regression	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)
Top	0.592	0.336	0.410	0.253
	[0.510]	[0.270]	[0.267]	[0.243]
Bottom	-0.153	-0.389	-0.259	-0.247
	[0.526]	[0.376]	[0.339]	[0.407]
Top - Bottom	0.745	0.725	0.669	0.501
	[0.413]	[0.414]	[0.385]	[0.407]

Panel B: Benchmark Trade Credit Results

Measure	**Net Trade Credit**				**AR Turnover**				**AP Turnover**			
Regression	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)	Excess Return	One Factor (+MKT)	Two Factor (+MOM)	Three Factor (+HML)
Bottom Trade												
Low TC	-0.022 [0.521]	-0.254 [0.364]	-0.116 [0.328]	-0.025 [0.378]	0.099 [0.512]	-0.130 [0.366]	0.013 [0.339]	0.118 [0.392]	-0.119 [0.537]	-0.346 [0.420]	-0.203 [0.400]	-0.310 [0.464]
High TC	-0.366 [0.557]	-0.601 [0.436]	-0.478 [0.406]	-0.623 [0.495]	-0.643 [0.609]	-0.889 [0.478]	-0.760 [0.435]	-0.902 [0.532]	-0.178 [0.536]	-0.419 [0.370]	-0.306 [0.325]	-0.257 [0.392]
Difference	0.345 [0.275]	0.347 [0.278]	0.362 [0.286]	0.598 [0.324]	0.742 [0.346]	0.759 [0.349]	0.773 [0.354]	1.019 [0.411]	0.060 [0.268]	0.073 [0.264]	0.102 [0.282]	-0.052 [0.314]
Top Trade												
Low TC	0.608 [0.490]	0.368 [0.296]	0.431 [0.285]	0.334 [0.253]	0.647 [0.493]	0.409 [0.292]	0.478 [0.286]	0.391 [0.257]	0.668 [0.548]	0.407 [0.314]	0.530 [0.311]	0.329 [0.269]
High TC	0.617 [0.565]	0.347 [0.318]	0.444 [0.312]	0.198 [0.320]	0.584 [0.573]	0.308 [0.322]	0.402 [0.316]	0.167 [0.317]	0.624 [0.501]	0.380 [0.283]	0.400 [0.276]	0.278 [0.273]
Difference	-0.009 [0.297]	0.021 [0.297]	-0.013 [0.269]	0.137 [0.312]	0.063 [0.285]	0.101 [0.283]	0.075 [0.264]	0.224 [0.304]	0.044 [0.258]	0.027 [0.258]	0.129 [0.243]	0.051 [0.255]
Long Top – Short Bottom												
Low TC - High TC	0.974 [0.472]	0.969 [0.477]	0.909 [0.455]	0.958 [0.501]	1.289 [0.493]	1.298 [0.499]	1.237 [0.459]	1.292 [0.526]	0.846 [0.432]	0.826 [0.433]	0.835 [0.401]	0.587 [0.405]
High TC - High TC	0.983 [0.507]	0.947 [0.501]	0.922 [0.470]	0.821 [0.527]	1.227 [0.516]	1.197 [0.514]	1.162 [0.478]	1.069 [0.536]	0.802 [0.402]	0.799 [0.404]	0.706 [0.366]	0.536 [0.395]
Low TC - Low TC	0.629 [0.409]	0.622 [0.417]	0.547 [0.390]	0.360 [0.401]	0.547 [0.438]	0.539 [0.444]	0.464 [0.428]	0.273 [0.442]	0.786 [0.499]	0.753 [0.496]	0.733 [0.484]	0.639 [0.519]
High TC - Low TC	0.638 [0.440]	0.601 [0.436]	0.560 [0.398]	0.223 [0.426]	0.485 [0.448]	0.438 [0.436]	0.389 [0.405]	0.049 [0.422]	0.743 [0.442]	0.726 [0.438]	0.604 [0.411]	0.588 [0.449]

