

*Online Appendix to:*

Foreign Investment, Regulatory Arbitrage,  
and the Risk of U.S. Banking Organizations

# 1 Branch locations

This study focuses on the relation between BHCs’ foreign subsidiary locations and the strength of regulation and supervision in host countries. A relevant question is why we focus on subsidiaries exclusively and omit analysis for other types of affiliates, particularly bank branches. As pointed out by prior studies (Focarelli and Pozzolo (2005), Fiechter et al. (2011) and Ongena et al. (2013)), foreign branches typically fall under the supervisory jurisdiction of a BHC’s head office. Thus, cross-country differences in banking regulation and supervision stringency should not have a material effect on BHCs’ foreign branch locations. To test this empirically, we first augment our sample by including BHC-year-branch country observations and estimate several variations of Equation (1) in the manuscript. For ease of comparison, we also include equivalent specifications for the foreign subsidiary sample. Table OA-1 presents results.

[Insert Table OA-1 about here]

While the coefficient estimates suggest a positive link between U.S. BHCs’ foreign branch locations and weaker regulation and supervision abroad, this relationship is largely driven by Great Britain. Including a control for Great Britain, or country fixed effects, breaks the association between branch locations and regulatory stringency. This observation is consistent with Goldberg and Saunders (1980), who explore and discuss the key role of Great Britain for the U.S. bank branch expansion abroad. In contrast to the fragile association between branch locations and host country banking regulation and supervision, analogical tests show that BHCs’ subsidiary locations are robustly correlated with host country regulatory environments.

## 2 Subsidiary locations: Difference specifications

While our instrumental variable analyses in Section 4.2 mitigate concerns that the results in Table 4 of the manuscript are driven by country-specific factors not related to regulatory stringency, we further confirm this with analysis of expansions and contractions of subsidiary counts over the four regulation and supervision surveys. Specifically, in this section of the Online Appendix, we partial out country-specific factors that are invariant over time by using difference regression specifications. To accommodate the frequency of our regulation and supervision survey data, we difference all variables using the four cross-sections of data corresponding to each survey year and discarding values in-between survey years. Table OA-2 presents results.

[Insert Table OA-2 about here]

In Column (1), we use a least squares estimator on untransformed subsidiary count differences. In Column (2), we use an ordered probit estimator where we categorize changes in BHC subsidiary counts into “negative growth,” “zero growth,” or “positive growth” groups. Overall and individually, these tests confirm the robustness of our results to explicitly accounting for time-invariant country-specific factors.

## 3 Subsidiary locations: Traditional and non-traditional activities

After the global financial crisis, policymakers and academics have paid closer attention to the relationship between non-traditional banking activities such as investment banking and trading, and the rise in bank size, interconnectedness, complexity, and risk. For example, a critical component of the complexity indicator used by the Financial Stability Board and

Basel Committee on Banking Supervision to designate financial institutions as globally systemically important banking organizations (G-SIBs) is the notional amount of their over-the-counter derivatives.<sup>1</sup> Furthermore, studies have shown that banks with higher involvement in non-traditional banking activities contribute more to systemic risk (e.g., Brunnermeier et al. (2012)). Given these observations, and our finding in Section 4.1 that weaker restrictions to banking activities in host countries may be a motive for the location of U.S. BHCs' foreign subsidiaries, we separately analyze foreign subsidiaries engaged in traditional versus non-traditional banking activities in this section of the Online Appendix.

We start by splitting the sample into traditional and non-traditional subsidiaries according to NAICS industry definitions. Traditional subsidiaries are defined as those with NAICS code 522, which corresponds to entities engaged in credit intermediation and related activities. In contrast, non-traditional subsidiaries are defined as those with NAICS codes 523, 524, 525, 531 and 551, which correspond to entities engaged in securities, insurance, asset management, and real estate activities, respectively. We then re-estimate Equation (1) from the manuscript for each group separately. Table OA-3 presents results.

[Insert Table OA-3 about here]

The coefficient estimates for *Regulation & Supervision* are positive and statistically significant at the 1% level across all specifications. The results in Columns (1) and (3) suggest that U.S. BHCs are equally likely to locate foreign traditional and non-traditional subsidiaries in host countries with weaker banking regulation and supervision regimes. However, the results in Columns (2) and (4) suggest that U.S. BHCs tend to operate more non-traditional subsidiaries in less regulated foreign environments. Weak regulation and supervision might be particularly conducive to an increased breadth of BHC non-traditional operations.

