

# Online Appendix for “The Offshoring Return Premium”

*(not for publication)*

This appendix contains additional tables that are mentioned and described in the paper but were not reported there to preserve space. Specifically, this appendix includes:

- Table OA.1: Offshore counter-parties and external validation
- Table OA.2: Foreign country exposures
- Table OA.3: Bivariate sorts: offshore output vs market capitalization
- Table OA.4: Top 50 central nations in the world trade network
- Table OA.5: Offshoring return premium, political instability and nation size

## **1 Offshore counter-parties and external validation**

We examine the properties of our offshoring network both in time-series and cross-section as compared to external data sources. Specifically, we consider foreign trade as reported by the U.S. Census Bureau, the official source for nation-by-nation U.S. exports and imports.<sup>1</sup>

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<sup>1</sup>Monthly and annual total exports and imports by all U.S. entities are available from 1985 to present. We use annual total exports and imports from the following data file: <https://www.census.gov/foreign-trade/balance/country.xlsx>.

Although Census foreign trade data are accurate representations of aggregate offshoring activities by all U.S. entities, we note that the figures include both private and public firms in the U.S. as well as government shipments of goods. Therefore, aggregations from our sample of Compustat firms that have machine readable 10-Ks are not expected to fully correlate with the Census totals. However, we believe there is ample overlap such that the aggregate Census data can offer a strong validation test for the quality of information contained in our offshoring data.

Table OA.1 displays two separate lists of the top 10 nations, one from the Census trade data and the other from our offshoring network, over the two periods, 1997-2006 and 2007-2013. Panel A compares Census exports and our corresponding offshore output measure, and Panel B compares Census imports and our offshore input measure.

**[Insert Table OA.1 Here]**

In Panel A, the top 10 counter-party nations at the Census list are also at the top of our list in general with a few exceptions. However, the order of those nations are slightly different. As previously stated, this small disagreement is likely because the Census trade data cover both private and public firms as well as the U.S. government. We also observe similar changes in both lists from the early period to the later period. For example, China exhibits a rise in its ranking as a counter-party nation in both Census exports and our offshoring output variable. It is also worth noting that the Netherlands ranks highly in the Census list but not as high in our list. This difference is justifiable as the Netherlands is a transfer point for shipped goods given its large ports. The Census might log these shipments as exports to the Netherlands, but the firms in our sample would disclose in their 10-Ks that some of these goods are being consumed elsewhere in Europe. Overall, the correlation coefficient between Census exports and the number of textual mentions of offshore output from our database is 0.85 with a p-value of 0.0000.

In Panel B, we also observe significant overlap in both Census imports and our offshoring input textual mentions. The correlation coefficient between Census imports and the number of textual mentions of offshore input is slightly greater compared to Panel A at 0.88 with a p-value of 0.0000. These strong results provide confirmation that the information in our data is of high quality.

## 2 Foreign country exposures

In Table OA.2, we consider a balanced panel sample that includes all firm-nation-year observations regardless of whether a firm has offshore output activities in a given nation in a given year. The goal is to compare a firm with offshore output activities in a nation against a stronger counterfactual firm that does not sell output to the nation. The dependent variable in Panel A is the annual firm-nation exchange rate beta, the slope of a regression of each firm's monthly stock returns on the given nation's monthly exchange rate changes. The dependent variable in Panel B is an analogous beta based on the given nation's stock market index returns.<sup>2</sup>

[Insert Table OA.2 Here]

We regress these firm and nation-specific betas on our three offshoring variables: Offshore Output Dummy, External Input Dummy and Internal Input Dummy. In addition to the dummy variables, we also consider relative intensity for each activity in each nation: Offshore Output Fraction, External Input Fraction and Internal Input Fraction. These intensities are computed as the number of times the given activity in a given nation is mentioned, divided by the total number of firm mentions of the given activity for all nations. We further stress-test our results by including a control for the U.S. market beta. This neutralizes any standard association between foreign market betas and domestic market betas. All regressions include firm and year fixed effects.

We find in the first column of Panel A that the exchange rate beta is significantly and positively associated with offshore output activity to the given nation. The output fraction in column (4) reinforces this point by showing that the greater the output intensity to the given nation, the stronger is the association between the firm's stock returns and the nation's exchange rates. Analogously in columns (1) and (4) of Panel B, we find that the foreign stock market beta is significantly and positively associated with offshore output to the nation, and the association is much stronger in significance for both the output dummy and the output fraction as compared to the exchange rate betas. This finding echoes a main result of our paper that the offshoring return premium is likely best explained by quantity risk and not price risk.

