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Parliamentary Representation in the Macau Special Administrative Region: A Quantitative Analysis of Roll Call Voting Behavior in the 5th Legislative Assembly, 2013-2017

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Abstract

This paper examines the nature of parliamentary representation in the Macau Special Administrative Region through an extensive roll call voting analysis for the 5th term Legislative Assembly from 2013 through 2017. It presents a considerable amount of variance in the decision-making of the legislators, meaning that the Macau legislature is not just a rubber stamp but a place where a series of collective decisions are made with careful consideration of the individual legislators. Unlike the conventional wisdom that the pro-establishment politicians dominate Macau politics, its social network analysis reveals that two distinct groups shape legislative politics in Macau. Its spatial model of roll call voting finds that most of collective decision-makings fit a single government-opposition dimension.

Keywords: parliamentary representation, roll call voting behavior, one country two systems, Macau

1. Introduction

The main objective of this paper is to examine the nature of parliamentary representation in the Macau Special Administrative Region. Despite the important role of parliamentary activities in our understanding of politics and society, little is known about how political elites behave inside the Legislative Assembly of Macau. Is there a meaningful variance of legislative behavior that allows a further investigation? If so, to what extent and in what ways political elites in the legislature act differently and what are the main factors drawing such divergent legislative representation? These are important but rarely studied research questions for understanding the contemporary government and politics in Macau.

In this first quantitative research on legislative politics in Macau, to my best knowledge at least in the literature written in English, I use the original data of roll call voting in the 5th term Legislative Assembly from 2013 through 2017 for capturing the pattern of legislative representation in Macau. A close look at the roll call voting data suggests that a considerable amount of variance exists in this final stage of legislative policy-making process. Legislators were actively engaged in these collective decision-making activities. In their overall roll call voting decisions, extremely high (dis)agreements are rare. That is, the Macau legislature is not just a rubber stamp but a place where a series of collective decisions are made with careful consideration of the individual legislators.

Unlike the conventional belief that the pro-Beijing legislators have dominated Macau politics, this paper's social network analysis further finds that two distinct groups of approximately equal size exist in the legislature. Its spatial model of roll call voting also sheds a new light on Macau politics by presenting that most of collective decision-makings fit a single government-opposition dimension.

The remainder of this paper is organized as follows. Section 2 describes the basic feature of government and politics in Macau. Section 3 reviews relevant literature. Section 4 provides an empirical analysis. And Section 5 concludes.

2. Political Structure in Macau

The formal English name of the Macau government is the Macau Special Administrative Region of the People's Republic of China (officially in Chinese: 中華人民共和國澳門特別行政區政府; in Portuguese: *Governo da Região Administrativa Especial de Macau*). As shown by this lengthy name with the two different official languages, Macau has been experiencing its unique historical trajectory. This small city was one of the first Western settlements in East Asia, governed by the Portuguese Empire and its successor of the Portuguese Republic from the mid-16th century. Followed by the Sino-Portuguese Joint Declaration in 1987, its sovereignty was returned to the People's Republic of China on 20th December 1999. Since then, the Macau government has administered this territory in close to twenty years, semi-independently.

"One country, two systems" (in Chinese: 一個國家，兩種制度; in Portuguese: *um país, dois sistemas*) is the key principle for governing Macau as well as Hong Kong under the Chinese sovereignty. This doctrine honors the established institutions and rules in the colonial period of the two regimes and declares that the socialist system and policies in Mainland China would not be practiced in these two post-colonial regimes for 50 years after the handover. Under this rule, except for military defense and foreign affairs, the local governments are authorized to exercise most of government affairs, such as judiciary and courts system, law enforcement, monetary and tax policy, business,

education, healthcare and social welfare, and immigration and customs policy. If it is not related to the sovereignty issue, participation in international organizations and conferences is also allowed[1]. At the same time, however, this high degree of autonomy with limited interference by the Central Government and the Chinese Communist Party is granted only by the willingness of the Mainland[2].

The Macau Basic Law (in Chinese: 中華人民共和國澳門特別行政區基本法 ; in Portuguese: *Lei Básica da Região Administrativa Especial de Macau da República Popular da China*) implements the "One country, two systems" principle for its governance. This constitution not only defines the fundamental foundation of the "One country, two systems" principle, the rights and duties of Macau citizens, and the key rules of economic, cultural, and social affairs, but also specifies the Macau government's political structure. In particular, Chapter IV proclaims the separation of powers[3] into three branches: The Executive branch headed by the Chief Executive, the Legislative Assembly, and the Judiciary. The selection of the Chief Executive has been done indirectly by 300 members of the Election Committee[4]. As the Chief Executive of Macau is not elected by universal suffrage, the Legislative Assembly is the only place for Macau citizens to be empowered to choose their representatives, while not all legislative seats are filled by directly elected legislators.

The Legislative Assembly (in Chinese: 立法會 , in Portuguese: *a Assembleia Legislativa*) is the counterpart of the government body for checks and balances over the executive branch. The Basic Law (Article 71, Section 4, Chapter IV) stipulates this unicameral body's powers and functions, including law-making, budgetary examination and approval, decision-making over taxation and debts proposed by the executive branch, as well as policy and public issue debate. Members of the Legislative Assembly have the right for bill introduction and

parliamentary question (Article 75-6, Chapter 4, Section IV). They are also responsible for collective decision-making of bills and motions whether to be passed or not[5].

Regarding the executive-legislative relation, the Chief Executive has the power of dissolution of the Legislative Assembly in case if he or she declines to sign a bill passed by the Legislative Assembly[6] or if the Legislative Assembly is against the budget proposed by the executive branch (Article 52, Chapter 3, Section IV). By contrast, the Legislative Assembly is assigned the power of impeachment of the Chief Executive; first, the Legislative Assembly forms an independent investigation committee when the Chief Executive is charged with serious law breach or dereliction of duty, and if the committee finds it to be sufficient, the Legislative Assembly is able to impeach the Chief Executive by a two-thirds majority of the legislature (Article 71, Chapter 4, Section IV).

Table 1 Composition of the Legislative Assembly of Macau, 1999-2017

Term	Year	Total	Direct Election	Indirect Election	Appointed
1st	1999-2001	23	8	8	7
2nd	2001-2005	27	10	10	7
3rd	2005-2009	29	12	10	7
4th	2009-2013	29	12	10	7
5th	2013-2017	33	14	12	7

Source: Author's count from the Basic Law.

Table 1 describes the organizational evolution of the Legislative Assembly. Its term is four years, except for the first term served in two years. The size of the legislature has been increased gradually from 23 in

the 1st term through 27 in the 2nd term and 29 in the 3rd and 4th terms to 33 in the 5th term. It comprises the legislators directly elected by voters (直接選舉議員 in Chinese, *Deputados Eleitos por Sufrágio Directo* in Portuguese), those who are indirectly elected by an electoral college (間接選舉議員 in Chinese, *Deputados Eleitos por Sufrágio Indirecto* in Portuguese), and the seven members appointed by the Chief Executive (特首委任議員 in Chinese, *Deputados Nomeados pelo Chefe do Executivo* in Portuguese).

As regards the direct election, legislators are elected in the closed list proportional representation system under the highest averages method[7] in a single geographical constituency covering all territories of Macau. This territorial election has been competitive that voters have faced up to twenty lists of associations[8] and cast a ballot on a single list. This large volume of the list submission is due to the electoral rule that benefits a small size of affiliated members, but at the same time, it is criticized for fostering a distorted proportional representation with a lack of electoral majority for strengthening the legislature. Electoral campaigns have been low-profile due to little interest from voters who are relatively satisfied with economic development based upon the Casino boom. Several ethical issues, violations of electoral regulation, vote-buying and other scandals were also reported during the campaign periods, while it has been declining from the earlier period (Chong, 2016; Chou, 2015; Lo and Chong, 2016; Yee, 1997; 2005; Yu, 2007; 2011)[9].

