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掮客與經濟涉入的政治

Brokers and The Politics of Economic Engagement

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掮客與經濟涉入的政治

Brokers and The Politics of Economic Engagement

本論文係吳松儒君 (R04323059) 在國立臺灣大學經濟學系完成之碩士學位論文，於民國 107 年 6 月 13 日承下列考試委員審查通過及口試及格，特此證明

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馮勃翰

謝辭

每次有人問：「你是政治系還是經濟系的學生？」，我都會陷入一陣遲疑。從政治系大學部至經濟系碩士班，我的求學歷程和這兩個科系的關係實在難捨難分，對政治經濟學和形式理論的熱情促使我在進入經研所後創立讀書會研讀相關文獻，並請政治系和經濟系的兩位老師共同指導碩士論文；心態上，政治系是我追求學問和發想研究問題的起點，而經濟系則是我接受嚴謹研究方法訓練的道場。雖然直到現在我還是不確定如何回答自己來自何處又要去往何方這種問題，但跌跌撞撞摸索至今著實也累積了一些心得，就權以這篇論文作為個人的一份答卷吧。

能完成這份論文，最要感謝的肯定是兩位指導老師：政治系童涵浦老師是我在學術研究上的啟蒙者，從大學時的工作坊引領我進入政治經濟學的世界一窺堂奧，乃至後來合作研究與申請博士班，老師的視野與洞見都使我獲益良多，更成為我努力仿效的典範。經濟系馮勃翰老師在模型發展與寫作架構上給我極大幫助，當思考或寫作陷入瓶頸時，跟老師的一席討論總能令我茅塞頓開，問題迎刃而解；跟老師請益的過程也使我對博班訓練與研究發表有更多認識。此外，謝謝兩位經濟系的口試委員林明仁老師和江淳芳老師對文章提出了犀利的建議，有些細部問題可以立即改正，有些大方向則點出了我訓練上的不足之處，尤其旁徵博引與說故事的能力，亟待未來在博士班繼續加強。

本篇論文源自 2017 年八月童老師發起的研究工作坊，過程中來自芝加哥大學的 Steven（任德加）對於研究的想法貢獻良多，而後我們也一同將初步的結果投稿至 MPSA 的 Poster Session，2018 年四月初於芝加哥發表，在此我深表謝意。口試前，冠銘和伯軒分別遠自芝加哥和洛杉磯跨海聽我練習，預先將潛在問題悉數點出；口試時，棋瑩擔任助手幫忙張羅大小雜事，以及親友團們到場加油打氣，我也十分感激。另外，本篇論文排版使用張耕齊同學改良的 LaTeX

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台大社會科學論文模版，於此一併致謝。

除上述諸位老師同學，在我的求學路上，還幸運遇見了其他許多良師益友：大五時擔任政治系李鳳玉老師的研究助理近一年，此後儘管投入經濟系的學術社群，老師依舊待我如家人一般，受關心照顧點滴在心，感激之情非三言兩語可道盡；政治系林俊宏老師雖不曾在課堂上教授過我，卻在我的生涯規畫陷入困境時指點迷津，對往後的路途起了決定性的影響；經濟系系主任林明仁老師作為我大一經濟學原理和研究所兩學期勞動經濟學的授課老師，在申請經研所以及美國博士班時都於百忙中幫忙撰寫推薦信，對我當下知識的學習和往後生涯的推進都給予極大助益。建中 324 班同學們（特別是冠銘和興舜，好吧還有楷翔......）互相扶持的十年情誼是我往前邁進的重要動力；政治系摯友齊聖、奕安、昀潔、俊緯、范姜等人，原聲結識的夥伴家萱、旻汎、乃文、吳璠等人，你們讓我的大學歲月過得無比精彩，緊要關頭更感恩有你們相伴相挺。經研所大家庭的成員孟章、伯軒、韋銘、碩傑、筱筑、詩媛、祖恩等人，654 研究室室友棋瑩、宗達、樂思、呂越、羿妏、冀之，以及政經讀書會的夥伴紹鈺、淳儀、安樸等人，沒有你們的參與，經研所的兩年半歲月不會成為我人生至今最美好的一段學習時光。

最後，感謝我家人全心全力的支持，使我能無後顧之憂地踏上學術之路。經歷過生離死別，使我明白要更感恩所得所獲、更勇敢走自己的路、更珍惜愛我和我所愛的人。謝謝爹地為這個家盡心盡力地付出你的一切，謝謝媽咪對我們無微不至的照顧，謝謝虹萱對我出國讀書的體諒和支持。那些美好的、痛苦的過去都已釀成回憶銘記於心，當晨曦劃破漆黑的大地，我會拾起行囊，以無畏的心情繼續這段未知的旅途。

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摘要

本文提出一個賽局理論模型以解釋經濟涉入的策略；經濟涉入係指一國有意識地藉由擴張與另一國間的經貿合作來改變後者行為並改善雙邊政治關係。本文主要探討那些要素影響經濟涉入之表現，及這些因素之影響途徑。過往的相關文獻多聚焦於質化理論和實證分析，而形式理論則付之闕如。本文所提出之模型係針對一特定情境，亦即一國之委託人透過政治掮客輸送經濟資源予另一國公民，藉此獲得公民之政治支持。本文在 Stokes 等人 (2013) 提出的侍從主義模型之基礎上修改提出一基準模型，用以解釋上述以掮客為中介之經濟涉入策略，並探討兩個延伸方向：所得不平等的影響和內生的掮客。

關鍵詞：經濟涉入、掮客、不平等。

JEL 分類代號：C72、D63、D72。

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Abstract

We propose a game-theoretic model to account for economic engagement strategies, in which a country deliberately expands the economic cooperation with another country so as to change the latter's behavior and to improve bilateral political relations. The main questions we seek to answer are what and how different factors influence the performance of economic engagement. Related literature on economic engagement focuses mainly on qualitative theories and empirical analysis, but a formal theory has yet to be developed. Our model deals with a specific scenario where a principal from a country distributes economic resources to citizens in another country through a "political broker", in an attempt to gain political support from the citizens. With a modification of the clientelism model from Stokes et al. (2013), we develop a baseline model for this type of broker-mediated economic engagement and provide two extensions: the effect of income inequality and endogenous brokers.