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<sup>2</sup>We also consider consumption exposure, although not in this specific test. The reason we do not examine it here is because consumption data is only available at an annual frequency, and power is too limited.

We also examine whether offshore input activities differ in their associations with the exchange rate and stock market betas. In column (2), we find that internal input activities generally exhibit insignificant relation with the exchange rate beta, but significantly positive relation with the stock market beta. We do not have a strong prediction for internal input because this activity bundles the counter-cyclical purchase of input with pro-cyclical ownership of assets. The results suggest that the pro-cyclical force might be dominant in this setting, particularly for foreign stock market betas. In contrast, column (3) shows that external input activities in both Panels A and B are significantly and negatively related to the betas. This finding is important, because it not only validates the quality of our offshoring data as a measure of U.S. firms' foreign country exposures, but it also supports our prediction that offshore output vs input activities will have different stock return implications.

### **3 Bivariate sorts: offshore output vs market capitalization**

Table OA.3 displays the results of double-sorting our sample by offshore output and market capitalization variables and examining average portfolio returns.

[Insert Table OA.3 Here]

### **4 Top 50 central nations in the world trade network**

Table OA.4 lists the top 50 central nations in the world trade network. For this list, we use directed trade data adjusted for nations' log GDP excluding a geographical distance control. Results are similar with undirected trade data with or without the geographical distance control.

[Insert Table OA.4 Here]

## 5 Offshoring return premium, political instability and nation size

We consider analogous tests in Tables 5 and 6 of the paper for political instability risk and GDP in Table OA.5. For each nation, we use the World Bank “Political Stability and Absence of Violence/Terrorism” index from 1996 for political risk. Nations with low political stability are tagged as having the greatest political instability risk, and nations with high political stability are tagged as having the lowest political instability. We hypothesize that if investors are concerned about political instability, then stock returns will be higher for high political instability nations. We also consider a model that controls for a potential role for nation size. In particular, one might expect that risk premia are simply driven by offshoring activity to larger nations. We thus consider GDP for each nation as measured in 1996 to explore whether our results can be explained by nations with large economic size. Terciles for GDP are comprised of larger nations, medium sized nations, and smaller nations.

[Insert Table OA.5 Here]

Panel A of Table OA.5 sharply rejects the political risk hypothesis, as the results are strongest for nations in the lowest political risk tercile. In contrast to a political risk hypothesis, this finding fits better with a consumption risk interpretation. In particular, nations with lower political risk are more likely to embrace global economic policies, and are thus likely to have higher global and U.S. consumption risk exposure and higher returns, as the table illustrates. The results in Panel B for GDP are also not consistent with a conclusion that our results are driven by a GDP-based explanation. In particular, we do not see strong sorting of returns across nation size and find a U-shaped pattern.

Table OA.1: Offshore Counter-parties and External Validation

The table displays lists of the top 10 nations in which U.S. firms offshore their output (Panel A) and input (Panel B) over the two different sample periods of 1997-2006, and 2007-2013. For each sample period, we compare our list to rankings based on the U.S. Census Bureau's historical trade data. The Census historical trade data are available at <https://www.census.gov/foreign-trade/statistics/historical/index.html>. Exports is the annually estimated total export amount by all U.S. firms including both private and public firms in million dollars. Imports is the annually estimated total import amount by all U.S. firms including both private and public firms in million dollars. Mentions is the total number of output or input mentions that appear near each nation word by all public firms in our sample in the given period. For each five-year sample, we report the annual averages of Exports, Imports, and Mentions over the five-year period.

<i>Panel A: Exports vs. Offshore Output</i>												
Rank	Census trade data (1997-2006)			Our data (1997-2006)			Census trade data (2007-2013)			Our data (2007-2013)		
	Nation	Exports	Share (%)	Nation	Mentions	Share(%)	Nation	Exports	Share(%)	Nation	Mentions	Share(%)
1	Canada	178061.6	23.0	Canada	10903.1	15.3	Canada	262664.2	19.6	China	10674.1	15.1
2	Mexico	100929.8	13.1	Japan	6077.2	8.5	Mexico	174275.6	13.0	Canada	9997.4	14.1
3	Japan	57338.3	7.4	United Kingdom	5585.6	7.9	China	90062.4	6.7	Japan	4487.1	6.3
4	United Kingdom	38308.8	5.0	China	4216.2	5.9	Japan	62699.9	4.7	United Kingdom	3807.3	5.4
5	Germany	29958.0	3.9	Mexico	3587.7	5.0	United Kingdom	50848.0	3.8	Mexico	3218.6	4.5
6	China	25537.0	3.3	Australia	3391.9	4.8	Germany	48692.2	3.6	Australia	3166.9	4.5
7	South Korea	24712.6	3.2	Germany	3330.9	4.7	Netherlands	37841.5	2.8	South Korea	2661.7	3.8
8	Netherlands	22013.5	2.8	South Korea	2708.8	3.8	South Korea	37704.8	2.8	Germany	2518.0	3.6
9	Taiwan	20192.8	2.6	France	2642.9	3.7	Brazil	35552.5	2.7	India	2054.3	2.9
10	France	19555.4	2.5	Singapore	2518.4	3.5	Hong Kong	29318.9	2.2	Singapore	1959.7	2.8

