Democracy, Globalization and Ownership: A General Equilibrium Model with Vertical Preferences

Extended Abstract

H. Ghazzai∗a and R. Lahmandi-Ayed†b

aMediterranean School of Business and Unité MASE-ESSAI, University of Carthage
bESSAI and Unité MASE-ESSAI, University of Carthage

February 28, 2019

Abstract

We consider a general equilibrium model with vertical preferences for one good and two identical countries each having initially one firm. Citizens in each country are asked to vote either for openness or for autarky. Openness means that a foreign firm can sell and produce its product in the domestic country and that the domestic firm can sell and produce its product in the foreign country. The decision to open frontiers is effective only when it is bilateral.

Citizens in each country are potentially consumers, workers and shareholders in the domestic firm. They are vertically differentiated with respect to their intensity of preference for quality and their sensitivity to effort. We prove that citizens in the country of the high quality firm always vote for openness. The result of the votes in the country of the low quality firm depends in a complex way on the degree of concentration of the ownership structure, and the relative dispersion of the citizens with respect to their intensity of preference for quality and their sensitivity to effort.

Keywords: Globalization, Democracy, Vertical Differentiation, General Equilibrium, Ownership Structure.

1 Introduction

In 2015, David Cameron Prime Minister of the UK, under the pressure from the eurosceptics even in his own party, held and in-out referendum on EU membership of the UK. Notwithstanding the absolute majority of conservatives he obtained in the 2015 elections, BREXIT won the referendum in 2016. Cameron who had campaigned for remaining in Europe, did

∗hend.ghazzai@msb.tn
†rim.lahmandi@polytechnique.org, rim.lahmandi.ayed@gmail.com
have to resign.

If direct lessons may be drawn from this recent history, the first would be that representative democracy where a social planner chosen by majority decides of the best option, may diverge from direct participative democracy where citizens express their views directly. Second, globalization has far from unanimous popular support. In this paper, we examine the decision of countries to open or not their frontiers when this decision is not taken by the social planner but is a decentralized decision taken through the direct vote of the citizens.

We consider a general equilibrium model with two identical countries each having initially one firm. Each country is composed of individuals who are potentially workers, consumers and shareholders of the domestic firm and differing with respect to their intensity of preference for quality and their sensitivity to effort. Firms produce a vertically differentiated product using labor as the unique output. In autarky, each firm is a monopoly in its own country. When frontiers are open, firms may produce and sell their products in the foreign country. They face thus competition but have access to larger good and labor markets. Firms set their qualities and prices non-cooperatively, anticipating market clearing wages. Citizens in each country are asked to vote either for openness or autraky. Openness is effective when the results of the citizens’ votes in both countries are in majority for openness. Therefore, openness is the result of a bilateral choice.

We prove that under autarky, both firms produce the highest possible quality. When economies are open, prices are lower, wages are higher and the equilibrium at the quality stage of the game is such that one of the firms moves to a lower quality and gets a lower profit than under autarky while the profit of the high quality firm is higher under openness.

There are three effects that influence citizens’ vote for or against openness. As consumers and/or workers, citizens prefer openness because competition between firms lowers prices and increases wages. Thus, the work/consumption effects favor openness. As shareholders, citizens may or not prefer autarky. Indeed, the ownership effect favor openness for the shareholders that own the high quality firm and favor autarky for the shareholders that own the low quality firm. There is no ownership effect for non-shareholders. The results of the votes depend on these effects. In the country of the high quality firm, citizens always vote for openness as the consumption, work and ownership effects all favor openness. In the country of the low quality firm, non-shareholders always vote for openness as there is no ownership effect. Shareholders need to weigh the positive work/consumption effects and the negative ownership effect. The overall result of the votes in the country of the low quality firm depends in complex way on the ownership structure and the dispersion of citizens with respect to their intensity of preference for quality and their sensitivity to effort.

