Joining the Asian Infrastructure Investment Bank

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Abstract

The launching of the Asian Infrastructure Investment Bank (AIIB), with fifty-seven founding members joining, is a big success for the Chinese government. What are the countries that choose to join, in what sequence do they join and, more importantly, why do they join? Building from a network model, I examine how economic forces, political ideologies and the existing IO infrastructure together shaped countries' decisions. This study finds substantial network effects: the probability of joining increases when a country's neighbors (broadly defined) have joined. In addition, countries that are currently less democratic are more likely to join. Lastly, existing IO membership also constitutes a significant factor. In particular, member countries less represented in the Asian Development Bank are more likely to join the AIIB.

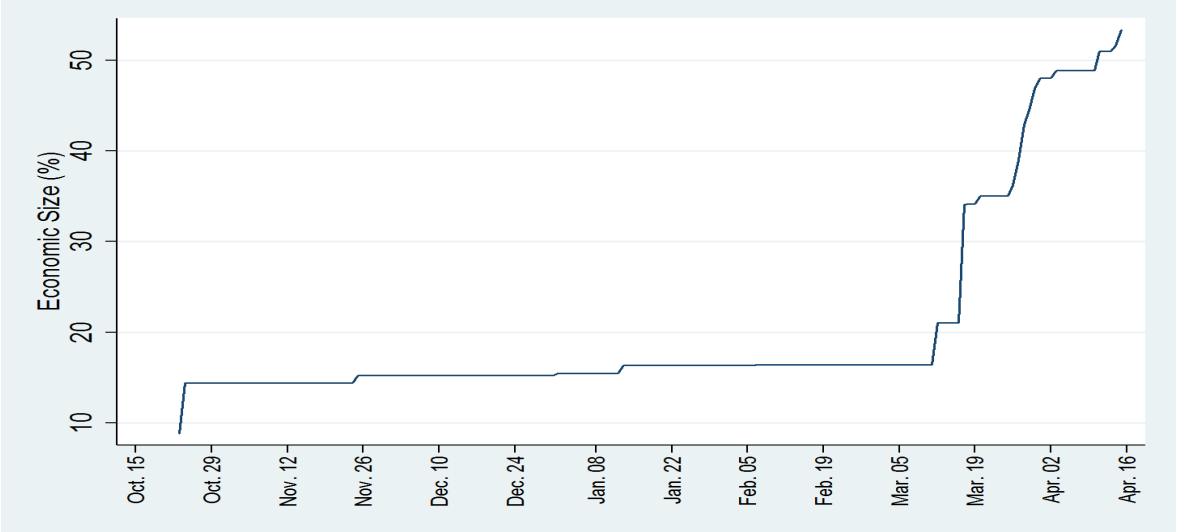
JEL Codes: F3, F5

Keywords: China, Asian Infrastructure Investment Bank, Network;

1 Introduction

The launching of the AIIB is a big success for the Chinese government. Fifty-seven countries have joined the Bank as prospective founding members.[1] The momentum, however, does not stop there. According to the President of AIIB, there are up to 20 countries currently waiting to join the organization as ordinary members.[2] The Belgian council of Ministers has agreed to join the AIIB in June 2015, and Ireland has submitted its application in 2016.[3] In terms of membership, the AIIB is expected to soon eclipse the Japan-led Asian Development Bank (ADB), which currently has sixty-seven members. In Fig. 1, I plot the expansion of AIIB's membership in terms of the share of the world economy that its members represent.

Figure 1: Evolution of the AIIB's Economic Weight in the World



Note: Calculated based on published information from the Chinese Ministry of Finance. GDP figures (2013) are from the World Bank.

My paper tries to understand and explain the (non)-joining behaviors of countries between between October 24, 2014 and March 31, 2015, the period when the application for founding member status was open. The questions that I will address in this paper are

[1] For AIIB's membership information, please see http://www.aiib.org/html/pagemembers/.

[2] http://www.wsj.com/articles/up-to-20-countries-waiting-to-join-china-led-aiib-president-designate-says-1442666572.

[3] For Belgium's application, see "Candidature de la Belgique à l'Asian Infrastructure Investment Bank," June 19, 2015, http://www.presscenter.org/fr/pressrelease/20150619/candidature-de-la-belgique-a-lasian-infrastructure-investment-bank. For Ireland's application, please see "Doherty welcomes Irish application to join Asian Infrastructure Investment Bank," May 31, 2016, http://www.sinnfein.ie/contents/40137.

(1) whether less democratic countries are more likely to join the AIIB, or put another way, whether democratic countries are less likely to join, (2) whether membership in related IOs affect a country's decision to join, an effect I will refer to as IO linkage, and (3) whether the less represented members of the Asian Development Bank are more likely to join the new emerging rival.

This paper builds itself upon the strength of network effects exhibited in AIIB's expansion process. Anecdotal evidence abounds that a country's decision to join the AIIB was influenced by the decisions in neighboring countries in the region. The UK's joining, for example, is widely credited as having initiated the wave of joining in Europe.[4] Belgium's reluctance to join has received criticism partly because all its neighbors (France, Germany, Luxembourg and the Netherlands) have already joined as founding members. Therefore, it is of natural interest to estimate and control for the network effects from the sequence of the joining and the geographic clustering of the founding members. Moreover, from a policy point of view, the network structure uncovered in this article will help the IO initiator (China) to identify ideal first-mover candidates (the U.K. in the AIIB case) in future initiatives.

This paper is related to a rich literature on network effects, sometimes called regional effects, in political science. Simmons (2009) finds that a country is more likely to ratify a human rights treaty if a large proportion of countries in its regions have already signed. Similarly, Simmons & Elkins (2004) find strong regional effects in the adoption of liberal economic policies. From a utility prospective, Simmons & Elkins (2004) argue that the way network effects work is that a country's participation alters the payoff calculation of other countries in the same region. Network effects do not always apply, however. For example, Simmons & Danner (2010) show that there are no network effects in the joining of the International Criminal Court.

This paper is also related to a nascent literature in international trade on the role that informational networks play in facilitating or hampering transactions. Chaney (2014) models an exporter' behavior as a combination of direct search and indirect search. In indirect search, the exporter searches for new markets through the countries that it already exports to. In the same vein, I show that indirect search plays an important role in AIIB's membership structure: geographical barriers will break down once a regional power has joined the AIIB and the AIIB will be able to radiate away from this regional power. Krautheim (2012) incorporates network effects as informational externalities to explain why distance effects in gravity equations are not decreasing over time.

Substantively, this paper contributes to the growing literature on autocracy pro-

[4] "3 European Powers Say They Will Join China-Led Bank." Available at http://www.nytimes.com/2015/03/18/business/francegermanyanditalyjoinasianinfrastructureinvestment-bank.html?_r=0.

motion that centers on China and Russia. Given that China is a rising great power and that China is itself an autocracy, China's interactions with other less democratic countries have received close scrutiny from various scholars (Bader, 2015a,b; Burnell, 2010). Such interactions can take the form of foreign aid (Bader, 2015b; Dreher et al., 2015; Dreher & Fuchs, 2015), foreign direct investment (Stone, Yu, Wang), international trade (Bader & Daxecker, 2015; Bader, 2015a), official visits (Kastner & Saunders, 2012), and lastly joining a China-led international organization, which is the focus of my paper. Less democratic countries might be eager to join the institution partly because they view China as one of their own and are eager to lend their support, partly because they are eager to side with the strongest member of the less democratic community, and partly because they are very relieved that finally a non-Western dominated IO is about to emerge. On the pulling (back) side, moreover, less democratic countries face less pressure from the opposing pressure of the United States than their more democratic counterparts (Carter & Stone, 2015a).