Keywords: Economic engagement, Brokers, Inequality.

JEL Classification: C72, D63, D72.

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Chapter 1

Introduction

We propose a game-theoretic model to account for economic engagement strategies, in which a country deliberately expands the economic cooperation with another country so as to change the latter's behavior and to improve bilateral political relations (Kahler and Kastner, 2006). The main questions we seek to answer are what and how different factors influence the performance of economic engagement. Although there could be many different types of economic engagement, our model deals with a specific scenario where a principal from a country (which we call in our model "the foreign country") distributes economic resources to citizens in another country (which we call "the domestic country") through a "political broker", in an attempt to gain political support from the citizens (the concept is demonstrated in Figure 1.). With a modification of the clientelism model from Stokes et al. (2013), we develop a baseline model for this type of broker-mediated economic engagement, and provide two extensions in the following chapters.

Related literature on economic engagement focuses mainly on historical and empirical analysis: Kastner (2006) focuses on the economic integration across the Taiwan Strait and whether it could reduce the likelihood of military confrontation; Davis (2009) raises evidence to show the importance of economic side payments on the stability of the Anglo-Japanese alliance during 1900-1920; Paulson Jr (2008) asserts that the strategic economic engagement adopted by George W. Bush toward China has been beneficial for the prosperity of both countries.

A rare case for theoretical effort would be Kahler and Kastner (2006), who provides a classification for the economic engagement strategies: conditional engagement, unconditional engagement utilizing constraining effects of interdependence, and unconditional engagement utilizing transformative effects of interdependence. The authors claim that China's economic engagement of Taiwan belonged to the third category and showed early signs of success, lending support to two of their hypotheses: this type of economic engagement is more likely to succeed if 1) the target country is

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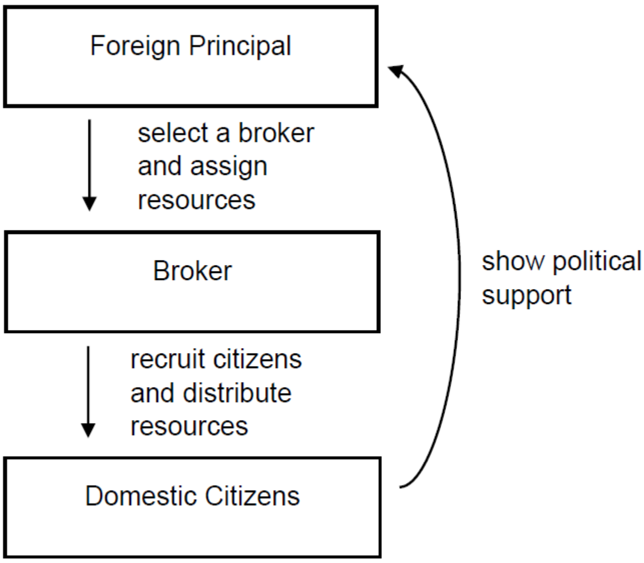

Figure 1: The concept of broker-mediated economic engagement

a democracy and 2) a broad consensus backing this economic engagement exists in the initiating country. However, the 2016 election cycle saw the Democratic Progressive Party (DPP) gain control of both the presidency and the legislature, an unprecedented development signaling a big blow to Beijing's economic engagement policies. This reminds us of the crucial need for a formal theory to explain the possible mechanisms that determine the success or failure of economic engagement.

It is worth noting that from the case of Beijing's economic engagement toward Taiwan, Beijing actually could not directly influence policy in Taiwan; instead, they relied on the Kuomintang (KMT) to enact legislation favoring closer relations with China. Hence, Beijing's economic engagement of Taiwan can also be thought of as broker-mediated and may be reconceived as a principal-agent problem. Stokes et al. (2013) models an electoral principal-agent scenario in which brokers distribute resources to voters in order to win their votes for a machine party. They identify that an information asymmetry problem leads brokers to target ideologically loyal voters rather than ideologically median or distant voters, which would do harm to the party's probability of winning elections. Additionally, Brollo et al. (2013) identifies that an exogenous resource windfall may lead to a decline in the quality of political candidates, because high type candidates also have higher reputation costs from entering politics. In this paper, we will try to incorporate these mechanisms along with an inequality mechanism to construct a model of broker-mediated economic engagement.

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Chapter 2

Baseline Model

2.1 Setup

The baseline model is hinged on the clientelism model of Stokes et al. (2013) with modifications to fit in the context of economic engagement. In the following, we will first introduce the players, their respective objectives and decision rules, and then the timing of the game.

First, there is a principal from a foreign country. The only objective of the foreign principal is to gain "enough popularity" for her country from citizens in another country (which is called the domestic country in our model). To make it clear, "enough popularity" in our model means that the foreign principal sets a threshold value for the supporting rate of her country from the domestic citizens, and the explicit objective is to maximize the probability of exceeding the threshold, denoted by P_F. In our model there is a stage to evaluate the popularity of the foreign country, which we call an "implicit election". In Stokes' model, there is a real election, so the popularity of the foreign principal is naturally evaluated by the electoral result. However, in our scenario, there is no election to directly evaluate the foreign country's popularity among the domestic citizens, so what we mean by an "implicit election" is more like a survey question for the citizens, asking what their impressions are toward the foreign country. Based on the threshold previously set up and the survey result, the principal can therefore make a judgment about whether she has successfully obtained "enough popularity". To achieve this objective, the principal chooses a broker (the exact decision rule is explained later) and assigns an amount of resources Ω for the broker to distribute to the domestic citizens.