For indirect election, the electoral colleges of professional or special interest groups, dubbed functional constituencies, select their representatives. These functional constituencies include business (工商 及金融界 in Chinese, *dos sectores industrial, comercial e financeiro* in Portuguese), labor (勞工界 in Chinese, *do sector do trabalho* in Portuguese), professional (專業界 in Chinese, *do sector profissional* in

Portuguese), welfare and education (社會服務及教育界 in Chinese, *dos sectores dos serviços sociais e educacional* in Portuguese), and culture and sport (文化及體育界 in Chinese, *dos sectores cultural e desportivo* in Portuguese)[10]. While there is a set of formal rules and regulations for this indirect election, it has been conducted without competition that each electoral college nominates a single list of candidates to be selected by the 5th term (Chou, 2005; 2015; Yee, 1997, 2005; Yu, 2007)[11].

Party politics is the key feature in representative politics in other regimes holding competitive election, but it is not yet established in Macau. Instead of party organization, for every election, individual associations reflecting a specific or a broad set of societal interests form each electoral list, mostly dismantled after the election. In Macau's electoral history, including the most recent 6th term election held on September 17th, 2017, the largest number of seats earned from a single list is three for the case of the United Citizens Association of Macao (澳門民聯協進會) in the 5th legislative election in 2013. Except for this single outlier, only one or two representatives have been elected from each list in the direct election[12].

Given this small size of the legislators from the same list, a cohesive way of parliamentary behavior[13], similar to partisan representation in other political regimes, does not take seriously in Macau politics. It is more individualist style of representation based upon the patron-client relationship between an interest group and its representative in the legislature that shapes Macau politics (Chong, 2016; Chou, 2005; Lo and Chong, 2016).

Most of the politicians in the legislature tend to have a pro-Beijing and pro-government preference. These pro-establishment legislators may fall into the three clusters, including business organizations, labor unions, and neighborhood organizations. As regards the opposition,

politicians with the liberal democratic ideas are conventionally discussed as a potential rivalry, but they were not successful in the 5th term election with only two directly elected representatives. In addition, some legislators associated with casino interest groups do not share a common preference with pro-establishment legislators and try to keep their business interest against the governmental strategy of economic diversification (Chong, 2016; Chou, 2005, 2015; Lo and Chong, 2016; Yee, 1997, 2005; Yu, 2007; Yu and Chin, 2012).

3. Related Literature

As Carey (2012, ix) best summarizes, legislative decisions are about roll call votes that collectively determine either the proposed agenda to be passed or rejected. Collectively, roll call voting is the final stage of legislative policy-making. Individually, this position-taking activity provides a tremendous amount of useful information of legislative representation. In the studies of the American Congress, roll call voting analysis has a long and rich history for assessing the status of representative government. With the pioneering work of Miller and Stokes (1963), a voluminous literature has been generated on the accountability of representative roll call voting (e.g., Achen, 1978; Bartels, 1991; Broockman, 2016; Clinton 2006). This research program concerns how voter preferences are reflected in legislative voting. In this literature, constituency control is the key component in democratic politics, and this normative idea should be realized in legislative politics in the form of the correspondence between voters' policy preferences and their representatives' decision-making in roll call voting.

In the last two decades, inspired by this literature of legislative representation in the United States, a substantial amount of research on comparative legislatures has been concerned with roll call voting

behavior (e.g., Carey, 2012; Morgenstern, 2004; Sieberer, 2006). As theories of representation based on American politics are developed within its unique institutional context, the students of comparative legislative behavior take care of different institutions, such as regime type, party systems, and electoral rules (Gamm and Huber, 2002). These extended studies of roll call voting basically theorize the two models of legislative representation that are shaped by varying political institutions (Carey, 2012; Carey and Shugart, 1993). One is party-dominated representation, in which individual legislators follow party line in their roll call voting to represent collective party policies. The other model is defined as individual-predominant representation, where intra-party disagreement of voting is frequently observed, as each legislator needs to build his or her own personal reputation. In this literature, the pattern of representation is driven by different amount of institutional incentives for legislators to seek party label or personal reputation.

The recent methodological advances in roll call voting shed new light on analyzing legislative representation, in particular ideal point estimation and social network analysis (Armstrong *et al.*, 2014; Jackman, 2009; Poole, 2005; Ward *et al.*, 2011). One of the key findings from this application of the new statistical methods is low-dimensionality in the legislature. For example, American politics has been featured by mostly a single dimensional left-right ideology in Congress and Senate (Poole and Rosenthal, 1997, 2011). Regardless of many complexities of political representation and institutional varieties, it is consistently observed that most of the variation in roll call voting patterns can be summarized by one or at best two factors around the world from Western democracies to Easter European countries and to Asian and Latin American polities (Coman, 2017; Poole and Rosenthal, 2011: 295). Social network analysis also provides a useful tool for measuring political power and influence, hitherto exceedingly difficult

to quantify, based upon the concept of centrality that those legislators who are more central have the greater influence on other politicians' legislative decision-making (Dal Maso *et al.*, 2014; Fowler, 2006; Ringe and Wilson, 2016).

Until now, the discussed literature is mostly based on democratic countries where the legislature is an active policy-making body of representation. Least arguably, Macau is not a political regime that falls under this category of democracy. However, the above literature review is necessary, as the recent studies have successfully extended the literature of democratic representation into authoritarian politics in similarity to Macau. These studies first find that authoritarian leadership may dislike the existence of the legislature but allows it with a considerable amount of policy-making powers, in order to signal regime strength, rent distribution, and co-optation with notable individuals and potential oppositional forces (e.g. Boix and Svolik, 2013; Gandhi, 2008; Gandhi and Przeworski, 2007; Gandhi and Lust-Okar, 2009; Magaloni, 2008; Magaloni and Kricheli, 2010; Lust-Okar, 2005; Svolik 2012).

Moreover, a growing body of studies find that competitive authoritarian legislative institutions may achieve meaningful representation. Treux (2014, 2016) finds that policy proposals made by the members of the National People's Congress in China are matched with nominal Chinese residents. Several studies (e.g. Manion 2016; Kamo and Takeuchi 2013; Cho, 2006) present that local people's congress delegates in China describe themselves as representatives of their geographical area and work for the interests and demands from the region. Malesky and Schuler (2010) analyze that delegates in Vietnam's National Assembly face different institutional incentives based on their electoral origins and their parliamentary behavior is largely shaped by these institutional settings.

While legislative studies on Macau are rare, and virtually non-existent in English, literature on the Legislative Council of Hong Kong has recently emerged (Gu, 2015; Jang, 2016, 2018, forthcoming; Tam, 2017; Wang and Peng, 2016). These studies share a common ground of institutional influence on individual legislators with the above studies of parliamentary representation in democratic countries as well as authoritarian regimes and present empirical findings of how legislative behavior is affected by institutional factors, such as democratic transition, party influence, and type of (s)election, i.e., direct election vs. indirect election and appointment.

4. Roll Call Voting Analysis

This section provides an empirical analysis of the roll call voting record in the 5th term from 2013 through 2017. Since the 5th term, the National Assembly of Macau has publicly released the official roll call voting records (全體會議議決 in Chinese, *Deliberações do Plenário* in Portuguese)[14]. For data collection, I accessed the official website and downloaded all pdf files of roll call voting and manually recorded each politician's activity for each bill.