Our paper constitutes an empirical test of the contested multilateralism framework proposed by C. Morse & O. Keohane (2014). According to the authors, there are two pathways to contested multilateralism. Outside options are a prerequisite for successful contested multilateralism. Further, for contested multilateralism to materialize, the coalition must be either not credible (thus the existing IOs do to heed to their voice) or in spite of credible coalition veto players block organizational policy change in the current IOs. In the case of the AIIB, China certainly has outside options, and its aspiration for a larger role in the international financial system has been consistently ignored by the veto players in the current IO system. According to the authors, there are two types of contested multilateralism: (1) regime shifting and (2) competitive regime creation. The AIIB falls into the second type.

I organize the rest of the paper as follows. In Section II, I specify the model formulation that aims at identifying the network structure of the AIIB membership. In Section III, I introduce the data. I present the empirical results in Section IV. Section V concludes.

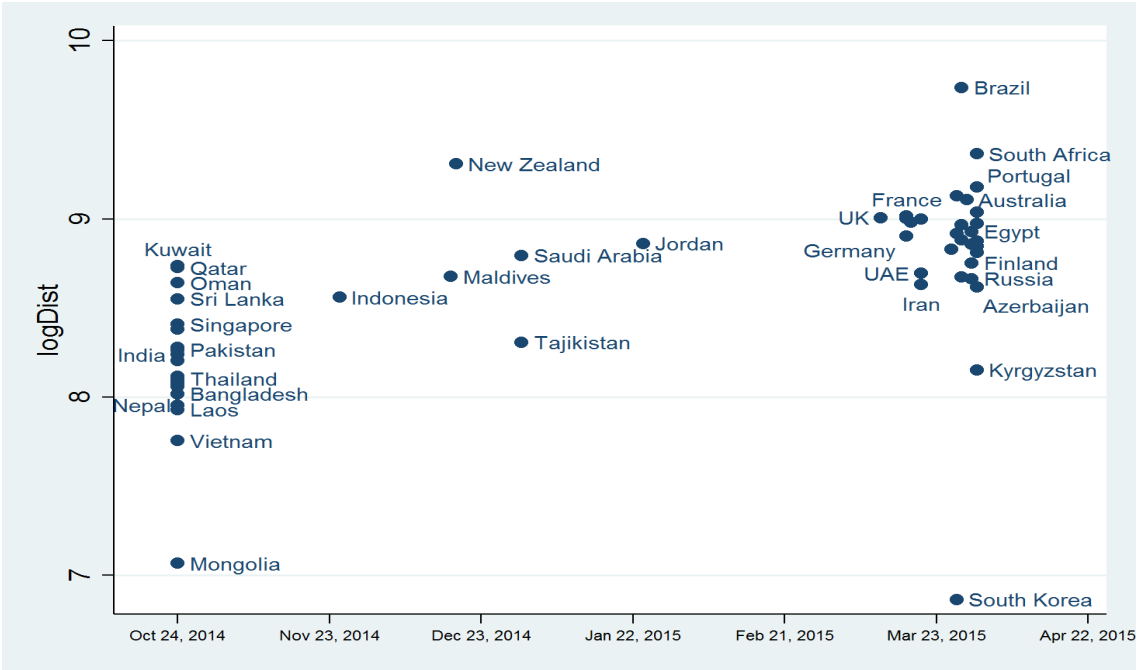
2 A Dynamic Model of Membership Expansion

In this section, I develop a model of sequential entry by states into an IO that captures the network effects that I observe in AIIB's membership expansion. This is a random utility model that builds upon Stone (2011). States decide whether or not to join the IO based on their utility calculations, which are influenced by static economic and geopolitical variables, IO linkage variables, and dynamic network variables.

2.1 Economics and Politics

Empirical observations show that countries close to China are the first ones to join and large economies tend to join the AIIB earlier than smaller ones when controlling for geographic distances. I report this pattern in Fig. 2. This suggests that GDP size and geographic distance weigh heavily in states' calculations.[5] Since the AIIB is an investment bank in nature, I expect that everything else being equal, the probability of rich countries joining the AIIB should be higher than poor countries. Lastly, I test whether countries that have deeper trade ties with China are more likely to join the institution as motivated by future commercial interests (Dreher & Fuchs, 2015; Bader, 2015a; Fuchs & Klann, 2013; Richardson & Jr., 1980; Keohane & Nye, 1977).

Figure 2: Geographic Expansion of the AIIB Membership



Note: The graph presents all the 56 founding members of the AIIB except China. Due to space constraint, I have not reported all the names. It can be clearly seen how AIIB membership expands geographically over time (the x axis). Given its proximity to China, South Korea's late joining makes it an outlier in the graph, not to say Japan's no show.

Economic institution as it is, the AIIB also carries political implications. Joining the Bank is equivalent to lending the Chinese government their votes. As the U.S. Trea-

[5]This set of variables are also standard in international trade literature. See, for example, Krugman (1980); Chaney (2013)

sury Secretary Jacob Lew says, by joining the Bank, Western democracies, such as the UK, are lending their names to it.[6] Joining from less democratic countries could be less costly for at least two reasons. For one, joining would be costly if the political preferences of the candidate country and China differ considerably. This can be interpreted as domestic audience cost, for example. Less democratic countries are closer to China in their democratic development. For another, as illustrated by Carter & Stone (2015b), more democratic countries are more prone to the influence of the United States, who initially strongly opposed the establishment of the AIIB. As a result, I expect that less democratic countries are more eager to join the institution.

2.2 IO and Contested Multilateralism

A country's utility in joining the AIIB could also be influenced by its existing IO memberships, such as membership in the Asian Development Bank or the World Bank, as membership in these IOs indicate that a country is well-resourced and well-connected. The number of IOs has proliferated in recent years (Stone, 2009) and, in particular, some China-(co)founded IOs are beginning to emerge, including, for example, the BRICS, the New Development Bank, and the Shanghai Cooperation Organization (SCO). To test the strength of IO linkage, I will examine the effects of membership in BRICS, SCO and in the Japan's led Asian Development Bank (ADB) on a country's decision to join the AIIB.

Besides IO linkage, the AIIB and ADB pair also provides an ideal case study for contested multilateralism (C. Morse & O. Keohane, 2014). The establishment of AIIB fits in the framework of contested multilateralism as competitive regime creation. China, now in an economically much stronger position, is dissatisfied with its standings in the current IO complex, it seeks to change the complex without much success, and subsequently, powered by its vast resources recently accumulated, decides to create an IO in its own image. In my work, I hypothesize that the more disgruntled members of the existing IO are more likely to join the China-led new IO, as a way to express its frustration with its limited presence in the current IO complex.

2.3 Network effects

Lastly, this paper builds itself upon the network effects, i.e., how a country's decision is affected by its neighbors' decisions. According to Simmons & Elkins (2004), network effects may alter a country's utility through two distinct mechanisms. One is competition: countries compete with each other to attract capital and international business to help

[6] China gloats as Europeans rush to join Asian bank by the Washington Post. Available at: https://www.washingtonpost.com/world/china-gloats-as-europeans-rush-to-join-asian-bank/2015/03/18/82139f88-9915-4a81-81af-ae6eacf528c7_story.html.

domestic economic growth (Stockman & Delgado, 1988). In the AIIB context, I expect that the major European countries are competing against each other to attract Chinese investment and business.

Another mechanism is informational. When making decisions, government use available information in a rational fashion to maximize their utilities. As new information becomes available, the countries under consideration might change their position based on the updated information. For example, a leading country's joining the AIIB like the UK's brings new information to smaller countries like Luxembourg, Switzerland and even Israel, and might have convinced them that the AIIB membership will be utility-enhancing.