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<sup>1</sup>Details on the methodology used to designate institutions as G-SIBs can be found at: <http://www.bis.org/publ/bcbs255.pdf>

## 4 Subsidiary locations: Amplification through other country characteristics

Are there particular country characteristics, which amplify U.S. banks' tendency to locate subsidiaries in weak regulation and supervision jurisdictions? Based on economic intuition, we identify three characteristics that potentially provide channels for the amplification of the location effects of regulation and supervision stringency: market size, financial development, and the quality of countries' institutional and legal environments. First, banks might be particularly prone to operating subsidiaries in large, financially developed markets with weak regulation and supervision because such markets would provide banks with demand for their services, allow them scale of operations, and give them access to advanced financial technologies and potential breadth of activities. Second, banks might "trade off" a weaker regulatory environment for a stronger institutional environment. Specifically, banks might be particularly prone to engage in regulatory arbitrage only in jurisdictions that have strong governance and legal protections.

To test the above channels we introduce into our regressions interaction terms between *Regulation & Supervision* and:  $\ln(GDP)$ , *Credit-to-GDP*, *Offshore Financial Center* and *Country Governance*, respectively, and test their significance in econometric specifications similar to Equation (1) of the manuscript. Table OA-4 reports the results.

[Insert Table OA-4 about here]

Columns (1)-(3) and (5)-(7) show some evidence that banking organizations are more likely to pursue cross-country differences in regulation and supervision in markets which are larger and more financially developed. We note, however, the lack of cross-specification robustness of these results: in most cases, the variable interaction terms are indistinguishable from zero. On the other hand, the results in Columns (4) and (8) suggest that while U.S.

BHCs generally tend to locate in countries with strong governance and institutions, they do not trade off weaker regulations for otherwise stronger institutional environment. Particularly, the term *Regulation & Supervision*  $\times$  *Country Governance* is negative and significant, suggesting that banks are less likely to pursue operations in countries with weak regulatory environment that otherwise have strong governance.

## 5 Risk: Within-host-country variation in regulation and supervision

In this section of the Online Appendix, we examine the relation between BHC risk-taking and country regulation and supervision by focusing on within-host-country variation in regulatory stringency. First, we examine changes in BHC risk-taking following the strengthening of regulation and supervision using the implementation of Basel 2.5 as a regulatory shock. Second, we adopt an approach similar to Lamont and Polk (2002) and zero in on changes in BHC risk due to changes in host countries' stringency of regulation and supervision keeping the countries to which BHCs have exposure unchanged. Consistent with the findings in our manuscript, the results in this section suggest that BHCs decrease (increase) risk-taking when host-country regulation and supervision tighten (ease). Details of our tests and results follow.

### 5.1 Basel 2.5 implementation

We use the implementation of Basel Accords revisions across countries in our sample as a positive shock to the stringency of regulation and supervision and examine its effect on BHCs' risk profiles. This test is useful because the implementation of new standards recommended by the Basel Committee on Banking Supervision are not likely to be driven

by country-specific economic conditions or BHCs’ influence on country institutions through their international operations.

We have two major Basel Accord rule implementations over our sample period: Basel 2 and Basel 2.5. Prior studies have found that while Basel 2.5 resulted in tightening of financial regulation on average, Basel 2 had an unclear and oftentimes not meaningful effect on financial regulation stringency (e.g., Cerutti et al. (2017)). We consequently focus on the Basel 2.5 revisions rather than Basel 2. Table OA-5 lists Basel 2.5 implementation dates for the countries in our sample that adopted those recommendations.

[Insert Table OA-5 about here]

We follow an event study approach where we compare BHCs’ risk measures for periods before and after countries implemented Basel 2.5. In doing so, we require that BHCs have subsidiary presence in those countries prior to and post implementation. More specifically, we define *Basel 2.5 Implementation* as an indicator variable that equals 1 for quarters following Basel 2.5 implementation in a country and 0 otherwise. Because Basel 2.5 implementation typically occurs near the end of our sample period, we use short window lengths of one to four quarters. For every event, we average data into pre-implementation and post-implementation observations. Table OA-6 presents results.

[Insert Table OA-6 about here]

We find that  $VaR$  and  $\Delta CoVaR$  both decreased post Basel 2.5 implementation as countries tightened banking regulations. Such results are consistent with Section 5 in our manuscript, where we find that lax regulatory environment of foreign subsidiary locations is related to higher BHC risk and banks’ contribution to systemic risk.