4.1. Data Description

The total number of roll call voting items is 82 and the total number of the legislators served in the 5th term is 33. And so, the data set format for this section is a matrix with 33 rows of each legislator and 82 columns representing each agenda of roll call voting (2,706 cells of activities). In each cell of this matrix, I coded each legislator's decision on each bill. There are five types of actions, including *Yea*, *Nay*, *Abstention*, *Present*, and *Not Available*. Legislators may reveal their preference over the agenda by voting for (贊成 in Chinese, *A Favor* in

Portuguese, coded as *Yea*) or against (反對 in Chinese, *Contra* in Portuguese, coded as *Nay*) the agenda. They can also choose not to express their position officially (棄權 in Chinese, *Abstenções* in Portuguese, coded as *Abstention*) or just keep a seat without any activities, which is recorded as *Present*. If not applied to any of these categories, his or her record of the bill remains blank (*Not Available*).

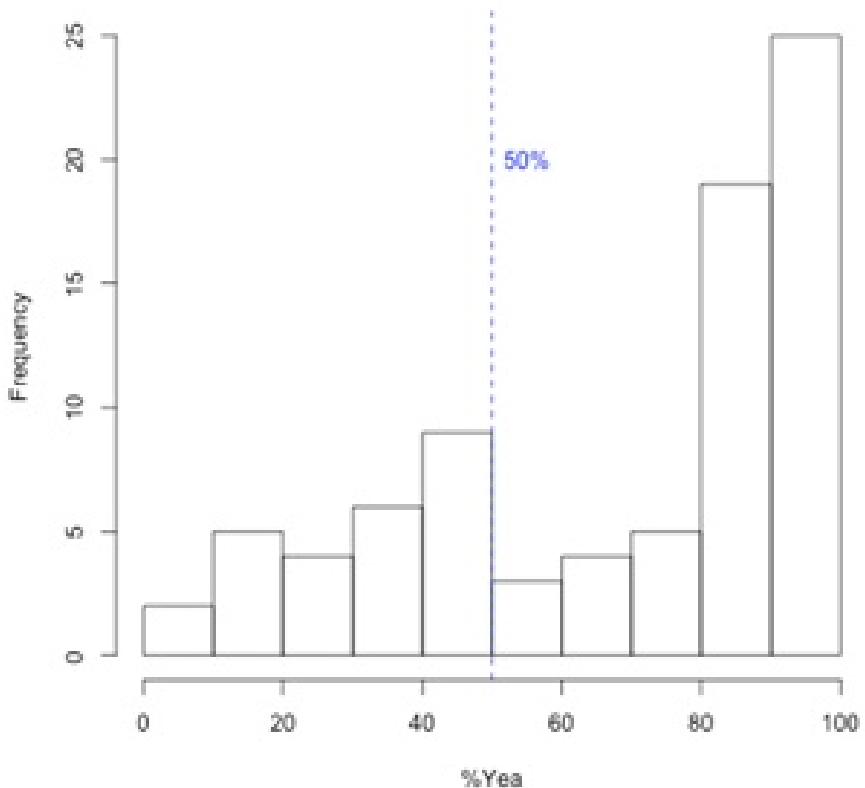**Figure 1** Distribution of Roll Call Voting Decision

Table 2 The Distribution of Roll Call Voting Results

	Total	Some *Nay*s	Some *Abstention/ Present*	Some Absence	Full Participation
Passed	67	21 (31.34%)	7 (10.4%)	29 (43.28%)	6 (9%)
Rejected	15				

Source: Author's count.

Figure 1 and Table 2 present the distribution of roll call voting results. Four distinct features are reported in Figure 1 and Table 2. First, most of the roll call voting results yield the agenda to be passed. Among the total of the 82 bills, 67 were passed (about 82%), while 15 (about 18%) were rejected. Second, many of the collective decisions were done lopsidedly to be recognized clearly which side won (the leftist and the rightist parts of Figure 1). Third, some of the voting were done competitively. Specifically, 10 collective decisions were made by one or two votes in the winning side (8 for passed and 2 for rejected). Last but not least, there is a considerable amount of variation within these passed bills. There are 21 out of 67 resolutions (31.34%) with some legislators voted against the bill. The other 46 cases were passed unanimously, but there are still subtle differences; 7 out of 67 bills (10.4%) were recorded with some actions of abstention or being present but not voting, 29 resolutions (43.28%) were passed with some members not participating in the voting, and only 6 cases (9%) can be considered for all legislators fully supporting the agenda[15]. Regarding the rejected bills, there is no unanimous decision.

Legislators were actively engaged in roll call voting decision in the 5th term legislature. The median of legislators' participation rate, limited to *Yea* or *Nay* choice, is 90.25% (74 out of 82 votes). The first and third quarters of participation rate is 79.27% and 93.9%, meaning that the half of legislators showed their preference on the bill, eight or nine of ten times. The lowest participation rate is 63.41% (52 out of 82 votes), except for the Speaker Ho Iat Seng (賀一誠) who only cast his vote in two bills for tie-breaking to be passed.

The other options, if a legislator does not want to take a position on a bill, are *Abstention* or *Present*. It accounts for about 3 percent of the total roll call voting action. In the 5th term, there have been 72 abstentions out of all the 2,706 decisions (2.7%). In the case of *Present*, a legislator is only seated to be counted to meet the quorum, the minimum number of members of the legislature to make the voting result valid, without any actions, including *Yea*, *Nay*, or even *Abstention*. 7 cases were reported, which is about 0.3% of all the roll call voting behavior. At the bill level, there is also a meaningful variance. In the case of 49 out of 82 agenda (59.76%), there is no record of *Abstention* or *Present*. Another 21 bills (25.6%) are recorded with one or two cases of *Abstention* and *Present*. The maximum number of *Abstention* and *Present* on a single agenda is 8, which means about 24% of the legislators does not show their position on the given bill. At the legislator level, 9 out of the 33 representatives (27.27%) have no record, while 11 legislators took these two types of choice one or two times (33.33%). The maximum number of *Abstention* and *Present* that an individual legislator chose in the 5th term is 8, accounting for the 9.76% of this politician's roll call voting decision.

In the case that a legislator was not categorized in any of the four, it is coded as *Not Available*. In the 5th term, 333 cases out of all the 2,706

decisions (12.3%) fall into this category. At the bill level, the median of *Not Available* coding is 4, and its first and third quarters are 3 and 5, respectively. All the votes include at least a single *Not Available* coded choice and its maximum count is 8. At the legislator level, its median is 5, and its first and third quarters are 2 and 13, respectively. Only one legislator (李靜儀, Lei Cheng I) has no record of this case, as well as just one *Abstention* record, meaning that she is the most active to show her preference on the given roll call voting choice. Except for the Speaker, who usually falls under this category, the maximum number of this action is 26 (梁安琪, Leong On Kei), meaning that he tends to be away from participation in roll call voting. Figure 2 and Figure 3 provide an overview of the distribution of *Yea/Nay*, *Abstention/Present*, and *Not Available* choices at the bill level as well as at the legislator level. In these two stacked bar plots, each box indicates individual bill and legislator, respectively. In each bar, the three colors, including gray, blue, and red, are used to visualize its proportion for each of the bill or legislator.

Last but not least, I checked a potential relation among its frequency of the choice set. There is no clear relationship between the frequency of *Yea* or *Nay* choice vs. one of *Abstention* or *Present* choice. The correlation of the two at the individual legislator's level is only -0.03. In contrast, a strong negative correlation (-0.987) is found between the frequency of *Yea* or *Nay* choice vs. one of *Not Available* cases.

Until now, this section presents many numbers in detail to describe the roll call voting data. It is noted, from this data description, that a meaningful variation exists across the individual legislators in their roll call voting decision. From the next subsection, I will take an extensive quantitative data analysis to find a pattern of roll call voting, if it exists.