In this article, I will focus primarily on analyzing the strength of the network effects by taking into consideration the decisions of a country's neighbors. Differentiating the two possible mechanisms behind these effects will be saved for future work.

2.4 Model formulation

I formulate a random utility model based on the above discussion. Country i has the utility function specified as follows and will join if its utility is greater than 0. The variables are updated daily between October 24, 2015 and March 31, 2015.

$$\begin{aligned} U_{i,t} =& \beta_0 \cdot \text{GDP}_{i,t} + \beta_1 \cdot \text{GDP per capita}_{\text{i}i} + \beta_2 \cdot \text{Distance}_{i,t} \\ &+ \beta_3 \cdot UN\ voting_{i,t} + \beta_4 \cdot \text{Neighbor}_{\text{extensive}}(i,t) + \beta_5 \cdot \text{Neighbor}_{\text{intensive}}(i,t) \\ &+ \beta_6 \cdot \text{Export}_{i,t} + \beta_7 \cdot \text{Polity}_{i,t} + \beta_8 \cdot \text{UN Voting} \epsilon_{i,t} \\ &+ \mathbf{\Gamma} \cdot \text{IOs}(i,t) + \lambda_1 \cdot \Delta_t + \lambda_2 \cdot \Delta_t^2 + \lambda_3 \cdot \Delta_t^3 + \epsilon_{i,t} \end{aligned} \tag{1}$$

where GDP is the country's economic size, GDP per capita is the income level, Distance is the geographical distance between the country and China, UN voting, a proxy for geopolitical interests, measures the voting similarity between the country and China, IO variables are binary, indicating whether or not country i is a member of an IO of interest, and $\epsilon_{i,t}$ has a standard normal distribution and is i.i.d.

$\text{Neighbor}_{extensive}$(i,t) captures the extensiveness of the AIIB's attraction for country i at time t. It is defined as the number of neighboring countries already in the IO for country i at time t.

$$Neighbor_{extensive}(i,t) = \sum_{j \in IO} Neighbor(i,j)$$

$\text{Neighbor}_{intensive}$(i,t) captures the intensity of attraction of the AIIB for country i at time t. Its design follows Chaney (2014). This naming convention follows Chaney

(2008).

$$Neighbor_{intensive}(i,t) = \max_{j \in IO} \log \frac{GDP_j}{Dist_{i,j}}$$

Δ_t and its polynomial terms are aimed at capturing time dependency (Carter & Signorino, 2010). From the parameters λ_1, λ_2 and λ_3, I will be able to test the existence of momentum effects.[7] This is closely related to the hazard rate concept in the literature on duration analysis (Box-Steffensmeier & Jones, 2004).

The dynamics of the model play out as follows. In Period 1, (only) the founder joins the IO. Variables Neighbor$_{extensive}$ and Neighbor$_{intensive}$ are updated for each country. Countries with positive utility choose to join. The world enters Period 2, with Neighbor$_{extensive}$ and Neighbor$_{intensive}$ updated for countries not yet in the IO. Countries that have not joined yet calculate their utility for Period 2 and decide whether or not to join. So in Period t, country i that is not yet in the IO will decide again with updated Neighbor$_{extensive}(i,t)$ and Neighbor$_{intensive}(i,t)$. There is a finite number of periods, as there is a deadline for the application of founding member status in the IO.

The key insight of the model is that country j's joining the IO will affect the subsequent calculations of all the non-member states through two channels: Neighbor$_{extensive}$ and Neighbor$_{intensive}$. In terms of marginal utility, this can be expressed as:

Neighbor$_{extensive}$:

$$\Delta U_i = \begin{cases} \beta_4, & \text{contig(i, j)} = 1 \\ 0, & \text{otherwise} \end{cases}$$

Neighbor$_{intensive}$:

$$\frac{\partial U_i}{\partial Neighbor_{intensive}(i,t)} = \beta_5$$

Additionally, IO linkage in the sense that countries that are already members of an IO are more likely to join the AIIB can be captured by $\mathbf{\Gamma}$. I will estimate the random utility model in Section 4 using Probit, but first let me introduce the data.

3 Data

The central piece of data in my paper is the dates of application, which I present in Appendix B. Data on other variables are from standard sources. Importantly, I restrict my sample countries to UN members that recognize China (not Taiwan). Data on countries that recognize Taiwan come from Xinhua, and I list these countries in Table 8 in the

[7] There are alternative ways to capture time dependency. For example, Beck et al. (1998) uses time dummies and/or cubic splines.

Appendix. Data on country GDP and GDP per capita come from the World Bank.[8] Both GDP and GDP per capita are in log scale. Data on geographical distance and on physical contiguity come from Centre d'Etudes Prospectives et d'Informations Internationales (CEPII). Distances are measured in kilometers and in this paper distance represents the logarithm of the physical distance. UN Voting measures countries' similarity in voting behavior to China. The raw voting data come from Voeten (2008). UN Voting is computed using the same approach as in Richardson & Jr. (1980) and Fuchs & Klann (2013). Only votes for which both countries are present are counted. Votes in agreement, including the case where both abstain, are coded as 1, votes that oppose each other are coded 0, and votes where one of the two countries abstain are coded 0.5. UN Voting is then the yearly average of these voting scores for each country and takes values from 0 to 1. A larger value indicates a higher level of similarity in geopolitical interests. The distribution of the voting data is available in Appendix C.

A key question I address in this paper is whether less democratic countries are more likely to join the AIIB. For this purpose, I use three alternative measures of democracy: polity score come from the Polity IV Project, and political rights and civil liberty from Freedom House.

To study IO linkage and test contested multilateralism, I construct the binary variable IO and the non-negative real variable *Share to GDP ratio*. The variable IO will take value 1 if country i is a member of an IO of interest. In the paper, I will use the BRICS, the Shanghai Cooperation Organization (SCO) and Asian Development Bank (ADB). BRICS is an (informal) IO that consists of Brazil, Russia, India, China and South Africa. All the five countries are founding members, but they joined at different times. SCO was co-founded by China, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, and Uzbekistan in 2001.[9] I present the detailed membership information at Table 1. I code the variable SCO as 1 for the 13 countries other than China in the SCO and 0 for all other countries. Here I do not distinguish between formal members, observer states and dialogue partners.[10] ADB, founded on 19 December 1966, is led by Japan and the United States. Information on ADB membership, including how it overlaps with and differs from AIIB membership, is presented in Section 4.4.

[8] I decide to use the data on GDP and GDP per Capita for the year 2013 instead of 2014, because data for 2014 are not yet reported for many countries.

[9] http://www.sectsco.org/EN123/.

[10] http://www.thehindu.com/news/international/india-gets-full-membership-of-the-shanghai-cooperation-organisation-along-with-pakistan/article7407873.ece.

Table 1: SCO Membership

SCO Status	Country
Member States	China, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Uzbekistan
Observer States	Afghanistan, India, Iran, Mongolia, Pakistan
Dialogue Partners	Belarus, Sri Lanka, Turkey

Note: India and Pakistan will become full members of the SCO in 2016 and Belarus will become an observer member (up from dialogue partner).

The raw data on countries' physical neighbors are obtained from the CEPII. To build dynamics into the model, I update the $Neighbor_{extensive}$ variable for each country according to the updated membership. I base this update on the announcement from the Chinese Ministry of Finance (MOF). As will be detailed later, not all applications are public but all admissions are announced publicly by the Chinese Ministry of Finance. I assume that only publicly available information will enter into states' calculation. Under this assumption, Iran's application (dated March 30, 2015) will not affect Azerbaijan's decision to apply on March 31, 2015. Spain's application on March 27, 2015 will not affect Portugal's decision.