## 5.2 Within-country changes in regulation and supervision

We also adopt an approach similar to Lamont and Polk (2002) to capture BHC risk effects from within-host-country changes in regulation and supervision while mitigating the effects of changes in BHC subsidiary country locations. We decompose changes in BHC exposure to subsidiary country supervision and regulation into two components: a component that reflects changes in host countries' stringency of regulation and supervision and a component that reflects changes in the countries to which BHCs have exposures. Specifically, for every BHC  $i$  in period  $t$ , we keep only the countries which the BHC has exposure to in both period  $t$  and period  $t - 1$ . Countries to which the BHC is exposed in period  $t$ , but not in period  $t - 1$ , are dropped from our estimation. We thus measure only the shock to regulation and supervision originating from country  $j$  (but not from changes in the composition of countries a BHC operates in), which is simply the change in regulation and supervision stringency in country  $j$  from period  $t - 1$  to period  $t$ . We then estimate a difference specification of BHC risk on host-country regulatory stringency.<sup>2</sup> Table OA-7 reports the results.

[Insert Table OA-7 about here]

Decreases in the stringency of regulation and supervision correspond to increases in BHC risk. Coefficients are significant at least at the 5% level. Overall, our tests here and in our manuscript indicate a strong association between subsidiary country supervision and regulation stringency and U.S. BHC risk, with results robust to a variety of estimation techniques.

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<sup>2</sup>Estimating differences regressions reduces the number of controls. Specifically, we difference away static variables.



## 6 Risk: Traditional and non-traditional activities

Section 3 of the Online Appendix examines whether BHC subsidiary locations in response to cross-country differences in banking regulation and supervision differ between traditional and non-traditional banking subsidiaries. In parallel fashion, this section examines whether the subsidiary location-BHC risk link documented in Section 5.2 of the manuscript manifests through traditional vis-à-vis non-traditional subsidiaries in weakly regulated markets. To test this, we estimate Equation (2) from the manuscript for the separate sub-samples of traditional and non-traditional subsidiaries previously described in Section 3 of the Online Appendix. Table OA-8 presents the results.

[Insert Table OA-8 about here]

Having operations in foreign markets with weaker regulatory regimes is associated with higher BHC risk regardless of whether subsidiaries are engaged in traditional or non-traditional activities. The coefficients estimates on *Regulation & Supervision* are positive and significant across all specifications and are similar in magnitude to those in Table 8, Panel A of the manuscript.

## References

- Barth, J. R., Caprio, G., and Levine, R. (2013). Bank regulation and supervision in 180 countries from 1999 to 2011. *Journal of Financial Economic Policy*, 5(2):111–219.
- Brunnermeier, M. K., Dong, G. N., and Palia, D. (2012). Banks’ non-interest income and systemic risk. *Working Paper, Princeton University*.
- Cerutti, E., Correa, R., Fiorentino, E., and Segalla, E. (2017). Changes in prudential policy instruments: A new cross-country database. *International Journal of Central Banking*, March.
- Fiechter, J., Otker-Robe, I., Ilyina, A., Hsu, M., Santos, A., and Surti, J. (2011). Subsidiaries or branches: Does one size fit all? *IMF Staff Discussion Note SDN/11/04*.
- Focarelli, D. and Pozzolo, A. F. (2005). Where do banks expand abroad? An empirical analysis. *Journal of Business*, 78(6):2435–2464.
- Goldberg, L. G. and Saunders, A. (1980). The causes of U.S. bank expansion overseas: The case of Great Britain. *Journal of Money, Credit and Banking*, 12(4):630–643.
- Lamont, O. A. and Polk, C. (2002). Does diversification destroy value? Evidence from the industry shocks. *Journal of Financial Economics*, 63(1):51–77.
- Ongena, S., Popov, A., and Udell, G. F. (2013). “When the cat’s away the mice will play”: Does regulation at home affect bank risk-taking abroad? *Journal of Financial Economics*, 108(3):727–750.

Table OA-1: **Branch Locations and Foreign Regulation and Supervision Stringency**

This table reports coefficient estimates from panel regressions of U.S. BHC subsidiary and branch locations on foreign banking regulation and supervision stringency and control variables. The sample is a panel of BHC-year-subsidary or branch country observations during the period [1995-2013] of 135 U.S. BHCs. *PresSub* is an indicator variable that equals 1 if a BHC reports having foreign subsidiaries in a given country during a year, and 0 otherwise. *PresBranch* is an indicator variable that equals 1 if a BHC reports having foreign branches in a given country during a year, and 0 otherwise. *Regulation* & *Supervision* measures the stringency of a country's banking regulation and supervision. It is defined as the first principal component of *Activities Restrictions*, *Capital Regulation* and *Supervisory Power*. *Activities Restrictions* measures the stringency of a country's regulation regarding banks' involvement in securities, insurance and real estate activities. *Capital Regulation* measures the degree to which supervisory authorities in a country oversee capital at risk and the initial source of funds used to capitalize a bank. *Supervisory Power* measures the extent to which supervisory authorities in a country can intervene to prevent and correct problems at financial institutions. *GBR* is a country indicator variable that equals 1 for the United Kingdom, and 0 otherwise. Detailed definitions of all variables are presented in Table 1 of the manuscript. We include BHC $\times$ year fixed effects and use robust standard errors clustered at the BHC $\times$ country level in all specifications. In columns (3), (4), (7) and (8) we also include country fixed effects. P-values are reported in parentheses and \*\*\*, \*\*, \* denote significance at the 1, 5 and 10 percent significance level, respectively.