  

<i>Panel B: Imports vs. Offshore Input</i>												
Rank	Census trade data (1997-2006)			Our data (1997-2006)			Census trade data (2007-2013)			Our data (2007-2013)		
	Nation	Imports	Share(%)	Nation	Mentions	Share(%)	Nation	Imports	Share(%)	Nation	Mentions	Share(%)
1	Canada	226617.2	18.0	Canada	7549.3	11.0	China	369423.8	18.1	China	12577.9	17.7
2	China	142336.6	11.3	China	5959.8	8.7	Canada	304654.1	14.9	Canada	7034.9	9.9
3	Mexico	135449.1	10.8	United Kingdom	5439.6	8.0	Mexico	236331.1	11.6	Mexico	4014.6	5.7
4	Japan	130278.0	10.4	Mexico	4746.5	6.9	Japan	130716.5	6.4	United Kingdom	3677.9	5.2
5	Germany	64749.8	5.2	Germany	3328.4	4.9	Germany	95409.8	4.7	Germany	2802.4	3.9
6	United Kingdom	42580.8	3.4	Japan	3028.9	4.4	United Kingdom	53121.2	2.6	Singapore	2460.9	3.5
7	South Korea	36233.7	2.9	Singapore	2560.8	3.7	South Korea	51673.7	2.5	Japan	2391.4	3.4
8	Taiwan	34624.3	2.8	France	2536.8	3.7	Saudi Arabia	42684.2	2.1	Brazil	2262.6	3.2
9	France	29051.6	2.3	Australia	2326.1	3.4	France	40799.3	2.0	Australia	2049.0	2.9
10	Malaysia	25420.6	2.0	Hong Kong	2037.8	3.0	Venezuela	38011.1	1.9	France	2007.3	2.8

Table OA.2: Foreign Country Exposures

The table examines whether firms reporting more offshoring activities in a given nation have higher exposure to the nation's foreign exchange rate changes (Panel A) and stock market index returns (Panel B). One observation is one firm-nation-year, and the exchange rate sample (stock market sample) includes 48 (51) nations for which data are available. We include all firm-nation-year permutations regardless of whether the firm has offshore output activities in a given nation in a given year. The dependent variable is the annual beta measured based on regressing the firm's stock return on the given nation's logarithmic exchange rate returns (Panel A) or stock market index returns (Panel B). We compute betas using monthly returns in all panels and each beta regression is run once per year based on twelve monthly observations. Beta estimates are then shrunk based on Vasicek (1973) to reduce the impact of outliers. Once we obtain the betas from this initial calculation, we use the betas (which exist in a firm-nation-year panel) as the dependent variable in the regressions displayed below. The betas are computed such that a higher beta implies a greater exposure to the given nation. The RHS variables, Offshore Output Dummy, External Input Dummy and Internal Input Dummy are one if the firm discusses its offshore output, external input and internal input respectively with the relevant vocabulary based on our offshore word lists along with a given nation word in a given year. The analogous Fraction variables are equal to the number of times the given activity in a given nation is mentioned divided by the total number of times the firm mentions the given activity to all nations. We also include specifications that control for the domestic U.S. market beta which is the 12-month beta with respect to the CRSP value-weighted index. All regressions include firm and year fixed effects, and *t*-statistics (in parenthesis) are adjusted for clustering by firm-year.