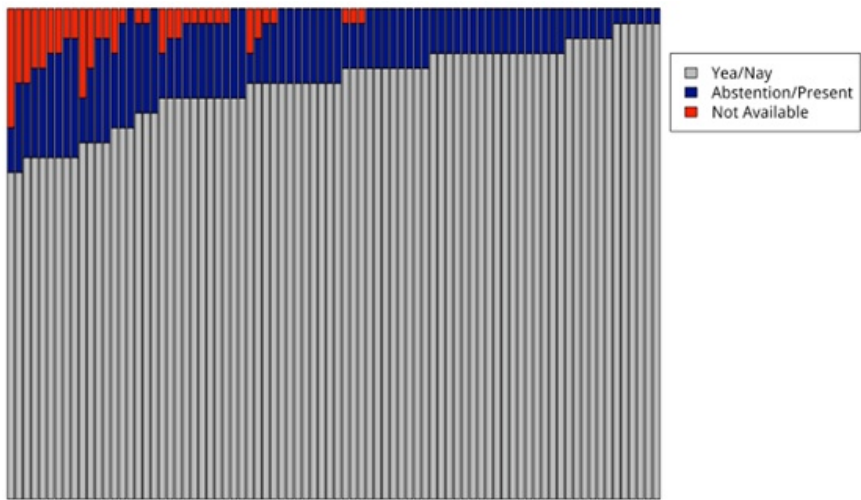**Figure 2** Overall Distribution of the Choice at the Bill Level

Figure 3 Overall Distribution of the Choice at the Legislator Level
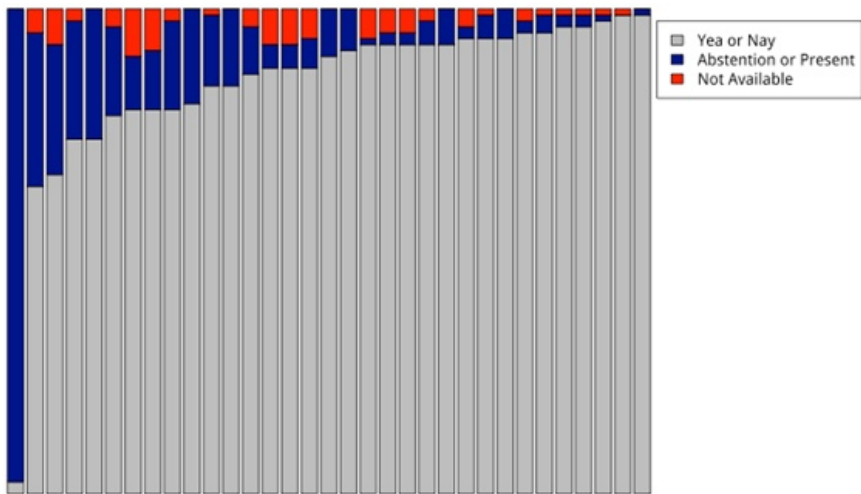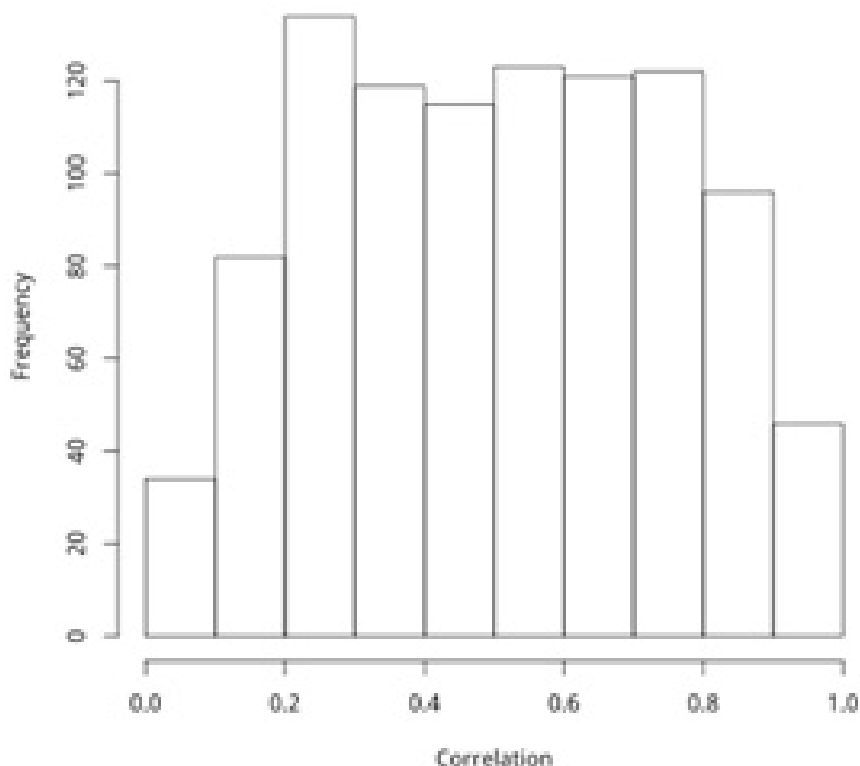
Figure 4 Correlation of Any Combinations of the Two Legislators

4.2. Correlation Matrix and Network Analysis

As an explanatory data analysis, for simplicity, I limit the set of choices, including *Yea* and *Nay* and excluding *Abstention*, *Present*, and *Not Available*. I also exclude the Speaker, as he only took *Yea* or *Nay* choice two times during the 5th term Legislative Assembly as well as the 36 unanimous votes. Then, I converted the existing matrix of 32 rows of each legislator and 36 columns representing each agenda of roll call
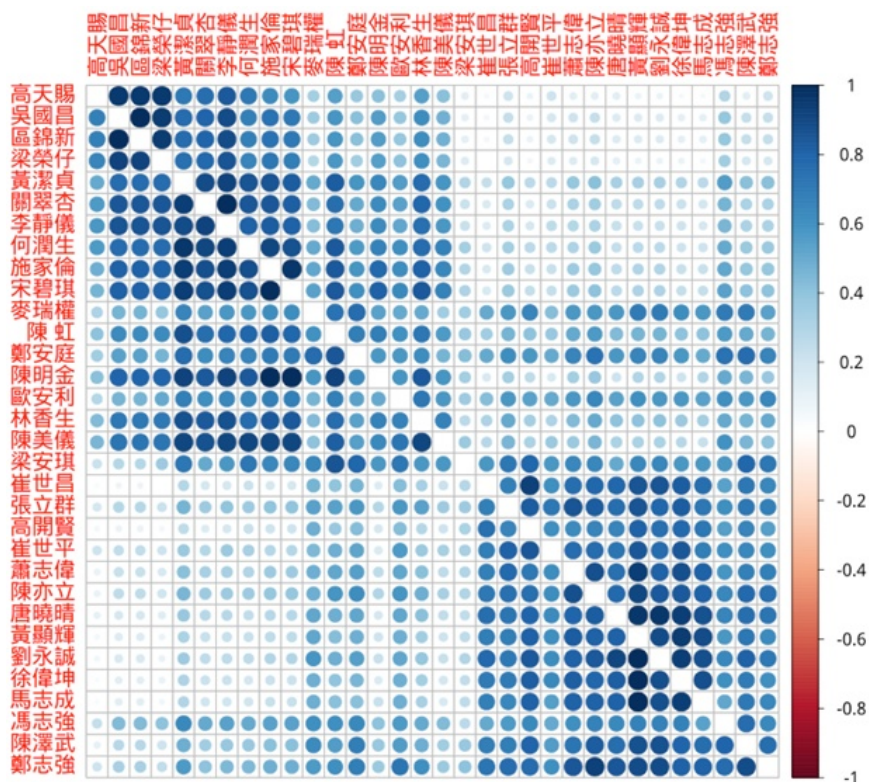
voting into a correlation matrix of 32 rows and columns of each legislator.