	PresSub			PresBranch				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Regulation & Supervision	0.011*** (0.000)	0.009*** (0.000)	0.005** (0.013)	0.005** (0.016)	0.001*** (0.006)	0.000 (0.299)	-0.000 (0.590)	-0.000 (0.616)
Ln(GDP)	0.023*** (0.000)	0.020*** (0.000)	0.069*** (0.003)	0.070*** (0.003)	0.001*** (0.001)	0.000 (0.139)	-0.000 (0.976)	-0.001 (0.791)
GDPG	-0.004 (0.714)	-0.005 (0.630)	0.012 (0.285)	0.011 (0.331)	0.002 (0.110)	0.001 (0.211)	0.001 (0.373)	0.002 (0.280)
GDPG Correlation	0.018** (0.035)	0.016* (0.063)	0.014** (0.041)	0.013* (0.055)	0.001 (0.566)	-0.001 (0.406)	0.001 (0.329)	0.001 (0.456)
Ln(GDPPPC)	-0.008*** (0.005)	-0.007*** (0.013)	-0.050** (0.030)	-0.051** (0.027)	-0.001** (0.021)	-0.000 (0.322)	0.001 (0.793)	0.002 (0.653)
Bilateral Trade	0.010*** (0.008)	0.015*** (0.000)	0.002 (0.726)	0.001 (0.911)	-0.000 (0.642)	0.001 (0.163)	0.001 (0.726)	0.001 (0.687)
Country Governance	0.028*** (0.000)	0.031*** (0.000)	0.019* (0.051)	0.020** (0.040)	0.000 (0.987)	0.000 (0.548)	-0.002 (0.157)	-0.002* (0.093)
Credit-to-GDP	0.038*** (0.000)	0.026*** (0.002)	0.031** (0.033)	0.035** (0.018)	0.004** (0.021)	0.001 (0.369)	-0.004 (0.249)	-0.006* (0.076)
Borrower & Creditor Rights	-0.005*** (0.000)	-0.005*** (0.000)	-0.004** (0.038)	-0.004** (0.038)	0.001** (0.015)	0.000 (0.117)	0.000 (0.925)	0.000 (0.453)
Banking Concentration	-0.053*** (0.002)	-0.044** (0.011)	0.004 (0.842)	0.008 (0.683)	-0.005 (0.121)	-0.001 (0.675)	-0.006 (0.305)	-0.007 (0.238)
Banking Profitability	-0.007 (0.613)	-0.016 (0.244)	0.005 (0.771)	0.007 (0.690)	-0.001 (0.743)	-0.001 (0.623)	-0.002 (0.392)	-0.003 (0.255)
Offshore Financial Center	0.034*** (0.001)	0.044*** (0.000)			0.001 (0.699)	0.006 (0.261)		
Contiguous	0.114*** (0.007)	0.173*** (0.000)			0.083*** (0.007)	0.105*** (0.000)		
Common Language	0.053*** (0.000)	0.031*** (0.000)			0.008** (0.013)	0.000 (0.794)		
Ln(Distance)	0.004 (0.592)	0.017** (0.015)			-0.003 (0.197)	0.002 (0.145)		
GBR		0.185*** (0.000)				0.068*** (0.008)		
Present Branch				0.345*** (0.000)				0.053*** (0.000)
Present Sub								
Observations	43,739	43,739	43,971	43,971	55,517	55,517	55,775	55,775
Adj. R2	.30	.31	.33	.34	.07	.08	.08	.10
Country FE	No	No	Yes	Yes	No	No	Yes	Yes

Table OA-2: **Subsidiary Locations and Changes in Country Regulation and Supervision**