Row	Offshore Output Dummy	Internal Input Dummy	External Input Dummy	Offshore Output Fraction	Internal Input Fraction	External Input Fraction	Market Beta	Observations
<b>Panel A: Foreign Exchange Rate Exposure</b>								
(1)	1.097 (3.64)	-0.190 (-0.55)	-2.136 (-3.06)					3,797,143
(2)	0.641 (1.65)	-0.800 (-1.80)	-3.973 (-3.26)	2.111 (2.73)	2.201 (2.39)	3.386 (1.95)		3,797,143
(3)	0.648 (1.67)	-0.798 (-1.79)	-3.979 (-3.27)	2.103 (2.72)	2.198 (2.39)	3.389 (1.95)	-1.128 (-13.84)	3,797,143
<b>Panel B: Foreign Stock Market Exposure</b>								
(4)	0.119 (58.13)	0.073 (33.71)	-0.016 (-4.26)					3,824,746
(5)	0.109 (40.64)	0.066 (22.58)	-0.041 (-6.02)	0.047 (8.13)	0.023 (3.86)	0.044 (4.20)		3,824,746
(6)	0.107 (49.00)	0.066 (27.58)	-0.039 (-6.85)	0.049 (9.77)	0.024 (4.58)	0.043 (4.81)	0.343 (314.82)	3,824,746

Table OA.3: Bivariate Sorts: Offshore Output vs Market Capitalization

Average portfolio stock returns are displayed based on independent sorts of offshoring output and market capitalization. In each month, we sort firms into terciles based on their CRSP market capitalization in the previous month. For offshore output, we consider firms that have zero offshore output as one group, and then sort the remaining firms into terciles based on the intensity of their offshore output. Sorts are independent. For each group, we report average stock returns in Panel A, and we report the observation counts in each group in Panel B.

Group	Small Cap	Mid Cap	Large Cap
<i>Panel A: Portfolio Returns</i>			
No Offshore Output	1.35	0.68	0.65
Tercile 1	1.41	0.76	0.51
Tercile 2	1.50	1.06	0.70
Tercile 3	1.62	1.20	0.92
<i>Panel B: Observations</i>			
No Offshore Output	70,488	70,628	70,559
Tercile 1	82,099	66,221	45,847
Tercile 2	64,547	63,236	65,493
Tercile 3	47,160	64,481	82,534

Table OA.4: Top 50 Central Nations in the World Trade Network

The table lists the top 10 most central nations in our trade network centrality in 1997. Trade network centrality is the eigenvector centrality constructed using directed bilateral trades. For each year we run a cross-sectional regression of each nation's directed trade value with another nation on the two nations' log GDPs, and take the residuals of the regression as the weights for bilateral trade pairs. The directed trade values are imports and exports separately. For this test, we use the centrality estimates for 1997, the year our sample period starts.

Rank	Nation	Trade network centrality
1	Belgium	0.14145
2	Netherlands	0.13879
3	Ireland	0.13644
4	Italy	0.13448
5	Germany	0.13385
6	France	0.13367
7	United Kingdom	0.13335
8	Switzerland	0.13314
9	Denmark	0.13195
10	South Korea	0.13190
11	Sweden	0.13171
12	Malaysia	0.13148
13	Finland	0.13077
14	Thailand	0.13007
15	China	0.12868
16	Singapore	0.12822
17	Spain	0.12801
18	Austria	0.12480
19	Indonesia	0.12459
20	South Africa	0.12211
21	India	0.12142
22	Czech Republic	0.12099
23	Norway	0.12092
24	United States	0.12063
25	Romania	0.12056
26	Turkey	0.12049
27	Japan	0.11956
28	Canada	0.11908
29	Russia	0.11861
30	Pakistan	0.11772
31	Bulgaria	0.11526
32	Hungary	0.11472
33	Poland	0.11408
34	Portugal	0.11228
35	Brazil	0.11155
36	Hong Kong	0.11130
37	New Zealand	0.11046
38	Australia	0.11002
39	Greece	0.10850
40	Israel	0.10824
41	Argentina	0.10716
42	Slovenia	0.10524
43	Slovak Republic	0.10341
44	Morocco	0.10261
45	Chile	0.10078
46	Philippines	0.09760
47	Mexico	0.09621
48	Peru	0.09613
49	Tunisia	0.08938
50	Iran	0.08816