This matrix conversion is made in order to check if there is a meaningful correlational pattern among the legislators. Each cell in this matrix represents a degree of the same decisions of the two legislators in the 5th term Legislative Assembly. It ranges from zero to one, meaning perfect disagreement and agreement between the two, respectively. For this conversion, I first counted the same decision either *Yea* or *Nay* of the agenda made by any combinations of the legislators and then divided this number by the total number of an individual legislator's voting record of *Yea* or *Nay*.

Figure 4 presents the distribution of all the 992 correlations among 32 legislators. It is not skewed on the left or right side. From 20 through 80 percentage area, it is close to being distributed evenly. It also shows that the extremely high agreement and disagreement are rare phenomena. In other words, legislators are different in their roll call voting choice from other politicians.

To better understand this correlation matrix, I also prepare a visualized version of the matrix as shown in Figure 5. For this graphical display of a correlation matrix, I used the corrplot package of R 3.4.1 program with hierarchical clustering option for matrix reordering. In this visualized matrix, a deeper blue circle means a higher correlation of the two legislators (one for the row and the other for the column). A lighter blue circle indicates a less relation between the two and the white cell means no agreement of the two. The diagonal matrix is filled as white as a correlation of the identical legislator does not have any meaning. From this visualization, it can be found that there are two or more than two major groups of voting. And the two clusters, one roughly in the upper left side of the matrix and the other in the lower right side, tend to take a position differently in roll call voting. In other words, if there is a

Figure 5 Visualization of the Correlation Matrix

significant disagreement in roll call voting decision, it will be these legislators in these two sectors who are conflicting with each other. However, these two clusters are not mutually exclusive and there are also many close connections of small size.

Social network analysis is a useful tool for discovering the nature of this correlation of roll call voting. It provides a visualized pattern of
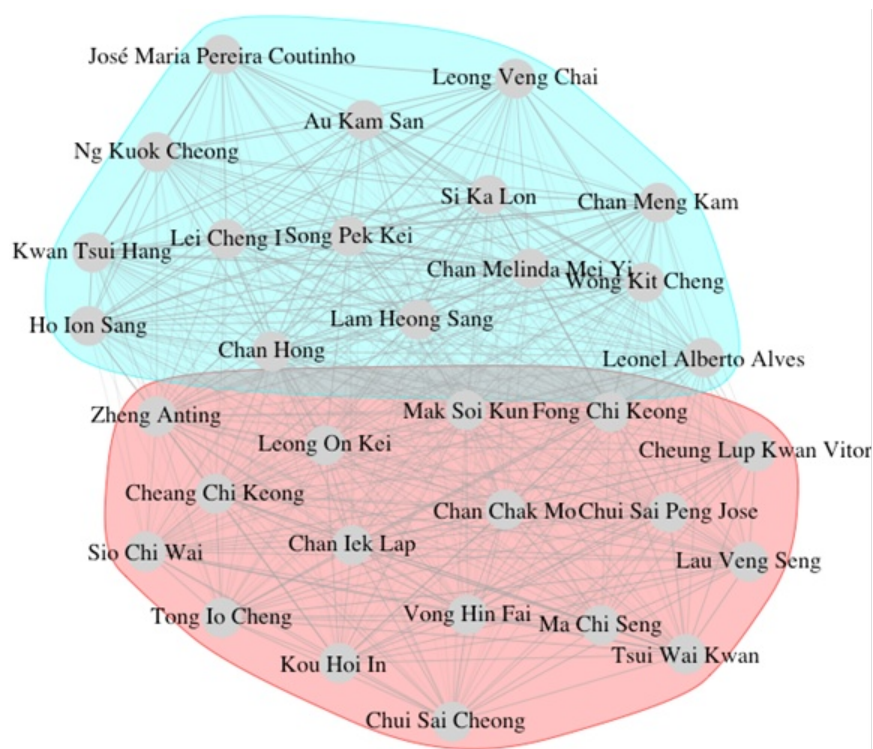
connections as well as useful measures to understand where each legislator is located in the network.

Figure 6 shows a network visualization of roll call voting by using the igraph package in R program. It uses the correlation matrix described above as an input source and draws a network layout based on the pattern of connections within the input matrix. In particular, I used the Fruchterman-Reingold layout algorithms, as this is one of the most widely used applications in this type of data. The gray circle or vertex represents each legislator's relational position in this network. The gray line or node shows the connection between the two legislators. A thicker or thinner line means a stronger or weaker relationship between the two, respectively. In addition to each legislator's position and his/her connection to the other legislators, Figure 6 also provides an information that there are two groups in this network, which are in the red- and blue-colored regions. This grouping is made by the community detection algorithm of the igraph package in R program.

Simply eyeballing Figure 6 provides a basic idea of the shape of network and legislators' relative position in the network. For example, Lam Heong Sang (林香生), Chan Hong (陳虹), and Mak Soi Kun (麥瑞權) are the most connected legislators in the 5th term Legislative Assembly. In contrast, José Maria Pereira Coutinho (高天賜), Leong Veng Chai (梁榮仔) and Chui Sai Cheong (崔世昌) are the top three isolated politicians in this network. Social network analysis provides further detailed information by measuring the relative importance of the actor in the network, including strength, closeness, and eigenvector centrality scores[16]. Figure 7 shows the distribution of the three measures of network characteristics.

The strength centrality is defined as the sum of weighted connections for each node and the main idea of this measure is that more connected actors are more important in the network. In the case of the

Figure 6 Network Visualization of Roll Call Voting

roll call voting network, it is simply measured by the sum of each row of the prepared correlation matrix. The other quantitative characteristics to examine each actor's power in the network is to check how close each node is located to every other politician in the network. This closeness index is measured by an inverse of the sum of distance for a node from all other nodes. Thus, a greater score means that the politician is more central and prominent in the network. Lastly, eigenvector centrality score corresponds to the values of the first eigenvector of the network.

The logic behind this eigencentrality is to assign more weight on a note when it is linked to by other important actors of the network. While these three scores measure the different network features, the three are highly correlated as Table 3 shows.

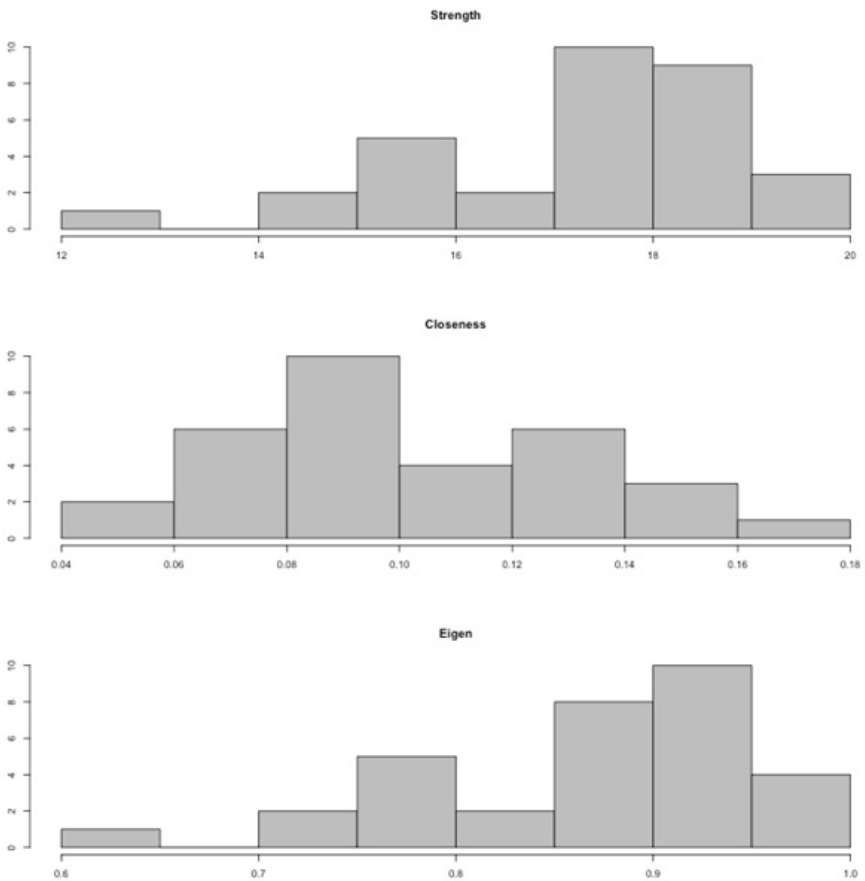**Figure 7** Distribution of Centrality Scores of the Network