This table reports coefficient estimates from regressions of changes in U.S. BHC subsidiary counts on changes in foreign banking regulation and supervision stringency and control variables. The sample is a panel of BHC-quarter-subsidary country observations during the period [1995Q1-2013Q4] of 135 U.S. BHCs. We difference all variables using the four cross-sections of data corresponding to each survey year in Barth et al. (2013) (2001, 2003, 2007 and 2011) and discard values in-between survey years.  $\Delta NSub$  is the change in the total number of subsidiaries a BHC has in a given country over two subsequent survey years.  $\Delta NSub Category$  is a categorical variable that categorizes  $\Delta NSub$  into three groups: “negative growth,” “zero growth,” or “positive growth”. *Regulation & Supervision* measures the stringency of a country’s banking regulation and supervision. It is defined as the first principal component of *Activities Restrictions*, *Capital Regulation* and *Supervisory Power*. *Activities Restrictions* measures the stringency of a country’s regulation regarding banks’ involvement in securities, insurance and real estate activities. *Capital Regulation* measures the degree to which supervisory authorities in a country oversee capital at risk and the initial source of funds used to capitalize a bank. *Supervisory Power* measures the extent to which supervisory authorities in a country can intervene to prevent and correct problems at financial institutions. Detailed definitions of all variables are presented in Table 1 of the manuscript. In Column (1), we use a least squares estimator. In Column (2), we use an ordered probit estimator. We use robust standard errors clustered at the BHC level in both specifications. P-values are reported in parentheses and \*\*\*, \*\*, \* denote significance at the 1, 5 and 10 percent significance level, respectively.

	$\Delta NSub$	$\Delta NSub$ Category
	(1)	(2)
$\Delta$ Regulation & Supervision	0.076** (0.039)	0.083*** (0.010)
$\Delta$ Ln(GDP)	1.575* (0.089)	1.565** (0.012)
$\Delta$ GDPG	-0.131 (0.623)	-0.538** (0.018)
$\Delta$ Ln(GDPPC)	-1.621* (0.091)	-1.458** (0.014)
$\Delta$ Bilateral Trade	0.142 (0.413)	-0.110 (0.333)
$\Delta$ GDPG Correlation	0.288 (0.514)	-0.330 (0.140)
$\Delta$ Country Governance	0.438* (0.075)	-0.012 (0.951)
$\Delta$ Credit-to-GDP	0.007 (0.183)	0.003 (0.270)
$\Delta$ Borrower & Creditor Rights	-0.117** (0.011)	-0.131*** (0.000)
$\Delta$ Banking Concentration	-0.392 (0.620)	0.344 (0.370)
$\Delta$ Banking Profitability	-0.001 (0.744)	-0.002 (0.511)
Observations	3,458	3,458
Adj. R2	0.01	-

Table OA-3: **Subsidiary Locations and Traditional vs. Non-Traditional Activities**

This table reports coefficient estimates from panel regressions of U.S. BHC subsidiary locations on foreign banking regulation and supervision stringency and control variables separately for traditional and non-traditional subsidiaries. Traditional subsidiaries are entities that engage in commercial banking activities and are identified by NAICS code 522. Non-traditional subsidiaries are entities that engage in securities, insurance, asset management or real estate activities. These entities are identified by NAICS codes 523, 524, 525, 531 and 551. The sample is a panel of 43,739 BHC-year-subsidiary country observations during the period [1995-2013] of 135 U.S. BHCs. *PresSub* is an indicator variable that equals 1 if a BHC reports having foreign subsidiaries in a given country during a year, and 0 otherwise.  $\ln(NSub)$  is the natural log of 1 plus the total number of subsidiaries a BHC has in a given country during a year. *Regulation & Supervision* measures the stringency of a country's banking regulation and supervision. It is defined as the first principal component of *Activities Restrictions*, *Capital Regulation* and *Supervisory Power*. *Activities Restrictions* measures the stringency of a country's regulation regarding banks' involvement in securities, insurance and real estate activities. *Capital Regulation* measures the degree to which supervisory authorities in a country oversee capital at risk and the initial source of funds used to capitalize a bank. *Supervisory Power* measures the extent to which supervisory authorities in a country can intervene to prevent and correct problems at financial institutions. Detailed definitions of all variables are presented in Table 1 of the manuscript. Control variables are the same as used in Table 4 of the manuscript, but their coefficient estimates are omitted for brevity. We include BHC $\times$ year fixed effects and use robust standard errors clustered at the BHC $\times$ country level in all specifications. P-values are reported in parentheses and \*\*\*, \*\*, \* denote significance at the 1, 5 and 10 percent significance level, respectively.