Table V
Customer Momentum Strategy, Size and Trade Credit Double Sort

This table shows returns with indices created from *two* independent sorts on firms in the baseline Top and Bottom Trade indices in the customer momentum strategy. Firms in countries in the Top (Bottom) index are sorted into 4 indices based on the median size and median trade credit level for all constituent firms in the Top (Bottom) index. This creates 8 indices. Excess Return is in excess of the monthly US T-Bill rate. One factor is the alpha from regressing on the MKT factor, two factor return is with MKT and MOM, three factor is with MKT, MOM, and HML. Percentage monthly (value-weighted, simple) USD returns are shown for the 4 regressions. Standard errors are shown within brackets below the return estimates, and computed using the Newey-West method.

Measure		**Net Trade Credit**			**AR Turnover**			**AP Turnover**		
		Market Cap			Market Cap			Market Cap		
Bottom Trade		Low	High	Low-High	Low	High	Low-High	Low	High	Low-High
Trade Credit	Low	0.290 [0.581]	0.524 [0.524]	-0.234 [0.302]	0.319 [0.556]	0.598 [0.506]	-0.280 [0.288]	0.256 [0.589]	0.185 [0.541]	0.070 [0.267]
	High	0.103 [0.661]	-0.143 [0.567]	0.245 [0.298]	0.052 [0.675]	-0.307 [0.635]	0.359 [0.302]	0.109 [0.655]	0.304 [0.537]	-0.195 [0.313]
	Low-High	0.188 [0.209]	0.667 [0.317]		0.266 [0.243]	0.905 [0.361]		0.147 [0.195]	-0.119 [0.257]	

Top Trade		Low	High	Low-High	Low	High	Low-High	Low	High	Low-High
Trade Credit	Low	1.180 [0.616]	0.907 [0.504]	0.273 [0.277]	1.229 [0.560]	0.887 [0.495]	0.342 [0.252]	1.142 [0.586]	0.730 [0.521]	0.412 [0.304]
	High	1.095 [0.656]	0.560 [0.535]	0.535 [0.429]	1.055 [0.699]	0.518 [0.553]	0.536 [0.407]	1.150 [0.678]	0.709 [0.503]	0.441 [0.381]
	Low-High	0.086 [0.219]	0.347 [0.301]		0.174 [0.257]	0.369 [0.283]		-0.008 [0.176]	0.021 [0.220]	

Long Top – Short Bottom		Bottom Trade (High TC)		Bottom Trade (High TC)		Bottom Trade (High TC)	
		Low Mcap	High Mcap	Low Mcap	High Mcap	Low Mcap	High Mcap
Top Trade (Low TC)	Low Mcap	1.078 [0.574]	1.323 [0.560]	1.177 [0.561]	1.536 [0.572]	1.033 [0.561]	0.838 [0.520]
	High Mcap	0.804 [0.558]	1.050 [0.494]	0.835 [0.563]	1.195 [0.528]	0.621 [0.537]	0.426 [0.465]

Table VI
Supplier Momentum Strategy, Size and Trade Credit Double Sort

This table shows alpha returns with indices created from *two* independent sorts on firms in the baseline Top and Bottom Trade indices in the supplier momentum strategy. Firms in countries in the Top (Bottom) index are sorted into 4 indices based on the median size and median trade credit level for all constituent firms in the Top (Bottom) index. This creates 8 indices. Excess Return is in excess of the monthly US T-Bill rate. One factor is the alpha from regressing on the MKT factor, two factor return is with MKT and MOM, three factor is with MKT, MOM, and HML. Percentage monthly (value-weighted, simple) USD returns are shown for the 4 regressions. Standard errors are shown within brackets below the return estimates, and computed using the Newey-West method.