Table 3 Correlation among the Three Centrality Scores

	Strength	Closeness	Eigen
Strength	1		
Closeness	.783	1	
Eigen	.999	.787	1

Source: Author's count.

4.3. Dimensional Analysis and Ideal Point Estimation

Another way of capturing roll call voting behavior is to apply the spatial model of politics to the existing roll call voting matrix data with 33 rows of each legislator and 82 columns representing each agenda of roll call voting. In this section, I employ the three spatial modelling applications, including Optimal Classification, W-NOMINATE, and IDEAL in R Program. As these models are made for the binary outcome, only *Yea* and *Nay* choices are considered in their scaling procedure. There are several technical differences among these three models, but all the three scaling procedures provide an estimation of ideal locations of individual politicians along a basic, low-dimensional Euclidean space.

Table 4 presents to what extent the single dimension estimated by three applications of spatial model explain roll call voting behavior. It shows that a single factor is sufficient to draw a map of politics in the 5th term Legislative Assembly. In the Optimal Classification model, 98.51% of *Yea* and *Nay* choices are correctly classified in a single dimension. The one-dimensional W-NOMINATE model also has a high classification rate (98.86%). The other two diagnosis statistics of the W-NOMINATE model, including Aggregate Proportional Reduction

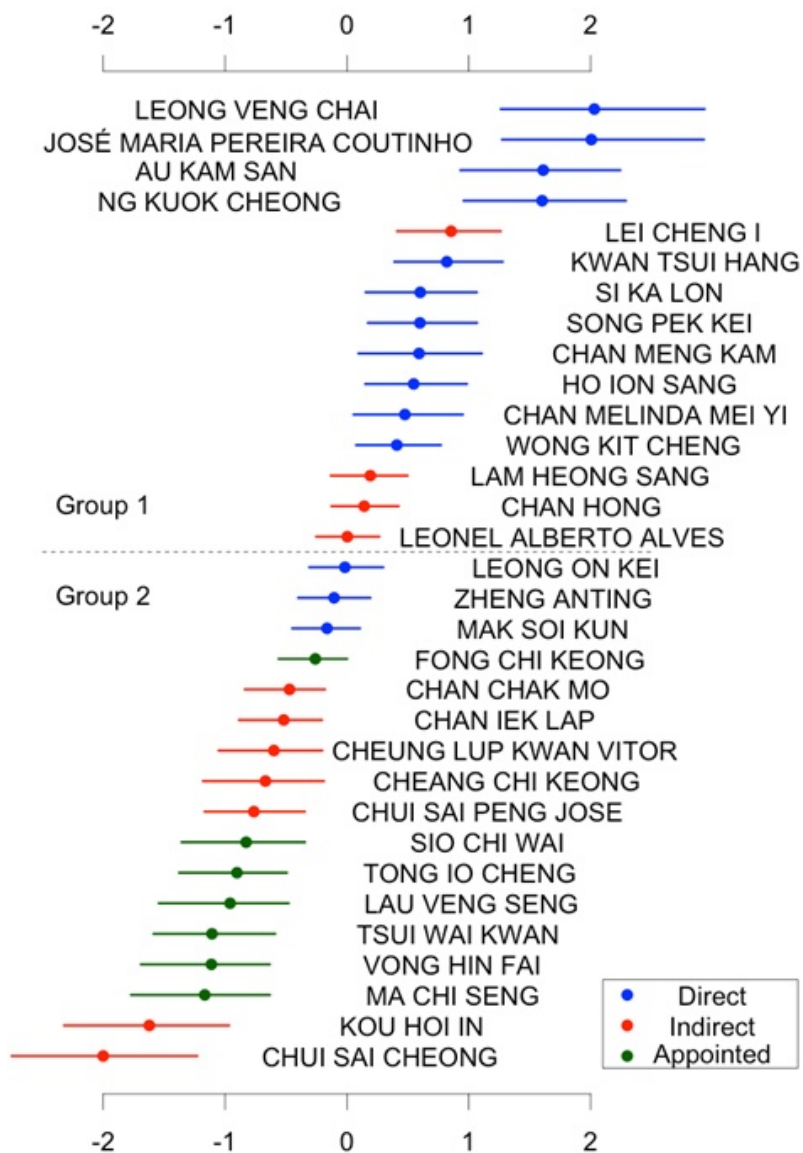**Table 4** Dimensionality of Spatial Models of Roll Call Voting

Optimal Classification		W-NOMINATE		IDEAL
Correct Classification	Correct Classification	Aggregate Proportional Reduction in Error	Geometric Mean Probability	Discrimination Rate
98.51%	98.86%	.861	.892	97.22%

Source: Author's count.

in Error (.861) and Geometric Mean Probability (.892), further support that one simplified variable from all the roll call voting decisions is enough. Lastly, the one-dimensional Bayesian ideal point estimation model, IDEAL, presents a high discrimination rate (97.22%) that confirms the uni-dimensionality of legislative politics in Macau.

Figure 8 presents the result of ideal point estimation with supplementary information. In this plot, the estimated location of each individual legislator with 95% confidence interval is represented as a dot with a bar. Blue, red, and green colors are used for indicating their types of (s)elections, i.e. direct election, indirect election in functional constituencies, and executive appointment, respectively. For an effective visualization, I sorted the ideal points to place the pro-establishment politicians to the left side of the plot. In addition, I draw a vertical line between the two legislators, Leonel Alberto Alves (歐安利) and Leong On Kei (梁安琪) to distinguish the two groups measured from the social network analysis in the previous section.

Figure 8 One-dimensional Ideal Point Estimation

Several interesting findings are noted from this Figure 8. First, the placement of the legislators in this plot represents a real politics in Macau. The two legislators in the leftist side hold the leadership positions in the legislature (秘書 in Chinese and *Secretário* in Portuguese). Then, most of the appointed members are located close to these two leaders. The four pro-democracy legislators, including Leong Veng Chai (梁榮仔), Jose Maria Pereira Coutinho (高天賜), Au Kam San (區錦新), and Ng Kuok Cheong (吳國昌), are located at the opposite side. That is the government-opposition structure in Macau politics by this estimated main dimension.

Second, the type of election variable is generally associated with the positioning of the legislators. In particular, the directly elected legislators are located in the opposition side of the main dimension. The two non-democratic ways of recruiting members of the Legislative Assembly of Macau are designed to be supportive for the executive branch, and Figure 8 demonstrates that those legislators actually represent pro-Beijing and pro-establishment policy in the form of roll call voting in the legislature. In contrast, legislators elected in a democratic way with a universal suffrage face a broad set of voters with various preferences, demands, and ideas of politics that are sometimes against the executive branch's policy direction. These legislators elected in a geographical constituency need to care for their voters, and this electoral connection pushes them to take a position as an opposition in their roll call voting behavior.