Next, there are a total of n brokers seeking the opportunity to work for the foreign principal. What the brokers do is to recruit domestic citizens into their networks by promising them certain amount of resources (which could vary for each citizen). The brokers differ by their effectiveness

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in distributing resources, denoted by η_k for broker k. The same as Stokes' setup, here we assume that brokers are ordered according to their effectiveness, so $\eta_n > \eta_{n-1} > ... > \eta_1$. The broker who is hired by the principal will distribute resources to domestic citizens in his network as promised if the principal successfully achieve her objective, and extract the remaining resources as his own rents. The objective of the selected broker is to maximize the expected rents:

$$EU^k(r) = P_F(r) \times (r + R) \tag{2.1}$$

where r denotes the rent extracted from Ω, and R denotes the exogenous rents from the principal[1]. From the equation it's easy to see that every broker has an incentive to recruit citizens as long as the principal has a positive probability to achieve her goal. The budget constraint for the selected broker is clearly the amount of resources distributed plus the rents he extracted; that is:

$$\Omega = \sum_j \bar{b}^j + r \tag{2.2}$$

where $\bar{b}^j$ is the average resources for citizens of income group j (introduced shortly).

Lastly, there are citizens in the domestic country, composed of three different income groups: the poor (p) and the rich (r). Citizens within each income group j have identical income y^j (intuitively $y^p < y^r$), with respective population share α^j. Following Stokes, the total population size is normalized to 1, and therefore the total income Y is equal to the average income $\bar{y} := \sum_j \alpha^j y^j$. Besides, the citizens also differ by their political ideologies; the ideology of citizen i from income group $j \in \{p, r\}$ is denoted by σ^{ij}, which follows an uniform distribution on $[\frac{-1}{2\phi^j}, \frac{1}{2\phi^j}]$. We further assume that $\phi^p > \phi^r$, which reflects the feature that poorer people are ideologically more concentrated. As mentioned before, citizens may face multiple offers from the brokers, and citizen i from income group $j \in \{p, r\}$ would agree to join the network of broker k if the following inequality is satisfied:

$$\kappa H(y^j + \eta_k b^{ij}) - c \geq \kappa H(y^j) + \sigma^{ij} \tag{2.3}$$

The left-hand side of the inequality shows the utility gained from joining broker k's network, where κ denotes how much voters value material wealth, $H(\cdot)$ is the material utility function[2], b^{ij} is the amount of promised resources from broker k, and c is the costs from joining the network. Note that η_k is multiplied with b^{ij}, which demonstrates that a more competent broker can distribute the same amount of resources more efficiently. The right-hand side is the utility from rejecting the offer,

[1] R can be interpreted as rewards promised by the principal if her objective is achieved.

[2] We assume that $H(\cdot)$ is differentiable and strictly concave.

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where the citizen's ideology σ_{ij} appears as well, so a higher value of ideology from a domestic citizen means that he or she is ideologically more distant from the foreign country.

In the stage of the "implicit election", every citizen is asked whether he or she supports the foreign country[3]. Similarly, citizen i from income group j who is organized by broker k will choose to support the foreign country if the following inequality is satisfied:

$$\kappa H(y^j + \eta_k b^{ij}) - c \geq \kappa H(y^j) + \sigma^{ij} + \delta \tag{2.4}$$

where δ denotes the exogenous popularity shock, which follows an uniform distribution on $[\frac{-1}{2\psi}, \frac{1}{2\psi}]$. Those citizens who don't belong to the selected broker's network are assumed to choose sincerely; that is, they will choose the foreign country if the following inequality is satisfied:

$$0 \geq \sigma^{ij} + \delta \tag{2.5}$$

One last assumption of this model is about information: it is assumed that the foreign principal could not directly observe the effectiveness of brokers and the types of domestic citizens they recruit; what she could only see is the size of brokers' networks. On the contrary, the brokers are assumed to know their own competence and each citizen's income and ideology; the citizens are assumed to know each broker's competence as well. This crucial assumption reflects the feature of information asymmetry between the principal and brokers, which is very common in a typical principal-agent setting.

To sum up, here is the timing of the game (also shown in Figure 2.):

1. Brokers organize domestic citizens into their networks; citizens decide whether to join the network based on Equation (2.3).

2. The foreign principal observes the size of networks and hires one broker.

3. The "implicit election" is held. The citizens who are in the selected broker's network decide whether to support the foreign country according to Equation (2.4) and the others decide according to Equation (2.5). If the principal achieves her objective, the selected broker will distribute resources to the citizens in his network as promised, and extract the remaining resources as his own rents.

[3] The actual wording of the question could be different, however.

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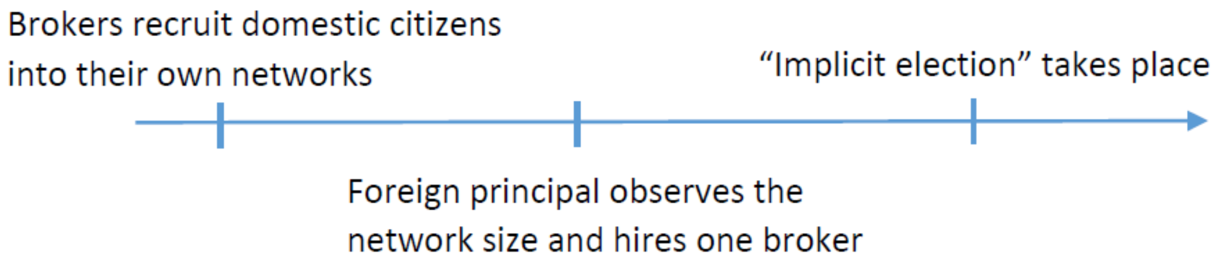