	Traditional		Non-Traditional	
	PresSub	Ln(NSub)	PresSub	Ln(NSub)
	(1)	(2)	(3)	(4)
Regulation & Supervision	0.007*** (0.000)	0.007*** (0.000)	0.007*** (0.000)	0.014*** (0.000)
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	43,739	43,739	43,739	43,739
Adj. R2	.22	.23	.27	.25

Table OA-4: **Amplification of Regulation and Supervision Effects through Other Host-Country Characteristics**

This table reports coefficient estimates from panel regressions of U.S. BHC subsidiary locations on foreign banking regulation and supervision stringency, interactions with other country level measures and control variables. The sample is a panel of 43,739 BHC-year-subsidary country observations during the period [1995-2013] of 135 U.S. BHCs. *PresSub* is an indicator variable that equals 1 if a BHC reports having foreign subsidiaries in a given country during a year, and 0 otherwise. *Ln(NSub)* is the natural log of 1 plus the total number of subsidiaries a BHC has in a given country during a year. *Regulation & Supervision* measures the stringency of a country's banking regulation and supervision. It is defined as the first principal component of *Activities Restrictions*, *Capital Regulation* and *Supervisory Power*. *Activities Restrictions* measures the stringency of a country's regulation regarding banks' involvement in securities, insurance and real estate activities. *Capital Regulation* measures the degree to which supervisory authorities in a country oversee capital at risk and the initial source of funds used to capitalize a bank. *Supervisory Power* measures the extent to which supervisory authorities in a country can intervene to prevent and correct problems at financial institutions. *Ln(GDP)* is the natural log transformation of a country's GDP. *Credit-to-GDP* is a country's private credit extended by deposit money banks and other financial institutions as a share of GDP. *Offshore Financial Center* is an indicator variable that equals 1 if a country is classified as an offshore financial center, and 0 otherwise. *Country Governance* measures country governance along six dimensions: control of corruption, regulatory quality, rule of law, voice and accountability, government effectiveness, and political stability. Detailed definitions of all variables are presented in Table 1 of the manuscript. Control variables are the same as used in Table 4 of the manuscript, but their coefficient estimates are omitted for brevity. We include BHC $\times$ year fixed effects and use robust standard errors clustered at the BHC $\times$ country level in all specifications. P-values are reported in parentheses and \*\*\*, \*\*, \* denote significance at the 1, 5 and 10 percent significance level, respectively.

	PresSub			Ln(NSub)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Regulation & Supervision	0.004* (0.078)	0.009*** (0.000)	0.009*** (0.000)	0.012*** (0.000)	0.013** (0.044)	0.014*** (0.000)	0.016*** (0.000)	0.019*** (0.000)
Regulation & Supervision × Ln(GDP)	0.001* (0.065)				0.001 (0.255)			
Regulation & Supervision × Credit-to-GDP		0.002 (0.674)				0.001 (0.920)		
Regulation & Supervision × Offshore Financial Center			0.019** (0.022)				0.005 (0.730)	
Regulation & Supervision × Country Governance				−0.007*** (0.000)				−0.015*** (0.000)
Ln(GDP)	0.019*** (0.000)	0.022*** (0.000)	0.023*** (0.000)	0.023*** (0.000)	0.025*** (0.000)	0.031*** (0.000)	0.032*** (0.000)	0.034*** (0.000)
Credit-to-GDP	0.038*** (0.000)	0.023*** (0.000)	0.036*** (0.000)	0.040*** (0.000)	0.075*** (0.000)	0.058*** (0.000)	0.075*** (0.000)	0.080*** (0.000)
Offshore Financial Center	0.003*** (0.000)	0.001 (0.001)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Country Governance	0.028*** (0.000)	0.035*** (0.000)	−0.015 (0.489)	0.033*** (0.000)	0.034*** (0.000)	0.038*** (0.000)	0.024 (0.516)	0.034*** (0.000)
Controls		0.027*** (0.000)	0.028*** (0.000)	0.051*** (0.000)	0.050*** (0.000)	0.050*** (0.000)	0.050*** (0.000)	0.101*** (0.000)
Observations	43,739	43,739	43,739	43,739	43,739	43,739	43,739	43,739
Adj. R2	.30	.30	.30	.30	.29	.29	.29	.29

Table OA-5: **Basel 2.5 Implementation Dates**

This table shows the Basel 2.5 implementation dates for countries in our sample.