There are also some unique exceptions for this association of the type of election variable and the ideal point location. For example, Lei Cheng I (李靜儀) is from a functional constituency, but she is placed in the middle of the cluster of directly elected legislators. This positioning reflects the characteristics of the functional constituency of labor section

that she is selected (勞工界選舉組別 in Chinese, *Colégio eleitoral do sector do trabalho* in Portuguese). The other exceptional one is Fong Chi Keong (馮志強), who is an appointed legislator, but isolated from all the other appointed members. This is not so much a surprising result, as he is well known for his critical view toward the executive branch within his pro-Beijing perspective (Yee, 1997). This Macau's leading real estate tycoon is also closely related with *Tongxianghui* (同鄉會 , Chinese native-place association) as well as the gaming industry (Chong, 2016; Lo and Chong, 2016).

Third, the two groups measured by a hierarchical clustering algorithm of social network analysis are perfectly matched with this ideal point estimation result. That is, all the legislators who are grouped in the upper side in Figure 6 with blue color have positive values of ideal points to be located in the right side in Figure 8. The other politicians grouped in the lower side in Figure 6 with red color have negative values of ideal points and they are placed in the left side in Figure 8.

Fourth, the two interests of hometown association and gambling are the main forces to drive for legislators to push more moderate positions. There are 6 out of the total 32 legislators who are notably related to the Casino business (Lo and Chong, 2016). Three, Chan Meng Kam (陳明金), Angela Leong On Kei (梁安琪) and Melinda Chan Mei Yi (陳美儀), are directly elected in a geographical constituency. The other three, Chan Chak Mo (陳澤武), Victor Cheng Lup Kwan (張立群), and Fong Chi Keong (馮志強 , also mentioned above), are from functional constituencies. Chan Meng Kam (陳明金) as well as the two other directly elected legislators, Song Pek Kei (宋碧琪) and Si Ka Lon (施家倫) of the United Citizens Association of Macao (澳門民聯協進會), are supported by the hometown association, Fujian *Tongxianghui* (福建同鄉會), and they are closely located in the middle of Figure 6. Mak Soi Kun (麥瑞權) and Zheng Anting (鄭安庭) are the two other

directly elected law-makers who are identified with the Jiangmen *Tongxianghui* (江門同鄉會).

Table 5 Correlation among the Three Spatial Models

	OC	W-NOMINATE	IDEAL
OC	1		
W-NOMINATE	.97	1	
IDEAL	.97	.96	1

Source: Author's count.

The above description is based on the Bayesian one-dimensional ideal point estimation, but as Table 5 shows, the correlation of the three outputs from different estimation techniques are very high. It is also noted that the range of the 95% confidence interval is relatively wide due to the small sample size of roll call voting. This makes it hard to clearly differentiate each legislator's position from each other, but the overall distribution of the legislators' ideal points still sufficiently demonstrates how representatives are aligned in the main government-opposition dimension of Macau politics.

4.4. Regression Models

In this final sub-section of roll call voting analysis, I take a series of regression analysis on participation in roll call voting, network centrality, and ideal point estimation. As regards participation, I consider the degree of preference revealing over the roll call agenda as well as the degree of abstention. The two dependent variables are prepared as the

percentage of *Yea* or *Nay* choices and *Abstention* over the total number of roll call voting, respectively. Since the two outcome variables are proportions ranging only from zero to one, I use a beta regression model to fit the data.

Three independent variables are considered. First, Next Election variable indicates if he or she runs for the 6th term election (coded 1 if applied and 0 for otherwise). The two dummy variables of Type of (S)Election allow checking if there are some differences among directly elected legislators from legislators in functional constituencies and appointed members. Opposition Group variable is from the social network analysis to capture the government-opposition dimension of politics.

Table 6 presents the result of the two beta regression models on legislators' participation rate. First, legislators who ran for the next 6th term election are more likely to participate in roll call voting to show their preference on the agenda. They tend not to take an abstention in comparison with members of the legislature who do not have an ambition for continuing their career in the next 6th term Legislative Assembly. These two findings generally support the idea that electoral motivation leads to politicians being engaged in parliamentary activities.

Second, Type of (S)Election variable also matters. The members appointed by the Chief Executive are more active to cast their votes in *Yea* or *Nay* and less likely to choose *Abstention* than the legislators who are elected through a competition in a geographical constituency. For the case of the legislators in functional constituencies, they are statistically indifferent in *Yea/Nay* choice, but less likely to choose *Abstention* than the directly elected members. This result may be related to the fact that the appointed members and the functional constituency legislators serve a narrow group with a clear preference. In contrast, politicians face various voters with sometimes conflicting demands and competing

Table 6 Regression Models on Participation

	Dependent variable	
	Yea/Nay	Abstention
	(1)	(2)
Next Election	0.624[*]	-0.755[*]
	(0.346)	(0.441)
Executive Appointment	1.291[**]	-1.341[**]
	(0.537)	(0.661)
Indirect Election	0.387	-0.899[**]
	(0.314)	(0.398)
Opposition Group	0.721[**]	-0.957[**]
	(0.319)	(0.400)
Constant	0.101	0.160
	(0.722)	(0.898)
Observations	32	32
R^2	0.199	0.221
Log Likelihood	40.100	51.391

Note: [*]$p<0.1$; [**]$p<0.05$; [***]$p<0.01$

preferences. This different nature of accountability can be an easy answer for the statistical result.

Lastly, the legislators of the opposition group tend to take more clear positions and less likely to choose not to show their preference than the governing group members. This is also understandable, as an opposition group is required to deliver a clear message of objection for the established association of the law-makers.

The second regression models are considered for analyzing the network centrality at the individual legislator's level. Three outcome variables include the Closeness, the Strength, and Eigen-centrality, and a larger value of these variables means that the legislator is located much centrally in the roll call voting network. In addition to the Type of (S)Election variable, I employ the three explanatory variables of social affiliations, described in the previous sub-section: Gambling Industry, Democracy, and *Tongxianghui*. For simplicity, the linear models are used for this analysis.

The results in Table 7 present that only two factors are related to explaining the variance of the three centrality measures. That is, the appointed legislators do not enjoy a power of centrality in comparison with the directly elected representatives. There is no difference between the legislators of direct and indirect election. In the perspective of social network analysis, these politicians appointed by the Chief Executive do not play a pivotal role in the legislature. More important groups of politicians from the perspective of social network analysis are the other two types of legislators.

Second, the pro-democracy legislators also do not have a central role in the roll call voting network. That is, despite the emergence of opposition group in the legislature, as shown in the sub-section of social network analysis, pro-democracy opposition is relatively weak and not a core element of the non-establishment group (Yu and Chin, 2012).