Figure 2: The timing of the baseline model

2.2 Analysis

We solve the game by backward induction. In the stage of the "implicit election", each citizen is going to decide whether to support the foreign country. The "swing voter" in income group j is defined to be the one with the largest value of ideology $\sigma^{ij} = \sigma^{j*}$ such that:

$$\sigma^{j*} = \kappa[H(y^j + \eta_k b^{j*}) - H(y^j)] - c - \delta \tag{2.6}$$

where b^{j*} represents his or her promised resources from the selected broker. An important claim is as follows:

Claim 1. *Any citizen in group j with ideology $\sigma^{ij} \leq \sigma^{j*}$ would choose to support the foreign country.*

Based on the claim, we can calculate the support rate for the foreign country from income group j (remember that σ^{j*} follows an uniform distribution on $[\frac{-1}{2\phi^j}, \frac{1}{2\phi^j}]$):

$$F_j(\sigma^{j*}) = \int_{\frac{-1}{2\phi^j}}^{\sigma^{j*}} \phi^j dz = \frac{1}{2} + \phi^j[\kappa(H(y^j + \eta_k b^{j*}) - H(y^j)) - c - \delta] \tag{2.7}$$

Therefore, the overall support rate for the foreign principal is:

$$\begin{aligned}\pi_F =& \sum_j \alpha^j \left\{\frac{1}{2} + \phi^j[\kappa(H(y^j + \eta_k b^{j*}) - H(y^j)) - c - \delta]\right\} \\ =& \frac{1}{2} + \sum_j \alpha^j \phi^j \left[\kappa(H(y^j + \eta_k b^{j*}) - H(y^j)) - c - \delta\right]\end{aligned} \tag{2.8}$$

Suppose the foreign principal sets the threshold value to be x^*[4], then the probability to achieve the threshold would be (remember that δ follows an uniform distribution on $[\frac{-1}{2\psi}, \frac{1}{2\psi}]$):

[4]In Stokes' original model, since there is a real election taking place, naturally the threshold would be $\frac{1}{2}$; in our model, the principal's ideal threshold is case-dependent, so here we assume that she can set x^* by herself. However, the value of x^* shouldn't be too large; otherwise the inequality $\pi_F \geq x^*$ would be impossible to reach.

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$$
\begin{aligned}
P_F &= Pr(\pi_F \geq x^*) \\
&= Pr(\frac{1}{2} + \sum_j \alpha^j \phi^j \left[\kappa(H(y^j + \eta_k b^{j*}) - H(y^j)) - c - \delta\right] \geq x^*) \\
&= Pr(\frac{\frac{1}{2} - x^* + \kappa \sum_j \alpha^j \phi^j \left[(H(y^j + \eta_k b^{j*}) - H(y^j))\right]}{\phi} - c \geq \delta) \\
&= \int_{\frac{-1}{2\psi}}^{\frac{\frac{1}{2} - x^* + \kappa \sum_j \alpha^j \phi^j \left[(H(y^j + \eta_k b^{j*}) - H(y^j))\right]}{\phi} - c} \psi dz \\
&= \frac{1+\psi}{2} - \psi x^* + \psi \left[\frac{\kappa}{\phi} \sum_j \alpha^j \phi^j (H(y^j + \eta_k b^{j*}) - H(y^j)) - c\right] \qquad (2.9)
\end{aligned}
$$

where $\phi = \sum_j \alpha^j \phi^j$. Maximizing the expected utility of rents from Equation (2.1), we can obtain the optimal rents for the selected broker conditional on being hired by the foreign principal.

Theorem 1. *Conditional on being hired by the foreign principal, the optimal rents for the selected broker is:*

$$
r^* = \frac{P_F \phi}{\psi \eta_k \kappa \sum_j \alpha^j \phi^j H'(y^j + \eta_k b^{j*})} - R.
$$

Clearly, from Theorem 1. we can derive some implications. First, as the probability for reaching the threshold is higher, the selected broker is going to extract more rents; this reflects the feature that if it's easier for the foreign principal to achieve her objective, the broker would rather save more resources for himself than distribute them to the citizens. Second, the higher the marginal utility from material benefits ($H'(\cdot)$) and the extent to which they emphasize material benefits (κ) are, the less rents the broker would extract; this echoes the feature that the citizens' responsiveness to material payoff is crucial to the broker's decision for rent extraction.

In equilibrium, we first look at which broker the principal is going to hire. From Equation (2.3), it's clear that a broker with higher effectiveness in distributing resources can organize the same size of network as other brokers with less resources. Since the citizens can observe brokers' competence, they will choose to join the network of the broker with the highest effectiveness (that is, broker n with effectiveness η_n) under the condition that Equation (2.3) is satisfied. Therefore in equilibrium broker n will be the one with the largest network, and the principal will hire him accordingly. Although the principal could only see the network size of the brokers, in equilibrium she can successfully hire the most competent broker.

What kind of citizens will the selected broker recruit? Since the principal could only observe the size but not the composition of the network, it's always beneficial for the selected broker to start

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with the domestic citizens that are "cheapest" to recruit. Since we assume that in Equation (2.3) citizens have a concave material utility function, the optimal recruiting process for the selected broker would be to start with the ideologically nearest citizens in the poor income group, and then at certain point turn to the ideologically nearest citizens in the rich income group.