Measure		**Net Trade Credit**			**AR Turnover**			**AP Turnover**		
		Market Cap			Market Cap			Market Cap		
Bottom Trade		Low	High	Low-High	Low	High	Low-High	Low	High	Low-High
Trade Credit	Low	0.216	-0.024	0.240	0.233	0.081	0.151	0.086	-0.123	0.209
		[0.616]	[0.519]	[0.296]	[0.578]	[0.512]	[0.283]	[0.606]	[0.536]	[0.262]
	High	-0.206	-0.383	0.177	--0.203	-0.649	0.446	-0.096	-0.168	0.072
		[0.700]	[0.552]	[0.304]	[0.722]	[0.607]	[0.322]	[0.703]	[0.530]	[0.366]
	Low-High	0.423	0.360		0.436	0.730		0.182	0.045	
		[0.227]	[0.278]		[0.258]	[0.353]		[0.197]	[0.276]	

Top Trade		Low	High	Low-High	Low	High	Low-High	Low	High	Low-High
Trade Credit	Low	1.130	0.576	0.555	1.140	0.645	0.494	1.163	0.599	0.564
		[0.595]	[0.487]	[0.337]	[0.548]	[0.494]	[0.294]	[0.601]	[0.547]	[0.320]
	High	1.036	0.615	0.421	0.911	0.561	0.349	0.940	0.661	0.279
		[0.676]	[0.566]	[0.398]	[0.710]	[0.572]	[0.400]	[0.675]	[0.499]	[0.393]
	Low-High	0.094	-0.040		0.229	0.084		0.223	-0.062	
		[0.211]	[0.305]		[0.281]	[0.293]		[0.201]	[0.269]	

Long Top – Short Bottom		Bottom Trade (High TC)			Bottom Trade (High TC)			Bottom Trade (High TC)		
		Low Mcap	High Mcap		Low Mcap	High Mcap		Low Mcap	High Mcap	
Top Trade (Low TC)	Low Mcap	1.336	1.514		1.343	1.788		1.258	1.330	
		[0.615]	[0.547]		[0.597]	[0.548]		[0.605]	[0.501]	
	High Mcap	0.782	0.959		0.848	1.294		0.694	0.766	
		[0.560]	[0.465]		[0.595]	[0.491]		[0.587]	[0.429]	

Table VII
Customer Momentum Strategy, Short-Term Debt and Trade Credit Double Sort

This table shows returns with indices created from *two* independent sorts on firms in the baseline Top and Bottom Trade indices in the customer momentum strategy. Firms in countries in the Top (Bottom) index are sorted into 4 indices based on the median short-term debt and median trade credit level for all constituent firms in the Top (Bottom) index. This creates 8 indices. Excess Return is in excess of the monthly US T-Bill rate. One factor is the alpha from regressing on the MKT factor, two factor return is with MKT and MOM, three factor is with MKT, MOM, and HML. Percentage monthly (value-weighted, simple) USD returns are shown for the 4 regressions. Standard errors are shown within brackets below the return estimates, and computed using the Newey-West method.

Measure		**Net Trade Credit**			**AR Turnover**			**AP Turnover**		
		Short-term Debt			Short-term Debt			Short-term Debt		
Bottom Trade		Low	High	Low-High	Low	High	Low-High	Low	High	Low-High
Trade Credit	Low	0.516	0.302	0.214	0.629	0.220	0.409	0.395	-0.251	0.647
		[0.529]	[0.561]	[0.280]	[0.509]	[0.551]	[0.285]	[0.517]	[0.631]	[0.306]
	High	0.265	-0.617	0.882	0.055	-0.655	0.710	0.585	-0.258	0.843
		[0.579]	[0.622]	[0.368]	[0.685]	[0.628]	[0.375]	[0.564]	[0.573]	[0.346]
	Low-High	0.252	0.919		0.574	0.874		-0.189	0.006	
		[0.357]	[0.326]		[0.463]	[0.274]		[0.271]	[0.315]	

Top Trade		Low	High	Low-High	Low	High	Low-High	Low	High	Low-High
Trade Credit	Low	0.917	0.979	-0.063	0.878	1.121	-0.244	0.787	0.852	-0.065
		[0.506]	[0.589]	[0.353]	[0.502]	[0.585]	[0.349]	[0.527]	[0.611]	[0.387]
	High	0.583	0.693	-0.110	0.594	0.570	0.024	0.807	0.775	0.032
		[0.603]	[0.549]	[0.388]	[0.634]	[0.568]	[0.390]	[0.536]	[0.548]	[0.341]
	Low-High	0.334	0.287		0.284	0.551		-0.020	0.077	
		[0.361]	[0.295]		[0.359]	[0.287]		[0.277]	[0.296]	