Given not all neighbors carry the same weight, I construct the $\text{Neighbor}_{intensive}$ variable to capture the effect of important neighbors: when a new member has joined the AIIB, $\text{Neighbor}_{intensive}$ will be updated according to $\max_{j \in IO} \log \frac{GDP_j}{Dist_{i,j}}$. By design, countries with small economies and countries located far away will not affect country i's utility. On the other hand, $\text{Neighbor}_{intensive}$ is not restricted to physically contiguous countries. The UK's application thus can affect France's decision through this channel.

4 Empirical Results

In this section I estimate the network model using the AIIB data. I first estimate the model using the standard probit and examine the empirical results. Second, I analyze the effects of the IO network on AIIB membership. Third, using ADB as an example, I test the contested multilateralism. Fourth, I estimate the same regressors using a Cox Partial Likelihood model as a robustness check of the membership structure. Lastly, using the results from the main results, I calculate the probabilities of new countries joining the AIIB and present the top 20 ranked candidates.

4.1 Main results

The first column in Table 2 displays estimates from a static model and only considers economic factors. This is similar to the standard gravity model in international trade and aims at capturing static economic factors. The result shows that large countries and countries close to that of China are more likely to join.

Table 2: The Network Structure of AIIB Membership

	1	2	3	4	5	6
AIIB Membership						
ln GDP	0.0870***	0.0986***	0.0685*	0.172***	0.107***	0.151***
	(0.005)	(0.004)	(0.071)	(0.000)	(0.002)	(0.003)
ln GDP per capita	0.00404	-0.0317	0.0128	-0.104*	0.0574	-0.00263
	(0.929)	(0.548)	(0.823)	(0.098)	(0.322)	(0.972)
ln Distance	-0.522***	-0.234**	-0.172	-0.172	-0.171	-0.0641
	(0.000)	(0.031)	(0.180)	(0.134)	(0.117)	(0.640)
$\text{Neighbor}_{extensive}$		0.141***	0.158***	0.148***	0.0956*	0.167***
		(0.004)	(0.005)	(0.005)	(0.058)	(0.005)
$\text{Neighbor}_{intensive}$		0.324***	0.300***	0.424***	0.432***	0.405***
		(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Export (as % GDP)			0.707			0.938
			(0.298)			(0.166)
Polity				-0.0306***		-0.0199
				(0.003)		(0.174)
UN Voting					2.327***	1.441*
					(0.001)	(0.093)
Δ	-0.282***	-0.259***	-0.307***	-0.269***	-0.257***	-0.327***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Δ^2	0.0124***	0.0114***	0.0138***	0.0113***	0.0112***	0.0139***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Δ^3	-0.000152***	-0.000139***	-0.000168***	-0.000130***	-0.000134***	-0.000159***
	(0.000)	(0.001)	(0.000)	(0.003)	(0.001)	(0.002)
Constant	0.590	-8.784***	-8.432***	-12.49***	-14.39***	-14.52***
	(0.584)	(0.001)	(0.002)	(0.000)	(0.000)	(0.000)
Observations	21876	21876	17294	19435	21717	15489
Pseudo R^2	0.243	0.278	0.288	0.308	0.295	0.330

p-values in parentheses
* p<0.10, ** p<0.05, *** p<0.010

In Column 2, I simultaneously introduce the two dynamic variables $Neighbor_{extensive}$ and $Neighbor_{intensive}$. Both coefficients are positive and significant, confirming our intuition that countries decisions are affected by their neighbors' behavior. $\text{Neighbor}_{\text{intensive}}$ differs from $\text{Neighbor}_{\text{extensive}}$ in two important ways. First it takes into account the economic weight of the participating countries, so that the UK's joining on March 12, 2015 will be assigned more weight than Luxembourg's joining on March 17, 2015. Second, $\text{Neighbor}_{\text{intensive}}$ overcomes the hard restriction of physical connectedness imposed by $\text{Neighbor}_{\text{extensive}}$. As a result, the UK's joining could affect Germany and Iceland, even

though they are not physical neighbors. For example, $\text{Neighbor}_{\text{intensive}}$ is updated upwards for Germany, France and Italy after the UK has joined the AIIB. This is consistent with the idea that the UK's decision to join the AIIB was a game changer.[11] As a matter of fact, in this model Israel also updated its $\text{Neighbor}_{\text{intensive}}$ value when the UK announced its application. This is because UK (which is located far away from Israel) is a much bigger economy than the neighboring Jordan, which was already a member by February, 2015.

Together, this suggests that a country is more likely to join if it either has physical neighbors in the AIIB and/or has large countries nearby that have joined the AIIB. The variable $Neighbor_{extensive}$ captures geographic contiguity while $Neighbor_{intensive}$ emphasizes economic weight. This has two implications. First, the effect of a regional power joining the AIIB is larger than that of an average country. Second, the $\text{Neighbor}_{intensive}$ variable is also able to explain the observation that it is usually large countries (usually the hegemons) that establish IO's. The most popular supply side argument is that hegemons alone can reap enough benefits from providing public goods (Stone et al., 2008; Keohane, 1984). Here $Neighbor_{intensive}$ offers the demand side argument: only large economies can garner enough initial momentum from neighboring countries and further attract countries farther away through network effects.

Another important observation is that *Distance* will have its significance decreased once I include $Neighbor_{extensive}$ and $Neighbor_{intensive}$, and it will lose its significance entirely in all the subsequent specifications. This offers an important insight: geographical barriers will break down once a regional power has joined the AIIB. The regional power will be able to serve as a regional hub for the AIIB.

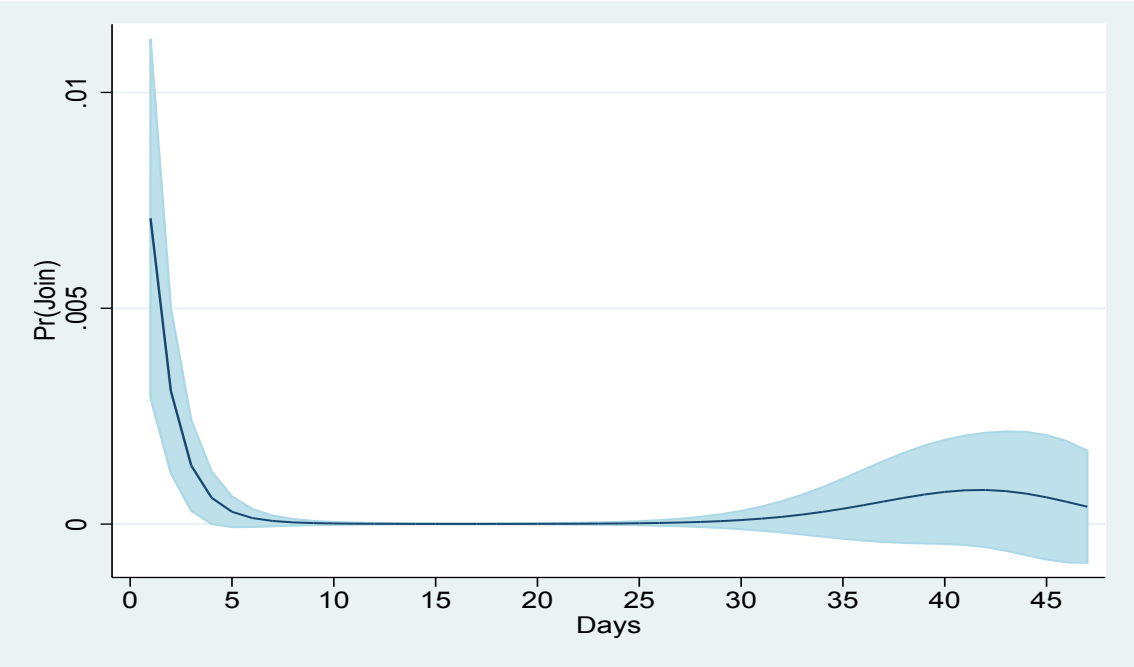
In Columns 3, 4, 5, I sequentially introduce Export, Polity and UN Voting. The coefficient on Export is positive but not significant. The coefficient on Polity is negative and significant, indicating that less democratic countries are indeed more likely to join the AIIB in its founding phase. This finding shows another dimension of how China and less democratic countries interact. Rather than China actively promoting autocracy abroad, less democratic countries are more responsive to China's initiative. To test for robustness, I use alternative measures of democracy and the results, presented in Table 9, remain. The UN Voting variable has a positive and significant coefficient. This suggests that countries that are strategically more aligned with China are more likely to join the institution.