Our baseline model shows what factors could influence the performance of broker-mediated economic engagement. Due to information asymmetry, the selected broker would target poorer and ideologically more loyal citizens for recruitment. Since the foreign principal's objective is to maximize P_F, it's better (from her perspective) to target ideologically median or even distant citizens. Therefore, although hiring a broker does help the foreign principal to attract more domestic citizens, the problem of information asymmetry creates some room for the selected broker to recruit "cheaper" citizens and thus leads to efficiency loss for the principal. In the following chapter, we will further dig into two aspects of broker-mediated economic engagement: the effect of income inequality and endogenous brokers.

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Chapter 3

Extensions

3.1 The Effect of Income Inequality

How would the extent of income inequality influence the performance of broker-mediated economic engagement? To begin with our analysis, we first need to construct a measure of income inequality. Like the baseline model, we assume that there are only two income groups in the society: rich and poor, with their income denoted by y^r and y^p respectively. Also, the proportion of rich people is denoted by $\alpha^r = n$ (hence $\alpha^p = 1 - n$). The total population is normalized to 1 as in the previous Chapter, so the average and total income is the same and denoted as Y: $Y = ny^r + (1-n)y^p$. Following Acemoglu et al. (2010), we construct a parameter θ measuring the proportional income of the two income groups:

$$y^r = \frac{\theta}{n}Y \tag{3.1}$$

$$y^p = \frac{1-\theta}{1-n}Y \tag{3.2}$$

where $\theta \in [n, 1]$, so a larger θ reflects rich people with higher income and poor people with less.

From Equation (3.1) and (3.2) we can draw the Lorenz curve in our model in Figure 3. Based on the Lorenz curve, we introduce a measure similar to the Gini coefficient:

$$G(\theta, n) = \frac{A}{A+B} = \frac{\frac{1}{2} - \frac{(1-\theta)(1-n)}{2} - \frac{n\theta}{2} - n(1-\theta)}{\frac{1}{2}} = \theta - n \tag{3.3}$$

where $\theta \in [n, 1], n \in [0, 1]$, and $G(\theta, n) \in [0, 1]$. As we can clearly see, a larger $G(\theta, n)$ represents a worse income distribution. With some derivations we can obtain the following two propositions.

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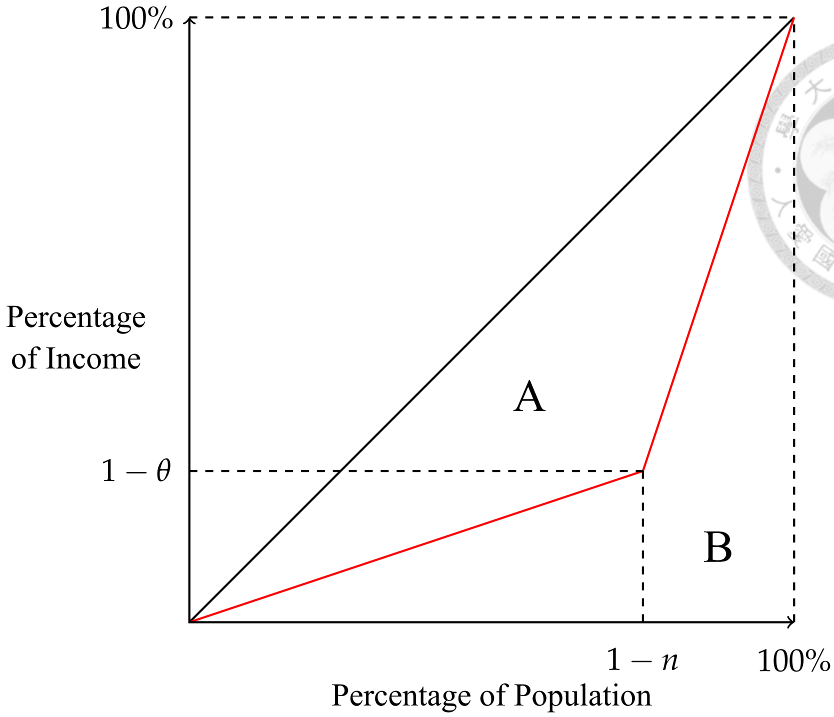

Figure 3: The Lorenz curve (red line) in our model.

Proposition 1. $\frac{\partial P_F}{\partial \theta} > 0$. *That is, given n, a higher income disparity between the rich and poor would be beneficial to the principal.*

Proposition 2. *The effect of n on P_F differs by the scale of n (given θ):*

1. *When n is small:* $\frac{\partial P_F}{\partial n} > 0$.

2. *When n is large:* $\frac{\partial P_F}{\partial n} < 0$.

From 1. and 2.: There exists n^* s.t. P_F can be maximized.

The illustration of Proposition 2. is in Figure 4.: given θ, worsening income distribution (when n gets smaller and $G(\theta, n)$ gets larger) would be detrimental to the principal when $n = \underline{n}$ (a case when the society is already very unequal), but beneficial to her when $n = \overline{n}$ (a case when the society is more equal).

The intuition for Proposition 1. is as follows: when we fix the number of people from poor and rich groups, a higher income disparity would make poor people more responsive to material benefits (because $H(\cdot)$ is strictly concave), which in turn increases the performance of economic engagement. Regarding Proposition 2., increasing n actually creates a tradeoff between group size and average income: less poor people (who are more responsive to economic resources) are bad for the principal, while poor people with higher average income are good for her. As Proposition

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2. stated, the group size effect is higher when n is large, and the income effect is higher when n is small.