Country	Basel 2.5 Implementation Date
Argentina	2013Q1
Australia	2012Q1
Austria	2011Q1
Belgium	2012Q1
Bulgaria	2011Q1
Brazil	2012Q1
Canada	2012Q1
Switzerland	2011Q1
China	2013Q1
Germany	2012Q1
Denmark	2012Q1
Spain	2011Q4
Finland	2012Q1
France	2011Q4
United Kingdom	2012Q1
Greece	2012Q1
Hong Kong	2012Q1
Croatia	2013Q3
Hungary	2011Q4
Ireland	2012Q1
Iceland	2013Q1
Israel	2013Q1
Italy	2012Q1
Korea	2012Q1
Luxembourg	2011Q1
Mexico	2012Q2
Malta	2011Q1
Netherlands	2012Q1
Peru	2009Q4
Philippines	2007Q3
Portugal	2011Q3
Russia	2013Q4
Singapore	2012Q1
Slovakia	2012Q1
Turkey	2012Q2
South Africa	2012Q1



Table OA-6: **Risk: Evidence from Basel 2.5 Implementation**

This table reports coefficient estimates from weighted regressions of U.S. BHC risk on host-country Basel 2.5 implementation and control variables. The sample is a panel of BHC-quarter-subsidary country observations during the period [1995Q1-2013Q4] of 64 U.S. BHCs. The regressions weight country exposures within a BHC-quarter proportionately to the number of reported subsidiaries by a BHC in a given country-quarter, and then weight BHC-quarters equally among each other. *VaR* is a BHC's unconditional maximum market equity loss at the 95% confidence level on a quarterly basis.  $\Delta Co VaR$  measures a BHC's contribution to systemic risk and is defined as the difference between the conditional value at risk (CoVaR) of the financial system conditional on an institution being in distress (95% quantile of quarterly equity return losses) and the CoVaR conditional on the median state of the institution. *Basel 2.5 Implementation* equals 1 for the period after a country implemented the Basel 2.5 regulatory framework, and 0 otherwise. For each BHC-subsidary country pair, we use observation windows of  $+/-$  1, 2, 3 or 4 quarter periods around the Basel 2.5 implementation quarter. Detailed definitions of all variables are presented in Table 1 of the manuscript. Control variables are the same as used in Table 8 of the manuscript, but their coefficient estimates are omitted for brevity. We include BHC fixed effects and use robust standard errors clustered at the BHC level in all specifications. P-values are reported in parentheses and \*\*\*, \*\*, \* denote significance at the 1, 5 and 10 percent significance level, respectively.

	+/- 1 Quarter		+/- 2 Quarters		+/- 3 Quarters		+/- 4 Quarters	
	VaR	$\Delta CoVaR$	VaR	$\Delta CoVaR$	VaR	$\Delta CoVaR$	VaR	$\Delta CoVaR$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Basel 2.5 Implementation	-0.966*** (0.000)	-0.239*** (0.001)	-1.392*** (0.000)	-0.358*** (0.000)	-0.924*** (0.000)	-0.240*** (0.000)	-0.465*** (0.000)	-0.124*** (0.002)
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	569	569	569	569	569	569	569	569
Adj. R2	.60	.78	.66	.81	.77	.89	.83	.93

### Table OA-7: Risk and Changes in Country Regulation and Supervision

This table reports coefficient estimates from regressions of changes in U.S. BHC risk on changes in foreign banking regulation and supervision stringency and control variables. The sample is a panel of BHC-quarter-subsidary country observations during the period [1995Q1-2013Q4] of 64 U.S. BHCs.  $VaR$  is a BHC's unconditional maximum market equity loss at the 95% confidence level on a quarterly basis.  $\Delta CoVaR$  measures a BHC's contribution to systemic risk and is defined as the difference between the conditional value at risk (CoVar) of the financial system conditional on an institution being in distress (95% quantile of quarterly equity return losses) and the CoVaR conditional on the median state of the institution. *Regulation & Supervision* measures the stringency of a country's banking regulation and supervision. It is defined as the first principal component of *Activities Restrictions*, *Capital Regulation* and *Supervisory Power*. *Activities Restrictions* measures the stringency of a country's regulation regarding banks' involvement in securities, insurance and real estate activities. *Capital Regulation* measures the degree to which supervisory authorities in a country oversee capital at risk and the initial source of funds used to capitalize a bank. *Supervisory Power* measures the extent to which supervisory authorities in a country can intervene to prevent and correct problems at financial institutions. For each BHC-subsidary country pair, we first average variables within each of the four survey periods of our regulation and supervision stringency measures. Specifically, we average within the period 1995-2001 for Survey I, 2002-2005 for Survey II, 2006-2009 for Survey III and 2010-2013 for Survey IV. We then run difference regressions of changes in  $VaR$  and  $\Delta CoVaR$  on changes in *Regulation & Supervision* and control variables. We weight country exposures within a BHC-period equally, and then weight BHC-periods equally among each other. Detailed definitions of all variables are presented in Table 1 of the manuscript. We use robust standard errors clustered at the BHC level in all specifications. P-values are reported in parentheses and \*\*\*, \*\*, \* denote significance at the 1, 5 and 10 percent significance level, respectively.