Table OA.5: Offshoring Return Premium, Political Instability and Nation Size

Fama-MacBeth regressions with own-firm excess monthly stock return as the dependent variable. One observation is one firm month from July 1998 to June 2015. The independent variables include three types of offshoring activities: (1) the sale of output in foreign nations (Offshore Output), (2) the procurement of input in foreign nations (Offshore Input), and (3) the extent to which foreign input is bought directly from an external party rather than produced by own-firm foreign assets (Offshore External Input). The latter two measures are constructed in a fashion to reduce their correlation with Offshore Output, and hence we include the word “abnormal” in each variable’s label. To contrast contributions from nations with different levels of political instability (Panel A) and nation size (Panel B), we construct these variables separately for the set of nations in the highest, middle, and lowest tercile of political instability and GDP, respectively. Political instability in Panel A is based on 1996 values of the political stability index from the World Bank (we invert the sign of this variable to measure “political instability” rather than “political stability” as the former indicates a form of risk). We use 1996 GDP levels for sorting nations in Panel B. Because nations with higher GDP, for mechanistic reasons, have more offshoring activity, GDP terciles are formed using cumulative GDP weights instead of less-meaningful nation-by-nation counts. We thus include nine variables: three offshoring variables for each tercile as noted in the column headers. We also include controls for the Fama and French (1992) variables (log book to market ratio and log size), a dummy for negative book to market ratio stocks (the dummy is not displayed to conserve space and is not significant), and a control for momentum (defined as the own-firm 11 month lagged return from month  $t - 12$  to  $t - 2$ ). All independent variables are standardized to have a standard deviation of one for ease of comparison and interpretation. Newey West  $t$ -statistics (based on 2 lags) are displayed in parentheses.

*Panel A: Political Instability Risk*

Row	Nations Used to Construct Offshoring Vars	High Risk Nations			Medium Risk Nations			Low Risk Nations			Log B/M Ratio	Log Size	Past 11 Mon Return	FX Ctls	Obs. / RSQ
		Offshore Output	Abnormal Offshore Input	Abnormal Offshore External Input	Offshore Output	Abnormal Offshore Input	Abnormal Offshore External Input	Offshore Output	Abnormal Offshore Input	Abnormal Offshore External Input					
(1)	See Column Headers	-0.020 (-0.49)			0.004 (0.10)			0.221 (3.52)			0.199 (1.18)	-0.370 (-2.08)	0.116 (0.70)	No	793,293 0.026
(2)	See Column Headers	-0.020 (-0.50)	-0.014 (-0.39)		0.009 (0.19)	-0.022 (-0.53)		0.219 (3.54)	-0.013 (-0.34)		0.204 (1.27)	-0.366 (-2.11)	0.115 (0.70)	No	793,293 0.027
(3)	See Column Headers	-0.020 (-0.50)	-0.014 (-0.39)	0.054 (2.06)	0.010 (0.23)	-0.021 (-0.50)	-0.054 (-2.46)	0.218 (3.54)	-0.016 (-0.42)	-0.031 (-1.26)	0.206 (1.29)	-0.368 (-2.12)	0.115 (0.70)	No	793,293 0.028
(4)	See Column Headers	-0.021 (-0.54)	-0.032 (-0.86)	0.073 (2.61)	0.010 (0.26)	-0.029 (-0.66)	-0.067 (-2.96)	0.167 (3.03)	-0.034 (-0.96)	-0.048 (-2.03)	0.045 (0.35)	-0.408 (-2.50)	0.016 (0.10)	Yes	696,757 0.066

*Panel B: Gross Domestic Product*

Row	Nations Used to Construct Offshoring Vars	High GDP Nations			Medium GDP Nations			Low GDP Nations			Log B/M Ratio	Log Size	Past 11 Mon Return	FX Ctls	Obs. / RSQ
		Offshore Output	Abnormal Offshore Input	Abnormal Offshore External Input	Offshore Output	Abnormal Offshore Input	Abnormal Offshore External Input	Offshore Output	Abnormal Offshore Input	Abnormal Offshore External Input					
(1)	See Column Headers	0.194 (2.46)	.	.	0.016 (0.32)	.	.	0.056 (1.48)	.	.	0.198 (1.19)	-0.370 (-2.08)	0.114 (0.70)	No	793,293 0.026
(2)	See Column Headers	0.194 (2.51)	-0.000 (-0.02)	.	0.015 (0.29)	-0.031 (-0.78)	.	0.055 (1.48)	-0.019 (-0.47)	.	0.205 (1.29)	-0.362 (-2.09)	0.114 (0.70)	No	793,293 0.028
(3)	See Column Headers	0.194 (2.51)	-0.003 (-0.11)	-0.027 (-1.42)	0.017 (0.34)	-0.028 (-0.71)	-0.050 (-2.06)	0.051 (1.39)	-0.022 (-0.53)	0.023 (0.95)	0.206 (1.30)	-0.367 (-2.11)	0.114 (0.70)	No	793,293 0.029
(4)	See Column Headers	0.171 (2.93)	-0.009 (-0.39)	-0.035 (-1.80)	-0.041 (-0.89)	-0.033 (-0.92)	-0.071 (-2.99)	0.073 (1.98)	-0.063 (-1.55)	0.037 (1.50)	0.045 (0.36)	-0.407 (-2.49)	0.015 (0.09)	Yes	696,757 0.066