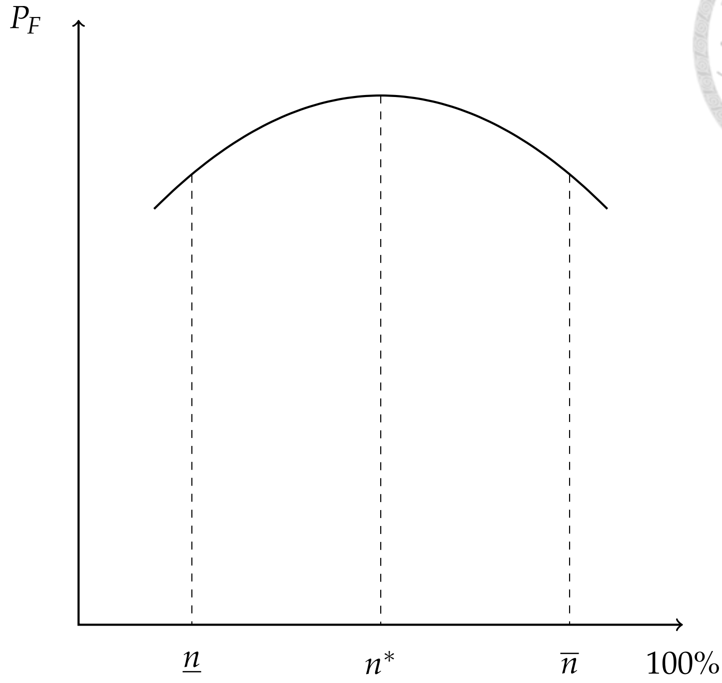

Figure 4: An illustration of Proposition 2.

3.2 Endogenous Brokers

In the baseline model, we assume that the number of potential brokers is exogenously given, but what will happen if they can choose endogenously whether to become a broker and compete for the principal's selection? We follow the endogenous political candidate model from Brollo et al. (2013) to incorporate this possibility, and the timing of the model becomes as follows:

1. Individuals decide whether to become brokers.
2. Brokers' competence η is revealed (but not to the principal) and they start to organize their networks.
3. The foreign principal hires the broker with the largest networks.
4. The "implicit election" is held. If the foreign principal successfully achieves her objective, the broker will distribute resources to the citizens in his network as promised in step 2. and extract the remaining resources as rents for himself.

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We assume that the overall population (who have the potential to become brokers) is 2N. There are two groups of people, high quality (H) and low quality (L); each has population N. Within group, they have different competences to distribute resources and opportunity costs to become brokers. The i_{th} individual in group $J \in \{L, H\}$ has effectiveness η_i^J, following an uniform distribution with density ξ and mean $1 + \mu^J$, where $\mu^H = \mu = -\mu^L$; his opportunity costs to become a broker is ik; thus high quality individuals on average have higher competence to distribute resources. Besides, once a broker from group $J \in \{L, H\}$ gets selected and starts distributing resources for his principal, his behavior has a probability of $q(r + R)$ getting caught by the domestic government, and he will suffer an utility loss of λ^J, where we assume that $\lambda^H > \lambda^L$. This assumption reflects the feature that when the rent-seeking behavior is caught, a high type broker suffers larger reputation costs than a low type broker.

Based on the setup above, the decision rule for the i_{th} individual in group $J \in \{L, R\}$ to become a broker is to satisfy the following inequality:

$$ik \leq P^J \left[(P_F^J - q\lambda^J)(r + R) \right] \tag{3.4}$$

where P^J is the probability for an individual in group J to be selected by the foreign principal; P_F^J is the probability of achieving the objective if the principal hires a broker from group J.

Since the foreign principal will hire the broker with the largest network size, and the domestic citizens will correctly anticipate this in the equilibrium, it's equivalent to saying that the principal will hire the broker with the highest competence in the equilibrium. Thus we can derive P^J using order statistics and derive the equilibrium number of brokers in each group (the detail is in Appendix A.4).

Our objective is to find the relationship between the total resources assigned to the selected broker and the overall quality of brokers. We define the overall quality of brokers as the percentage of low type brokers in the pool of brokers:

$$\Pi = \frac{n^L}{n^H + n^L} \tag{3.5}$$

where n^J is the number of people who decide to become brokers in group J. It turns out that we can find a pair of values λ^H and λ^L such that the percentage of low type brokers positively correlates with the amount of total resources Ω.

Proposition 3. $\exists\ \lambda^H$ & λ^L *s.t.* $\frac{\partial \Pi}{\partial \Omega} > 0$. *That is, an exogenous resource windfall can reduce the proportion of high type brokers, and thus do harm to the foreign principal.*

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This result echoes the idea of “political resource curse”, where an exogenous resource windfall could attract more low type people to run for office (since they have lower reputation costs of joining politics), and thus increase the possibility for rent-seeking behavior.

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Chapter 4

Conclusion

Our baseline model and its extensions introduce three mechanisms that would influence the performance of broker-mediated economic engagement: information asymmetry, income inequality and endogenous brokers. First, the information asymmetry problem between the foreign principal and the selected broker creates room for the broker to target ideologically loyal and poor domestic citizens, which would be beneficial for the broker but detrimental to the principal's winning probability in the "implicit election". Regarding income inequality, we introduce a measure similar to the Gini coefficient, and find that a higher income disparity between the rich and poor (higher θ) is beneficial to the principal; on the other hand, more poor people (smaller n) would be bad for the principal when the society is already very unequal and good for the principal when the situation is more moderate. Lastly, when people can decide by themselves whether to become brokers, it's shown that the "political resource curse" would also apply to the situation of broker-mediated economic engagement, which means that the overall quality of the pool of brokers would get worse as the selected broker obtain more resources from the principal.

For future research, in the empirical part it would be interesting to know whether our theoretical predictions make sense in the real-world data. Though it's really difficult to test those predictions given the limited source and types of data (most are surveys), we do observe more and more potential cases emerging. For example, a recent analysis from the Brookings Institution (2018) finds that the status of Israel among Arab regimes has changed from existential foe to unlikely ally, and suggests that this change in attitudes is due to efforts on Israel's part that can be characterized as economic engagement. Since 2008, Israel has developed working security and economic ties with its former Arab rivals. Israel has assisted the security endeavors of Arab states through surveillance technology and intelligence sharing and bolstered their economies through energy exports and tech sector collaboration.