Lastly, I examine time dependency. It will be interesting to know whether countries are more likely to follow other countries example in joining or to wait. I answer this question through analyzing the shape of the polynomial function of time. In Fig. 3,

[11] UK move to join China-led bank a surprise even to Beijing by *Financial Times*. Available at: http://www.ft.com/intl/cms/s/0/d33fed8a-d3a1-11e4-a9d3-00144feab7de.html. Received on October 26, 2015.

I calculate the expected probability of a country joining the AIIB as a function of its waiting time. The figure shows that the probability of joining decreases sharply as waiting time grows. The function is not monotonic, though. There is a slight increase around Day 40. But overall, the result suggests that a country is most likely to join immediately following another country's lead. I shall call it the momentum effect.

Figure 3: Joining Probability as a Function of Time with 95% Confidence Interval



Note: The 95% confidence interval is calculated using the Δ method. To preserve its symmetric structure, I do not cut off the regions below zero, but it should be understood that the probability of joining cannot be negative.

4.2 IO Linkage

In this section, I examine the effects of existing memberships on the likelihood of joining the AIIB. The three IOs of interest are BRICS, the Shanghai Cooperation Organization (SCO), and the Asian Development Bank (ADB). The case of BRICS and SCO is important because it allows me to gauge the contributions of China's current networks to the establishment of new China-led IOs. The case of ADB, on the hand, could highlight how China could leverage current IO memberships to boost the new IOs. I use the specifications in Column 7 of Table 2 for the estimation and present the results in Table 3.

The coefficients for BRICS in Columns 2 and 5 are not statistically significant. The

coefficients for SCO in Columns 3 and 5 are positive but not significant. The coefficients for ADB are significant in both specifications. This suggests that on the downside China's own IO network, BRICS and SCO for example, is not sufficiently strong to support the establishment of new IOs, and on the upside China is able to leverage the existing IO membership in the international community.

Table 3: IO Linkage

	1	2	3	4	5
AIIB Membership					
ln GDP	0.151***	0.156***	0.144***	0.202***	0.173***
	(0.003)	(0.005)	(0.004)	(0.000)	(0.003)
ln GDP per capita	-0.00263	-0.00566	0.0106	-0.0982	-0.0890
	(0.972)	(0.941)	(0.891)	(0.239)	(0.305)
ln Distance	-0.0641	-0.0603	-0.0402	0.264*	0.265*
	(0.640)	(0.662)	(0.774)	(0.090)	(0.098)
$\text{Neighbor}_{extensive}$	0.167***	0.175***	0.139**	0.182***	0.139*
	(0.005)	(0.009)	(0.038)	(0.004)	(0.062)
$\text{Neighbor}_{intensive}$	0.405***	0.401***	0.417***	0.406***	0.439***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Polity	-0.0199	-0.0194	-0.0204	-0.0449***	-0.0492***
	(0.174)	(0.189)	(0.162)	(0.005)	(0.003)
UN Voting	1.441*	1.479*	1.395	1.988**	1.679*
	(0.093)	(0.090)	(0.105)	(0.032)	(0.081)
Export (as % GDP)	0.938	0.953	0.994	1.372**	1.334*
	(0.166)	(0.161)	(0.144)	(0.040)	(0.051)
BRICS		-0.0711			0.405
		(0.815)			(0.248)
SCO			0.195		0.0731
			(0.379)		(0.768)
ADB				0.977***	1.031***
				(0.000)	(0.000)
Δ	-0.327***	-0.327***	-0.328***	-0.338***	-0.338***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Δ^2	0.0139***	0.0139***	0.0140***	0.0145***	0.0145***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Δ^3	-0.000159***	-0.000160***	-0.000162***	-0.000168***	-0.000168***
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Constant	-14.52***	-14.62***	-14.91***	-18.76***	-18.58***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	15489	15489	15489	15489	15489
Pseudo R^2	0.330	0.330	0.331	0.376	0.378

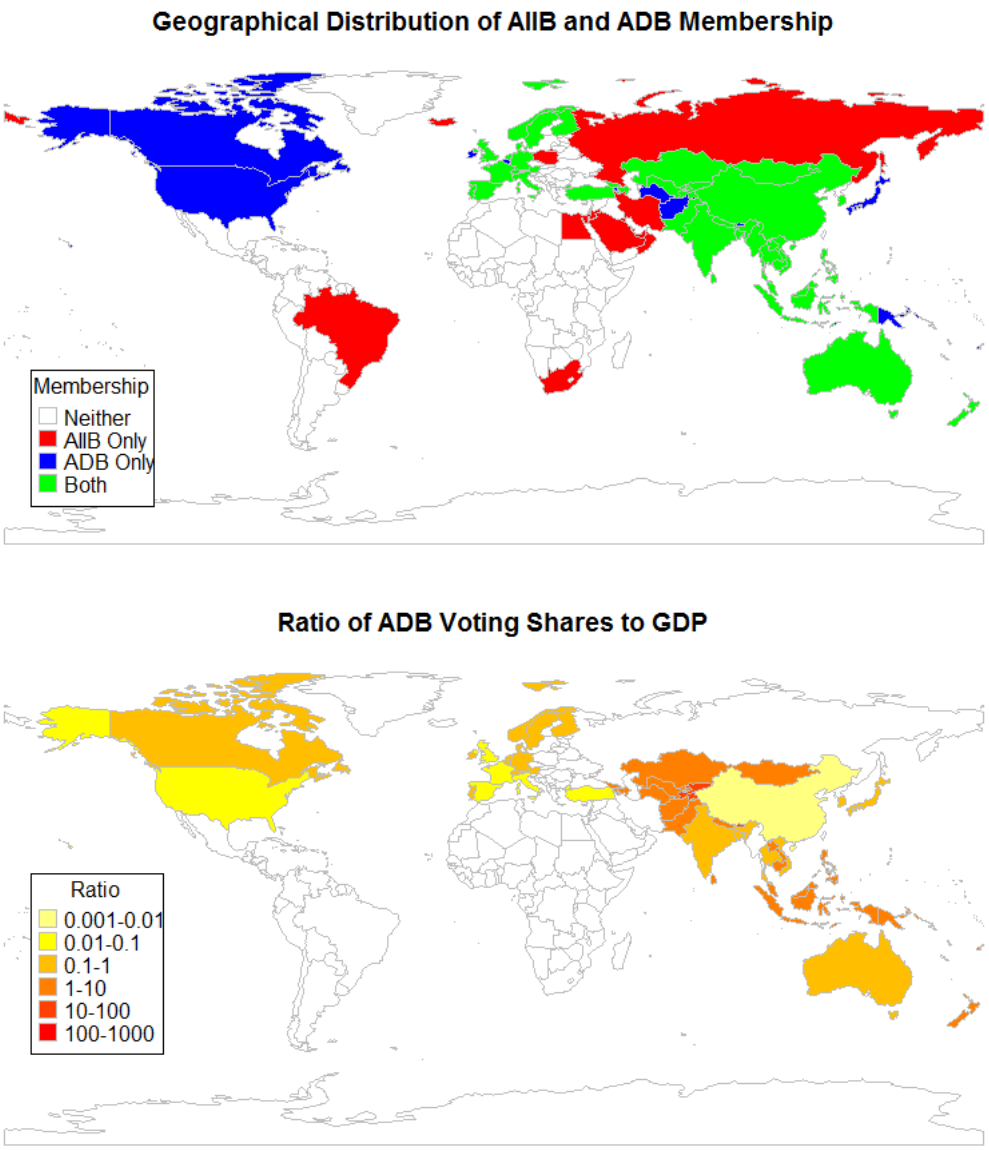
p-values in parentheses
* p<0.10, ** p<0.05, *** p<0.010