Table 7 Regression Models on Network Centrality

	Dependent variable		
	Closeness	Strength	Eigen
	(1)	(2)	(3)
Executive Appointment	-3.026[**]	-1.276[*]	-0.067[*]
	(1.399)	(0.690)	(0.034)
Indirect Election	-0.185	-0.609	-0.033
	(1.355)	(0.669)	(0.033)
Gambling Industry	0.243	0.087	0.007
	(1.230)	(0.607)	(0.030)
Democracy	-4.220[**]	-3.977[***]	-0.204[***]
	(1.737)	(0.857)	(0.042)
Tongxianghui	2.128	0.026	0.001
	(1.439)	(0.710)	(0.035)
Constant	11.574[***]	18.235[***]	0.920[***]
	(1.138)	(0.561)	(0.028)
Observations	32	32	32
R^2	0.420	0.527	0.546
Adjusted R^2	0.309	0.436	0.458
Residual Std. Error (df = 26)	2.625	1.296	0.064
F Statistic (df = 5; 26)	3.769[**]	5.783[***]	6.242[***]
Note:			[*]$p<0.1$; [**]$p<0.05$; [***]$p<0.01$

Table 8 Regression Model on One-dimensional Ideal Points

	Dependent variable
	Ideal Point
Executive Appointment	-1.215***
	(0.301)
Indirect Election	-0.789**
	(0.291)
Gambling Industry	0.095
	(0.265)
Democracy	1.536***
	(0.374)
Tongxianghui	0.142
	(0.309)
Constant	0.276
	(0.245)
Observations	32
R^2	0.736
Adjusted R^2	0.685
Residual Std. Error	0.565 (df = 26)
F Statistic	14.484*** (df = 5; 26)
Note:	*$p<0.1$; **$p<0.05$; ***$p<0.01$

The last regression model is considered to confirm the last sub-section's discussion of the ideal point distribution. The extensively discussed one-dimensional ideal points are considered as the outcome variable. As shown in Figure 8, larger positive and negative values mean more oppositional and pro-governmental preferences, respectively. The same explanatory variables are used with the previous regression models on the network centrality. Table 8 presents the result of the linear model.

It basically reconfirms the previous discussion by showing that the directly elected legislators are clearly differentiated from the other types of politicians. In addition, the variable for the pro-democracy legislators has a strong explanatory power on the distribution of the ideal points. However, the estimated coefficients of the Gambling Industry and the *Tongxianghui* variables are reported as statistically insignificant.

5. Concluding Remarks and Future Directions

The overarching argument of this paper is that a considerable amount of policy-making and representation exist in the Legislative Assembly of Macau, at least in the 5th term legislature from 2013 through 2017. In order to support this argument, I take a comprehensive data analysis of roll call voting and find a meaningful variance among the legislators of their decision-making on whether a proposed bill to be passed or not. Subsequently, it presents that the two groups, not a single dominant camp of pro-Beijing legislators, shape legislative politics in Macau. It further shows a uni-dimensionality of parliamentary politics in which most of the legislators from the functional constituencies and appointed members are located in the government-side, while the representatives from the direct election are aligned in the opposition-side.

In addition to enhance scholarly understanding of Macau politics, this paper has two further implications. The first is about the

"One country, two systems" principle and its applications in Hong Kong and Macau (Lo, 1995, 2007). In particular, the two legislative bodies, the Legislative Council of Hong Kong and the Legislative Assembly of Macau, have used a similar way of mixed-member electoral systems that combine the directly elected legislators with the other type(s) of politicians, including functional constituency representation and executive appointment. Thus, these two formal institutions provide a unique opportunity to compare the impacts of different types of institutional incentives holding many other external factors constant (Moser and Scheiner, 2012). Unlike Hong Kong, where a direct election is held in the five geographical constituencies, Macau employs a single nationwide district, and this difference provides a unique laboratory to analyze how democratic value is realized under these two different democratic rules in comparison with other legislators of functional constituencies and appointed members.

In addition, this paper fills the gap in the literature of comparative legislatures in Greater China. There are varieties of parliamentary representation at the central and local levels in contemporary Greater China, including Taiwan, Hong Kong, Macau, and arguably Singapore, as well as Mainland China. Except for Macau, the legislatures in the other parts of Greater China have been examined relatively well and those who are interested in this topic can find some reference and research articles written in English. This limited empirical investigation is now covered, which means a comprehensive comparative study of political representation in Greater China is feasible.

This paper is at an early stage of development to reveal the nature of policy-making and representation in Macau in a quantitative manner. Two things are particularly noted. First, an empirical analysis of other types of legislative activities is necessary to capture the full picture of politics in the Legislative Assembly of Macau. While roll call voting

analysis is the bread and butter of legislative studies, this is still one of the many activities for an individual legislator to realize what he or she wants to achieve in politics. Second, a comparative study of Hong Kong and Macau is also required to build a systematic knowledge on theory and practice of the geographic and functional constituencies as well as the "One Country, Two Systems". These two directions as well as other potential ways of developing this research program on Macau politics would be promising, but I also believe that this paper by itself has already enhanced the scholarly understanding of parliamentary representation in Macau.

Notes

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1.   It is discussed that Macau's presence as a non-central government for the cross-border activities can be helpful for advocating the shared interests of Macau and Mainland, and eventually provides a rationale of the "One country, two systems" policy (Henders, 2001).

2.   This central-local relation does fall under neither a unitary system nor federation, but a hybrid of the two, like various autonomous models around the world (Benedikter, 2009).

3.   Unlike the Western counterparts of separation of powers systems, it is emphasized that Macau takes an executive-led political system, or politico-administrative state, that assigns extensive powers to the Chief Executive at the core of the government without sufficient checks and balances from other institutions (Lo, 2009; Yee, 2005).

4.   According to Annex I, Method for the Selection of the Chief Executive of the Macau Special Administrative Region, the Election Committee is composed of representatives of the industrial, commercial and financial sectors (100 members), cultural and educational sectors and other professions (80 members), labor, social services, religious and other sectors (80 members), and governmental bureau, including the Legislative Assembly, several municipal organs, Macau deputies to the National People's Congress, and Macau representatives of the Chinese People's Political Consultative Conference (40 members).

5.   The former two, i.e. bill introduction and parliamentary question, are specified in the Basic Law, while the right of roll call voting in the floor is not. Instead, the Standing Orders (立法會議事規則 in Chinese, *Regimento da Assembleia Legislativa* in Portuguese) describes its process.

6.   The Chief Executive may return a bill to the Legislative Assembly in the first time. If the original bill is passed again in the second time, the Chief Executive should decide either to sign the bill or to dissolve the legislature (Article 51, Chapter 3, Section IV).

7.   Specifically, it uses the modified D'Hondt method: $V/2^{(k-1)}$, where V is the total number of votes that each list earns and k is the rank of the list.

8.   In the district election for the 6th term, 25 groups ran for 14 seats (one withdrew). After two weeks of official campaign periods, the election was held on September 17, 2017.

9. For each election, see Yee (1997) for the 1st term election, Yee (2005) for the 2nd term election, Yu (2007) for the 3rd term election, Chong (2016) and Yu (2011) for the 4th term election, and Lo and Chong (2016) for the 5th term election.

10. Until the 4th term, there were the four electoral colleges. It became five since the 5th term, as the Welfare, Culture, Education, and Sports constituency was split into two.

11. For the professional constituency in the 6th term, there was a competition, as two different lists were submitted for the election held on September 17th, 2017. The Macau Union of Medical Professional Interests won one seat, while the incumbent list of the Macau Union of Professional Interests got two seats.

12. In the legislative election for the 5th term, the following four list groups gained two seats: the Macau-Guangdong Union, the Union for Promoting Progress, the New Macau Association, and New Hope Macau.

13. Outside the legislature, specifically in terms of party organization (Key, 1964), some political groups in Macau, e.g. the United Citizens Association of Macao (澳門民聯協進會), have evolved to operate effectively in the electoral and governing processes with its activists and resources (Lo and Chong, 2016).

14. In the previous terms, roll call voting results could be seen directly if anyone visited the legislature when the decisions were made. News media occasionally reported some of the results with individual voting records, or an individual legislator sometimes explained their position of the bill to their constituents on his or her website, social media or printed leaflet. However, if one aims to take a comprehensive roll call voting records without any selective bias, the 5th term is the only available case in the history of Macau since the handover.

15. On these 6 bills, the Speaker did not participate in voting, but all the other legislators seated and showed their preference on these agenda.

16. The other two popular centrality scores, including degree centrality and betweenness, are excluded, as the two do not have a sufficient amount of variance among the legislators to report.

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