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Theoretically, there are still plenty directions worth exploring. First, our analysis of income inequality could be further extended to the analysis of redistribution; it would be intriguing to know how redistribution in the domestic country would affect the performance of economic engagement from the foreign country. Another direction is about ideologies and beliefs: what will happen to the performance of economic engagement if worsening income inequality results in political polarization among the domestic citizens? Theoretical framework from Benabou and Tirole (2006) on the emergence and persistence of collective beliefs could provide some helpful guidance. Besides, social identities and nationalism might also play an important role in economic engagement. An interesting paper from Shayo (2009) provides both theoretical and empirical analyses on class and national identities and how personal identification of those identities would affect people's preferences for redistribution. If we think of economic engagement as one kind of income redistribution, then a change in self-identification of social identities could also affect the performance of economic engagement, as probably in the case of Beijing's economic engagement on Taiwan and Hong Kong.

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Appendix A

Proofs

A.1 Proof of Claim 1.

Proof. For citizens in the network and ideology smaller than σ^{j*}, if there is a citizen k who doesn't support the foreign country, the broker n could increase his or her promised resources by moving some resources from the citizen with ideology σ^{j*} so that Equation (2.4) is satisfied for citizen k. It's feasible since citizens with ideology $\leq \sigma^{j*}$ are cheaper to buy. For citizens outside the network and ideology smaller than σ^{j*}, they will support the foreign country if Equation (2.5) is satisfied, which would surely hold if their ideology is less than σ^{j*}. □

A.2 Proof of Theorem 1.

Proof. The selected broker's maximization problem is:

$$\max_{\{r,b\}} EU^k(r) = P_F(r,b) \times (r+R) \quad \text{subject to} \quad \Omega = \sum_j \bar{b}^j + r$$

By Equation (2.9), the first order condition with respect to r is:

$$\frac{-\psi\eta_k\kappa}{\phi}\Big[\sum_j \alpha_j\phi_j H'(y^j + \eta_k b^{j*})\Big](r^* + R) + P_F = 0$$

Therefore the equilibrium rent is:

$$r^* = \frac{P_F\phi}{\psi\eta_k\kappa \sum_j \alpha^j\phi^j H'(y^j + \eta_k b^{j*})} - R.$$

□

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A.3 Proof of Proposition 1.

Proof. From Equation (2.9) in Chapter 2, we know that the probability for the foreign principal to achieve her threshold x^* when there are two domestic income groups is:

$$\begin{aligned} P_F = & \frac{1+\psi}{2} - \psi x^* + \\ & \psi \left\{ \frac{\kappa}{\phi} \Big[(1-n)\phi^p (H(y^p + \eta_n b^{p*}) - H(y^p)) \right. \\ & \left. + n\, \phi^r (H(y^r + \eta_n b^{r*}) - H(y^r)) \Big] - c \right\} \end{aligned} \tag{A.1}$$

Note that y^p and y^r are both function of θ from Equation (3.1) and (3.2); therefore:

$$\begin{aligned} \frac{\partial P_F}{\partial \theta} = & \frac{\psi\kappa}{\phi} \left[(1-n)(\frac{-Y}{1-n})\phi^p (H'(y^p + \eta_n b^{p*}) - H'(y^p)) \right. \\ & \left. + n(\frac{Y}{n})\phi^r (H'(y^r + \eta_n b^{r*}) - H'(y^r)) \right] \end{aligned} \tag{A.2}$$

where the first component inside the brackets is positive and the second is negative. Since we have assumed that $\phi^p > \phi^r$ and $H(\cdot)$ is strictly concave, hence $\frac{\partial P_F}{\partial \theta} > 0$. □

A.4 Proof of Proposition 2.

Proof. From Equation (3.1), (3.2) and (A.1), we can calculate:

$$\begin{aligned} \frac{\partial P_F}{\partial n} = & \frac{\psi\kappa}{\phi} \Big\{ -\phi^p [H(y^p + \eta_n b^{p*}) - H(y^p)] \\ & + (1-n)\frac{(1-\theta)Y}{(1-n)^2} \phi^p [H'(y^p + \eta_n b^{p*}) - H'(y^p)] \\ & + \phi^r [H(y^r + \eta_n b^{r*}) - H(y^r)] \\ & + n(\frac{-\theta Y}{n^2})\phi^r [H'(y^r + \eta_n b^{r*}) - H'(y^r)] \Big\} \\ = & \frac{\psi\kappa}{\phi} \Big\{ \phi^r [H(y^r + \eta_n b^{r*}) - H(y^r)] - \phi^p [H(y^p + \eta_n b^{p*}) - H(y^p)] \\ & - (\frac{\theta}{n}) Y \phi^r [H'(y^r + \eta_n b^{r*}) - H'(y^r)] \\ & + (\frac{1-\theta}{1-n}) Y \phi^p [H'(y^p + \eta_n b^{p*}) - H'(y^p)] \Big\} \end{aligned} \tag{A.3}$$

Fix θ, we see that the third component in the brackets, i.e. $-(\frac{\theta}{n})Y[H'(y^r + \eta_n b^{r*}) - H'(y^r)]$, would dominate the other components when n is close to zero, hence making $\frac{\partial P_F}{\partial n} > 0$; on the other hand, when n is close to one, the last component, i.e. $(\frac{1-\theta}{1-n})Y\phi^p[H'(y^p + \eta_n b^{p*}) - H'(y^p)]$, would dominate the others, hence making $\frac{\partial P_F}{\partial n} < 0$. □

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A.5 Proof of Proposition 3.