4.3 Contested Multilaterlism: ADB Members

The case of ADB is interesting for a second reason: the AIIB almost directly competes with ADB, and their memberships largely overlap. Figure 4 (upper) shows the current membership of the two institutions. The AIIB has 57 members, the ADB has 67, and the two have 42 members in common. Prominent countries in ADB but not in the

AIIB include the U.S., Japan and Canada. Russia, Brazil and South Africa, all three large emerging economies, are in the AIIB but not the ADB.

Figure 4: AIIB and ADB: Contested Multilateralism



Note: The ratio for Myanmar is not shown as the country's GDP figures are not available.

Since both institutions are development banks and both focus on Asia, this makes an ideal case for me to test the framework of contested multilateralism of C. Morse & O. Keohane (2014). Specifically, I test the hypothesis that among ADB members the

dissatisfied are more eager to join the AIIB. To operationalize the idea, I test whether ADB members, who have a low Share to GDP ratio, are more likely to join the institution. Figure 4 (lower) shows the distribution of the shares to GDP ratio. Not surprisingly, China has the lowest Share to GDP ratio. The ratio for some early joiners like the UK and Spain is also low. On the other hand, countries with high Share to GDP ratios such as Ireland and Belgium only applied very late, and countries with very high Shares to GDP ratios such as Armenia and Turkmenistan have yet to make their application. I present the formal regression results in Table 4.

Table 4: Contested Multilateralism

	1	2	3	4	5
AIIB Membership					
ln GDP	0.0178	0.0771	0.0227	0.00341	0.0255
	(0.764)	(0.251)	(0.753)	(0.976)	(0.829)
ln GDP per capita	-0.159**	-0.407***	-0.404***	-0.733***	-0.583***
	(0.024)	(0.000)	(0.000)	(0.000)	(0.000)
ln Distance	-0.229*	0.269*	0.543***	0.554**	0.645**
	(0.069)	(0.078)	(0.006)	(0.028)	(0.015)
Share to GDP Ratio	-0.0420**	-0.0313	-0.0367	-0.197***	-0.171***
	(0.049)	(0.109)	(0.112)	(0.002)	(0.009)
$\text{Neighbor}_{extensive}$		-0.211***	-0.189**	0.123	0.0938
		(0.010)	(0.030)	(0.304)	(0.437)
$\text{Neighbor}_{intensive}$		0.711***	0.734***	0.642***	0.628***
		(0.000)	(0.000)	(0.000)	(0.000)
Export (as % GDP)			2.514**	3.281***	3.500***
			(0.010)	(0.004)	(0.003)
Polity				0.0116	0.0277
				(0.659)	(0.342)
UN Voting					2.696
					(0.157)
Δ	-0.291***	-0.272***	-0.296***	-0.318***	-0.322***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Δ^2	0.0121***	0.0114***	0.0124***	0.0109**	0.0107**
	(0.000)	(0.001)	(0.001)	(0.020)	(0.026)
Δ^3	-0.000137***	-0.000128**	-0.000139**	-0.0000929	-0.0000865
	(0.004)	(0.011)	(0.011)	(0.186)	(0.230)
Constant	1.725	-16.69***	-18.27***	-12.74*	-17.36**
	(0.326)	(0.000)	(0.000)	(0.056)	(0.019)
Observations	5838	5838	4971	4438	4438
Pseudo R^2	0.252	0.319	0.330	0.430	0.436

p-values in parentheses
* p<0.10, ** p<0.05, *** p<0.010

Across all specifications, the coefficient for Share to GDP ratio remains negative. This means that countries with low representation in the ADB are more eager to join the new AIIB, thus confirming the argument by C. Morse & O. Keohane (2014) that contested multilateralism results from the dissatisfaction of the countries that have outside options.

4.4 Robustness Check

So far the model has been framed as a rational choice model. Here I test the robustness of the dynamic variables by putting them into a duration analysis framework, that is, the duration of waiting before joining the AIIB. There is a natural link between binary data and duration data.(Beck et al., 1998; Doksum & Gasko, 1990) Intuitively, countries that are more likely to join (with a higher $x\beta$, and thus $\Phi(x\beta)$) will have a shorter expected duration of waiting. This intuition can be captured by the Cox proportional hazard model:

$$\lambda_i(t) = \lambda_0(t)e^{x_i\beta}$$

where $\lambda(t) \equiv \frac{p(t)}{P(T>t)}$. If $x_i\beta > x_j\beta$, i.e., country i is more likely to join than country j, in the duration analysis framework, $\mathrm{P}(\mathrm{T}_i<\mathrm{T}_j)=\frac{e^{x_i\beta}}{e^{x_i\beta}+e^{x_j\beta}} > 0.5$, with T_i and T_j denoting the waiting time for country i and country j respectively. I provide the details of the proof in Appendix A.

With this natural transition, I can use the Cox Proportional Hazard model to test the robustness of the main results. The data are right-censored. Once a country joins the AIIB, the remaining countries will enter a new period of observation with updated $Neighbor_{extensive}$ and $Neighbor_{intensive}$. In the full specification, the number of observations is 1635.

The regression results are reported in Table 5. I use the same set of variables and the same specifications as in Table 2, except that in this framework, I do not include the time variables, as time dependency can be reflected in the hazard ratio (Beck et al., 1998; Carter & Signorino, 2010). Also the number of observations is much smaller than in the rational choice framework, where data are constructed on a daily basis. Another difference here is that in the Cox Partial Likelihood framework, only ranking matters. The length of the waiting time is not relevant.

Overall, the results are very similar to the ones reported in the main results. But the coefficients now have a different interpretation: countries with a larger $Neighbor_{extensive}$ in the AIIB tend to wait for a shorter period of time and so do countries with a large $Neighbor_{intensive}$ value. But essentially they are reading the same mechanism: countries with neighbors in the AIIB are more likely to join and so do countries with lots of economic interactions with AIIB members.

Under this framework, I find $Neighbor_{extensive}$ to be significant, and SCO loses its significance. But both are on the borderline of 95% confidence interval and point to the same direction as reported in Table 2. It is important to note that here again *Distance* is not significant, confirming my previous observation that geographic barriers will break down once regional hubs of AIIB membership emerge.