Long Top – Short Bottom		Bottom Trade (High TC)		Bottom Trade (High TC)		Bottom Trade (High TC)	
		Low ST debt	High ST debt	Low ST debt	High ST debt	Low ST debt	High ST debt
Top Trade (Low TC)	Low ST debt	0.652	1.534	0.823	1.533	0.202	1.045
		[0.503]	[0.558]	[0.540]	[0.550]	[0.464]	[0.518]
	High ST debt	0.715	1.597	1.066	1.776	0.268	1.110
		[0.553]	[0.608]	[0.669]	[0.626]	[0.570]	[0.616]

Table VIII
Supplier Momentum Strategy, Short-term Debt and Trade Credit Double Sort

This table shows returns with indices created from *two* independent sorts on firms in the baseline Top and Bottom Trade indices in the supplier momentum strategy. Firms in countries in the Top (Bottom) index are sorted into 4 indices based on the median short-term debt and median trade credit level for all constituent firms in the Top (Bottom) index. This creates 8 indices. Excess Return is in excess of the monthly US T-Bill rate. One factor is the alpha from regressing on the MKT factor, two factor return is with MKT and MOM, three factor is with MKT, MOM, and HML. Percentage monthly (value-weighted, simple) USD returns are shown for the 4 regressions. Standard errors are shown within brackets below the return estimates, and computed using the Newey-West method.

Measure		**Net Trade Credit**			**AR Turnover**			**AP Turnover**		
		Short-term Debt			Short-term Debt			Short-term Debt		
Bottom Trade		Low	High	Low-High	Low	High	Low-High	Low	High	Low-High
Trade Credit	Low	-0.114 [0.500]	-0.007 [0.588]	-0.107 [0.264]	0.086 [0.486]	-0.065 [0.596]	0.151 [0.293]	0.045 [0.519]	-0.515 [0.628]	0.560 [0.351]
	High	0.099 [0.564]	-0.999 [0.610]	1.098 [0.363]	-0.310 [0.654]	-1.008 [0.615]	0.698 [0.380]	0.014 [0.541]	-0.646 [0.589]	0.660 [0.347]
	Low-High	-0.212 [0.283]	0.992 [0.306]		0.396 [0.408]	0.943 [0.301]		0.030 [0.321]	0.130 [0.323]	

Top Trade		Low	High	Low-High	Low	High	Low-High	Low	High	Low-High
Trade Credit	Low	0.765 [0.496]	0.661 [0.540]	0.104 [0.312]	0.754 [0.504]	0.895 [0.552]	-0.140 [0.322]	0.647 [0.543]	0.820 [0.631]	-0.172 [0.336]
	High	0.535 [0.603]	0.741 [0.586]	-0.207 [0.363]	0.437 [0.582]	0.646 [0.617]	-0.209 [0.319]	0.610 [0.520]	0.766 [0.535]	-0.157 [0.304]
	Low-High	0.230 [0.396]	-0.080 [0.257]		0.317 [0.330]	0.249 [0.282]		0.037 [0.334]	0.053 [0.280]	

Long Top – Short Bottom		Bottom Trade (High TC)		Bottom Trade (High TC)		Bottom Trade (High TC)	
		Low ST debt	High ST debt	Low ST debt	High ST debt	Low ST debt	High ST debt
Top Trade (Low TC)	Low ST debt	0.666 [0.486]	1.764 [0.517]	1.064 [0.510]	1.762 [0.532]	0.633 [0.431]	1.293 [0.505]
	High ST debt	0.562 [0.527]	1.661 [0.520]	1.205 [0.601]	1.903 [0.555]	0.805 [0.525]	1.465 [0.520]