	$\Delta$ VaR	$\Delta\Delta$ CoVaR
	(1)	(2)
$\Delta$ Regulation & Supervision	0.307*** (0.008)	0.065*** (0.008)
$\Delta$ Ln(GDP)	-8.352** (0.043)	-1.591* (0.067)
$\Delta$ GDPG	1.305 (0.163)	0.149 (0.447)
$\Delta$ GDPPC	9.430** (0.025)	1.803** (0.041)
$\Delta$ GDPG Correlation	0.850** (0.037)	0.139 (0.104)
$\Delta$ Bilateral Trade	0.748 (0.641)	-0.469 (0.164)
$\Delta$ Country Governance	-0.232 (0.824)	0.049 (0.823)
$\Delta$ Credit-to-GDP	0.506* (0.098)	0.227*** (0.000)
$\Delta$ Borrower & Creditor Rights	0.331 (0.258)	0.084 (0.170)
$\Delta$ Banking Concentration	-0.585 (0.395)	-0.159 (0.270)
$\Delta$ Banking Profitability	3.363*** (0.001)	0.607*** (0.003)
$\Delta$ Market Volatility	385.180*** (0.000)	88.911*** (0.000)
$\Delta$ Ln(Assets)	-0.159 (0.515)	0.034 (0.511)
$\Delta$ Leverage	0.181*** (0.000)	0.012* (0.063)
$\Delta$ Foreign Assets (%)	-0.183 (0.923)	-0.475 (0.233)
$\Delta$ Income Mix	0.569*** (0.001)	0.085** (0.019)
$\Delta$ Market-to-Book	-0.018 (0.881)	0.105*** (0.000)
$\Delta$ Deposits (%)	0.911 (0.452)	0.046 (0.856)
Observations	278	278
Adj. R2	.87	.88

Table OA-8: **Risk and Traditional vs. Non-Traditional Activities**

This table reports coefficient estimates from panel regressions of U.S. BHC risk on foreign banking regulation and supervision stringency and control variables separately for traditional and non-traditional subsidiaries. Traditional subsidiaries are entities that engage in commercial banking activities and are identified by NAICS code 522. Non-traditional subsidiaries are entities that engage in securities, insurance, asset management or real estate activities. These entities are identified by NAICS codes 523, 524, 525, 531 and 551. The sample is a panel of BHC-quarter observations during the period [1995Q1-2013Q4] of 64 U.S. BHCs. *VaR* is a BHC's unconditional maximum market equity loss at the 95% confidence level on a quarterly basis.  $\Delta CoVaR$  measures a BHC's contribution to systemic risk and is defined as the difference between the conditional value at risk (CoVar) of the financial system conditional on an institution being in distress (95% quantile of quarterly equity return losses) and the CoVaR conditional on the median state of the institution. *Regulation & Supervision* measures the stringency of a country's banking regulation and supervision. It is defined as the first principal component of *Activities Restrictions*, *Capital Regulation* and *Supervisory Power*. *Activities Restrictions* measures the stringency of a country's regulation regarding banks' involvement in securities, insurance and real estate activities. *Capital Regulation* measures the degree to which supervisory authorities in a country oversee capital at risk and the initial source of funds used to capitalize a bank. *Supervisory Power* measures the extent to which supervisory authorities in a country can intervene to prevent and correct problems at financial institutions. Subsidiary count weights within a BHC-quarter are used to "collapse" BHC-quarter-subsidiary country observations to the BHC-quarter level. Detailed definitions of all variables are presented in Table 1 of the manuscript. Control variables are the same as used in Table 8 of the manuscript, but their coefficient estimates are omitted for brevity. We include BHC fixed effects and use robust standard errors clustered at the BHC level in all specifications. P-values are reported in parentheses and \*\*\*, \*\*, \* denote significance at the 1, 5 and 10 percent significance level, respectively.

	Traditional		Non-Traditional	
	VaR	$\Delta$ CoVaR	VaR	$\Delta$ CoVaR
	(1)	(2)	(3)	(4)
Regulation & Supervision	0.902*** (0.000)	0.203*** (0.000)	0.754*** (0.000)	0.174*** (0.000)
Controls	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Observations	1,037	1,037	1,253	1,253
Adj. R2	.52	.71	.54	.70