Table 5: Robustness Exercise: Duration of Waiting

	1	2	3	4	5	6
ln GDP	0.250***	0.261***	0.191**	0.385***	0.286***	0.312**
	(3.22)	(3.07)	(2.02)	(3.50)	(3.24)	(2.29)
ln GDP per capita	0.0515	-0.00258	0.111	-0.0974	0.219	0.0865
	(0.42)	(-0.02)	(0.74)	(-0.64)	(1.51)	(0.45)
ln Distance	-1.142***	-0.646**	-0.658*	-0.524*	-0.492*	0.205
	(-5.88)	(-2.40)	(-1.95)	(-1.80)	(-1.78)	(0.51)
$\text{Neighbor}_{extensive}$		0.410***	0.411***	0.415***	0.325***	0.219
		(3.27)	(3.00)	(3.20)	(2.59)	(1.31)
$\text{Neighbor}_{intensive}$		0.596**	0.441*	0.753***	0.859***	0.594**
		(2.50)	(1.75)	(2.95)	(3.25)	(2.12)
Export (as % GDP)			0.527			1.916
			(0.37)			(1.29)
Polity				-0.0726***		-0.0778**
				(-2.90)		(-2.20)
UN Voting					5.700***	4.011*
					(3.02)	(1.65)
BRICS						0.895
						(1.10)
SCO						0.239
						(0.45)
ADB						1.957***
						(4.22)
Observations	2458	2458	1831	2070	2442	1635
Pseudo R^2	0.126	0.164	0.141	0.184	0.183	0.226

t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.010

4.5 Prediction on Future Members

Although the deadline for prospective founding members to submit their applications to AIIB has passed, the AIIB, with 57 founding members, is now open to applications to becoming non-founding members. According to Jin Liqun, President of the AIIB, there are up to 20 states waiting to join the institution as ordinary members.[12] Some have made their intention to apply public, such as Belgium, Canada, Hungary, and Ireland, but most have kept it private.

In this subsection, I use the estimated model to predict the probability of prospective countries joining the AIIB. I use the estimated coefficients from Column 2 of Table 2, except that I do not include the time variables. These time variables are shared by all

[12]http://www.wsj.com/articles/up-to-20-countries-waiting-to-join-china-led-aiib-president-designate-says-1442666572.

countries and thus their omission will not affect the ranking. Compared with Column 7, the full model that estimates membership as founding members, this specification emphasizes the now-international characteristic of the AIIB (with 57 members) and the embedding network structure of the institution. Therefore I formulate the predicated probability as follows.

$$\begin{aligned}\Pr(\text{Join}=1) =& \Phi[\hat{\beta}_0 \cdot \text{GDP} + \hat{\beta}_1 \cdot \text{GDP per capita}_\text{i} + \hat{\beta}_2 \cdot \text{Distance} \\ &+\hat{\beta}_3 \cdot \text{Neighbor}_{\text{extensive}} + \hat{\beta}_4 \cdot \text{Neighbor}_{\text{intensive}}]\end{aligned} \tag{2}$$

On April 15, 2015 all the prospective founding members have been decided and publicly known. I update the explanatory variables based on this information and calculate the predicted probabilities for the countries that are still not members of the AIIB. I report the top 20 candidates in Table 6.[13]

Table 6: Ranking Probabilities of New Membership

1.	Belgium	11.	Ukraine
2.	Czech	12.	Belarus
3.	Japan	13.	Lithuania
4.	Afghanistan	14.	Armenia
5.	Iraq	15.	Turkmenistan
6.	Ireland	16.	Greece
7.	Slovakia	17.	Latvia
8.	Slovenia	18.	Croatia
9.	Slovenia	19.	Bhutan
10.	Hungary	20.	Romania

The ranking results are intuitive and reasonable. For example, Belgium, ranked No. 1 here, has strong incentives to join, given its considerable economic size and the fact that all the countries neighboring Belgium have already joined the AIIB. The same applies to the Czech Republic, whose application is now under consideration.[14] Japan, ranked third, is the second largest economy in Asia and is very close to China geographically.

There is also strong empirical evidence for this ranking. Belgium has already decided to join as an ordinary member. Currently there is a hot debate within Japan as to whether to join the AIIB as a non-founding member.[15] As for Ireland, the Department of Finance is weighing up the possibility of Ireland joining the institution.[16] Other countries

[13]The full list is available on the author's website.

[14]http://www.nouvelle-europe.eu/en/china-and-czech-republic-recent-political-shift.

[15]"Japan expected to join Asian Infrastructure Investment Bank." *Financial Times*. Available at: http://www.ft.com/intl/cms/s/0/40b0fff8d6ae11e497c300144feab7de.html#axzz3t0uY8q6L.

[16]http://www.independent.ie/business/irish/finance-weighs-up-ireland-joining-chinabacked-bank-

that have expressed an interest in joining the Bank include Afghanistan, Iraq and Hungary.

It should be noted, however, that this prediction is based on the information currently available. Once a member comes in, it will likely bring new dynamics to $Neighbor_{extensive}$ and $Neighbor_{intensive}$ and therefore the ranking will need to be updated accordingly.

5 Conclusion

This paper analyzes membership structure of the China-led AIIB. I have demonstrated the existence of neighbor effects through two dynamic variables $\text{Neighbor}_{extensive}$ and $\text{Neighbor}_{intensive}$. I show that less democratic countries are more likely to join as founding members and that countries with stronger IO connections are more likely to join. For the case of the Asian Development Bank, in particular, I have shown that countries under-represented in ADB are more likely join the AIIB. Lastly, I have employed the Cox proportionate hazard model as an alternative to demonstrate the robustness of the membership structure uncovered in this paper.

This paper contributes to the literature on autocracy promotion and the debate on democracy and multilateralism. I find that less democratic countries are more eager to join the China-led institution than their more democratic counterparts. This could be explained by (1) less democratic countries, more similar to China, are eager to support China, (2) less democratic countries face less audience cost in joining the China-led institution, and (3) more democratic countries are more constrained by the opposing pressures from the United States.

This paper also contributes to the existing literature in IO in two aspects. First, most studies have focused on the decision making of the leading state(s). The behavior of the participating countries is usually described as utility maximizing but seldom receives serious attention. The phenomenon that China, a developing country, establishes an IO and invites developed countries to join is new. It is ideal for modeling the decision making of the participating countries. Second, my study empirically tested and confirmed the contested multilateralism framework. Less represented countries (thus more dissatisfied) have shown to be more eager to join the new institution.

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6 Appendix A

In this appendix, I prove that if country i is more likely to join the IO (in the binary setting), then it is more likely that country i will wait for a shorter period of time to join (in the proportional hazard duration setting).

Mathematically,

$$\Phi(x_1\beta) > \Phi(x_2\beta) \implies \Pr(T_1 < T_2) > 0.5$$

where T denotes the duration of the waiting.
Proof:
(1) The hazard function is defined as h(t)=$\frac{p(t)}{P(T\geq t)}$.
(2) The survival function is defined as S(t)=Pr(T≥t)=$\int_t^\infty p(\tau)d\tau$. From (1) and (2), we can derive the identity S(t)=$e^{-\int_0^t h(\tau)d\tau}$.
(3) Introduce the Cox model as follows:

$$h(t) = h_0(t)e^{x\beta}$$

where x is the set of regressors, β is the vector of parameters, and $h_0(t)$ is the baseline hazard. Then $\frac{h_2(t)}{h_1(t)} = \frac{e^{x_2\beta}}{e^{x_1\beta}} = \frac{\gamma_2}{\gamma_1} \rightarrow S_2 = S_1^{\frac{\gamma_2}{\gamma_1}}$
(4)

$$\begin{aligned}
Pr(T_1 < T_2) =& \int_0^\infty \int_0^\infty p(t_1, t_2)dt_2t_1 \\
=& \int_0^\infty p(t_1) \int_{t_1}^\infty p(t_2)dt_2t_1 \\
=& \int_0^\infty p(t_1)S_2(t1)dt_1 \\
=& \int_0^\infty p(t_1)[S_1(t1)]^{\frac{\gamma_2}{\gamma_1}}dt_1 \\
=& -\int_0^\infty s(t_1)[S_1(t1)]^{\frac{\gamma_2}{\gamma_1}}dt_1 \\
=& -\frac{\gamma_1}{\gamma_1+\gamma_2}S_1(t_1)^{\frac{\gamma_1+\gamma_2}{\gamma_1}}|_0^\infty \\
=& \frac{\gamma_1}{\gamma_1+\gamma_2} \\
=& \frac{e^{x_1\beta}}{e^{x_1\beta}+e^{x_2\beta}} = \frac{1}{1+e^{x_2\beta-x_1\beta}} \\
>& 0.5
\end{aligned} \tag{3}$$