Proof. We start with deriving P^J using order statistics (remember that η^J follows an uniform distribution with density ξ and mean $1+\mu^J$, where $\mu^H = \mu = -\mu^L > 0$):

$$\begin{aligned}
P^H &= f_{\eta^H_{(n^H)}}(1+\mu^H)\left[Pr(\eta^L < \eta^H)\right] \\
&= \left\{\frac{n^H!}{(n^H-1)!} f_{\eta^H}(1+\mu^H)[F_{\eta^H}(1+\mu^H)]^{(n^H-1)}\right\}\left[\int F_{\eta^L}(x) f_{\eta^H}(x)dx\right] \\
&= \left(\frac{n^H\xi}{2^{n^H-1}}\right)\left[\xi^2(2\mu + \frac{1}{2\xi})\right] \\
&= \frac{n^H\xi^3(2\mu+\frac{1}{2\xi})}{2^{n^H-1}} \qquad \text{(A.4)} \\
P^L &= f_{\eta^L_{(n^L)}}(1+\mu^L)\left[Pr(\eta^H < \eta^L)\right] \\
&= \left\{\frac{n^L!}{(n^L-1)!} f_{\eta^L}(1+\mu^L)[F_{\eta^L}(1+\mu^L)]^{(n^L-1)}\right\}\left[\int F_{\eta^H}(x) f_{\eta^L}(x)dx\right] \\
&= \frac{n^L\xi^3(-2\mu+\frac{1}{2\xi})}{2^{n^L-1}} \qquad \text{(A.5)}
\end{aligned}$$

where n^J is the number of people in group J who are willing to become brokers.

The next task is to solve P_F^J, the probability for the principal to achieve the threshold x^* if she hires a broker from group J. Following the baseline model, citizen i in income group j will be organized by a broker from group J if the following inequality is satisfied:

$$\kappa H(y^j + \eta^J b^{ij}) - c \geq \kappa H(y^j) + \sigma^{ij} \qquad \text{(A.6)}$$

We can define the largest value of σ^{ij} under the condition that Equation (3.9) holds as σ^{j*}. And here we also assume that the broker is the one hired by the principal, whose expected competence is $1+\mu^J$. That is:

$$\sigma^{j*} = \kappa\left[H(y^j + (1+\mu^J)b^{j*}) - H(y^j)\right] - c - \delta \qquad \text{(A.7)}$$

Hence with similar derivations following the baseline model, we can solve for P_F^J:

$$P_F^J = \frac{1+\psi}{2} - \psi x^* + \psi\left\{\frac{\kappa}{\phi}\sum_j \alpha^j\phi^j\left[H(y^j + (1+\mu^J)b^{j*}) - H(y^j)\right] - c\right\} \qquad \text{(A.8)}$$

Since $\mu^H = -\mu^L > 0$, it's easy to see that $P_F^H > P_F^L$. Also, we could derive the marginal effect of

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rents on the probability of winning:

$$\frac{\partial P_F^J}{\partial r} = -\frac{\psi\kappa(1+\mu^J)}{\phi}\left\{\sum_j \alpha^j \phi^j \left[H'(y^j + (1+\mu^J)b^{j*})\right]\right\} < 0 \tag{A.9}$$

It's clear that $|\frac{\partial P_F^H}{\partial r}| > |\frac{\partial P_F^L}{\partial r}|$.

Now we return to the pool of brokers and see how the size and percentage are determined. From Equation (3.6), we know that the equilibrium number of brokers in group J (defined as n^J) must satisfy the following equation (here we ignore the integer constraints):

$$n^J k = P^J\left[(P_F^J - q\lambda^J)(r+R)\right] \tag{A.10}$$

Using Equation (A.4), (A.5) and (A.10), we can solve for n^H and n^L:

$$n^H = \frac{2\ln\xi + \ln(2\mu + \frac{1}{2\xi}) + \ln(P_F^H - q\lambda^H) + \ln(r+R) - \ln k - \ln 2}{\ln 2} \tag{A.11}$$

$$n^L = \frac{2\ln\xi + \ln(-2\mu + \frac{1}{2\xi}) + \ln(P_F^L - q\lambda^L) + \ln(r+R) - \ln k - \ln 2}{\ln 2} \tag{A.12}$$

Thus the share of low type brokers in the overall pool of brokers is:

$$\Pi = \frac{n^L}{n^H + n^L} = \frac{1}{1+\chi} \tag{A.13}$$

where $\chi = \frac{n^H}{n^L} = \frac{2\ln\xi + \ln(2\mu+\frac{1}{2\xi}) + \ln(P_F^H - q\lambda^H) + \ln(r+R) - \ln k - \ln 2}{2\ln\xi + \ln(-2\mu+\frac{1}{2\xi}) + \ln(P_F^L - q\lambda^L) + \ln(r+R) - \ln k - \ln 2}$. Since λ^H and λ^L are exogenously given and $\lambda^H > \lambda^L$, we can find a pair of values such that $P_F^H - q\lambda^H \approx P_F^L - q\lambda^L$. Hence by $|\frac{\partial P_F^H}{\partial r}| > |\frac{\partial P_F^L}{\partial r}|$, we can obtain the following result:

$$\frac{\partial \chi}{\partial r} = \frac{(\frac{\partial P_F^H/\partial r}{P_F^H - q\lambda^H} + \frac{1}{r+R})n^L - (\frac{\partial P_F^L/\partial r}{P_L^H - q\lambda^L} + \frac{1}{r+R})n^H}{(n^L)^2} < 0 \tag{A.14}$$

From Equation (A.13) and (A.14), it's clear that $\frac{\partial \Pi}{\partial r} > 0$. By the resource constraint: $\Omega = \sum_j \bar{b}^j + r$, we can finally come to the conclusion that $\frac{\partial \Pi}{\partial \Omega} > 0$. □

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