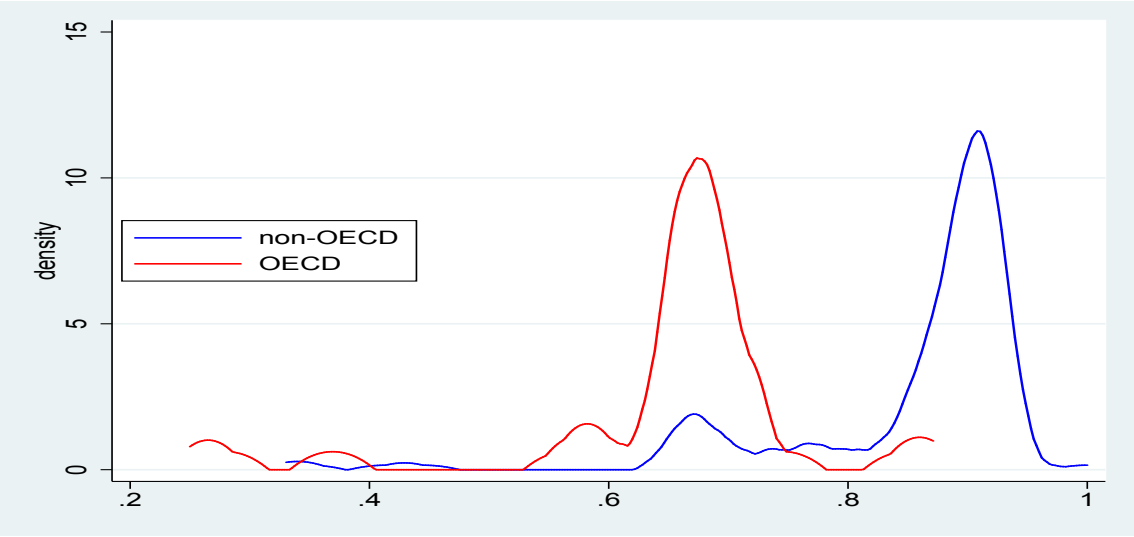
7 Appendix B

	Application			Public		
Country	Month	Day	Year	Month	Day	Year
Indonesia	11	25	2014	11	25	2014
Maldives	12	17*	2014	12	31	2014
New Zealand	12	18	2014	1	1	2015
Saudi Arabia	12	31	2014	1	13	2015
Tajikistan	12	31	2014	1	13	2015
Jordan	1	24*	2015	2	7	2015
United Kingdom	3	12	2015	3	12	2015
Germany	3	17	2015	3	17	2015
France	3	17	2015	3	17	2015
Italy	3	17	2015	3	17	2015
Luxembourg	3	18	2015	3	18	2015
Switzerland	3	20	2015	3	20	2015
UAE	3	20*	2015	4	3	2015
Iran	3	20*	2015	4	3	2015
Turkey	3	26	2015	3	26	2015
Spain	3	27*	2015	4	11	2015
South Korea	3	27	2015	3	27	2015
Austria	3	27	2015	3	27	2015
Georgia	3	28	2015	3	28	2015
Denmark	3	28	2015	3	28	2015
Netherlands	3	28	2015	3	28	2015
Brazil	3	28	2015	3	28	2015
Australia	3	29	2015	3	29	2015
Finland	3	30	2015	3	30	2015
Russia	3	30	2015	3	30	2015
Norway	3	30*	2015	4	14	2015
Egypt	3	30	2015	3	30	2015
Kyrgyzstan	3	31	2015	3	31	2015
Malta	3	31*	2015	4	9	2015
Sweden	3	31	2015	3	31	2015
Israel	3	31*	2015	4	15	2015
Portugal	3	31	2015	3	31	2015
South Africa	3	31*	2015	4	15	2015
Azerbaijan	3	31*	2015	4	15	2015
Iceland	3	31	2015	3	31	2015
Poland	3	31*	2015	4	15	2015

Note: Estimated dates are marked with a star. The relevant documents and the code book are available from the author's website.

8 Appendix C

Figure 5: Voting Distribution



Note: The density is calculated using 2013-2014 voting data. As illustrated above, OCED countries vote systematically differently from non-OECD countries from China's perspective.

9 Appendix D

Table 7: Main variables and sources of raw data

Variable	Explanation	Source
Ln GDP	Log of host country GDP	World Bank
Ln GDP per capita	Log of host country GDP per capita	World Bank
Exports	Export to China as share of Chinese GDP	UN Comtrade
Imports	Import from China as share of Chinese GDP	UN Comtrade
Ln Distance	Log of distance between country i and China	CEPII
Polity	Democracy index of the host country	Polity IV Project
UN Voting	Similarity between China and other states' voting	United Nations
Political Rights	Measure of Political Rights	Freedom House
Civil Liberty	Measure of Civil Liberty	Freedom House
Taiwan	A dummy on whether the country recognizes Taiwan	Xinhua

10 Appendix E

Table 8: UN Members that Recognize Taiwan

Burkina Faso, Belize, Dominican Republic
El Salvador, Guatemala, Guinea Bissau
Haiti, Honduras, Kiribati
Nauru, Nicaragua, Paraguay
Palau, Panama, Sao Tome and Principe
St. Kitts and Nevis, St. Lucia,St. Vincent and the Grenadines
Solomon Islands, Swaziland, Tuvalu

11 Appendix F

Table 9: Robustness Exercise: POLITY

	1	2	3
AIIB Membership			
ln GDP	0.202***	0.0811**	0.0785*
	(0.000)	(0.049)	(0.058)
ln GDP per capita	-0.0982	0.115	0.131*
	(0.239)	(0.102)	(0.065)
ln Distance	0.264*	0.155	0.178
	(0.090)	(0.290)	(0.231)
$\text{Neighbor}_{extensive}$	0.182***	0.0739	0.0630
	(0.004)	(0.218)	(0.301)
$\text{Neighbor}_{intensive}$	0.406***	0.412***	0.425***
	(0.000)	(0.000)	(0.000)
Export (as % GDP)	1.372**	1.017	1.093*
	(0.040)	(0.121)	(0.097)
Polity	-0.0449***		
	(0.005)		
UN Voting	1.988**	2.528***	2.336**
	(0.032)	(0.009)	(0.015)
ADB	0.977***	0.694***	0.698***
	(0.000)	(0.000)	(0.000)
Δ^2	0.0145***	0.0143***	0.0144***
	(0.000)	(0.000)	(0.000)
Δ	-0.338***	-0.319***	-0.321***
	(0.000)	(0.000)	(0.000)
Δ^3	-0.000168***	-0.000173***	-0.000174***
	(0.001)	(0.000)	(0.000)
Political Rights		0.0766	
		(0.140)	
Civil Liberty			0.112*
			(0.073)
Constant	-18.76***	-17.40***	-17.89***
	(0.000)	(0.000)	(0.000)
Observations	15489	17135	17135
Pseudo R^2	0.376	0.337	0.338

p-values in parentheses
* p<0.10, ** p<0.05, *** p<0.010

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