2 Related Literature

Our reference paper is the work of Kahloul et al (2016) who used the same model to compare whether citizens within the same country prefer more or less competition. Only two extreme ownership structures are examined when comparing the monopoly situation to the duopoly situation: a concentrated ownership structure where no citizen owns the firms in both situations.
and an egalitarian ownership structure where all citizens in both situations own the firms. In our paper, a proportion of the citizens own the domestic firm. This proportion can vary between 0 and 1. The ownership structure concentration is thus a parameter of the model.

An abundant literature exists on international trade and vertical differentiation but focuses on industrial organization models which are partial equilibrium models such as Motta et al (1997), Falvey and Kierzkowski (1987), Flam and Helpman (1987), Baldwin and Harrigan (2007) and Calmette et al (2016)...

3 Model

We consider two identical countries \( i = 1, 2 \) examining two options: (1) autarky or (2) openness. Each country has initially one firm \( i \). Firms produce an indivisible “differentiated”\(^{1}\) output using labor as the unique input. Firms choose the quality of their output from the quality segment \([0, \bar{q}]\).

Under autarky, each firm is a monopoly in its own country. It produces its output using the labor input of the domestic country and sells its product to the consumers of that country. If economies are open, a foreign firm can sell and produce its product in the domestic country and the domestic firm can sell and produce its product in the foreign country. Firms face competition and act in a duopoly structure but have access to a larger labor and good markets.

We assume that the production of one unit of the differentiated output requires one unit of labor (constant returns to scale).

Citizens in each country are asked to vote either for autarky or openness. Openness is a bilateral choice i.e. openness occurs if the results of the votes in both countries are in majority for this option. Otherwise, autarky prevails.

In each country, there is a population of citizens who are potentially workers, consumers and shareholders. Each citizen is endowed with an indivisible unit of labour and a given quantity \( e \) of a numeraire good. We denote by \( \lambda \geq 0 \) his/her share in the firm’s profit.

Each citizen is characterized by his/her sensitivity to effort \( \alpha \in [0, \bar{\alpha}] \) and his/her intensity of preference for the product’s quality \( \theta \in [0, \bar{\theta}] \). Citizens are uniformly distributed over \([0, \bar{\alpha}] \times [0, \bar{\theta}]\) with a density normalized to 1.

Citizens derive their utility from the consumption of the differentiated product and the numeraire as follows:

\[
V(x, t) = \theta qx + t
\]

where \( x \) is the consumption of the differentiated product of exogenous quality \( q \), \( t \) is the consumption of the numeraire good. The consumption bundle \((x, t)\) belongs to the consumption set \([0, 1] \times \mathbb{R}\).

A citizen has to choose whether to work or not and his/her consumption bundle, in particular whether to consumer or not one unit of the differentiated good and if so from which firm.

Under autarky, in each country \( i \), if a citizen chooses to work, he/she receives a wage \( w_i \) and must incur a training cost \( \alpha q_i \). If he/she chooses not to work, he/she receives no wage (and does not have to be trained), his/her revenue being limited to the initial endowment in the

---

\(^{1}\)Differentiated in the sense that it may possibly be of different qualities perceived differently by consumers.
numeraire and to his/her share in firm $i$’s profit. Under openness, in each country $i$, a citizen has the choice to remain idle ($w_i$), to work in the domestic firm and receive a wage $w_i$ or to work in the foreign firm and receive a wage $w_j$. Wages under autarky and openness are determined endogenously through balancing the supply and demand for labor for each firm.

A citizen needs also to make a consumption decision. He/she has to decide whether to consume one unit of the differentiated product. Under autarky, each citizen in country $i$ buys the product of the domestic firm. Under openness, in each country $i$, a citizen has the choice not to consume ($C$), consume the product of the domestic firm ($C_i$) or the product of the foreign firm ($C_j$).

In each country $i$, we suppose that the individuals are split into two groups: a fraction $\mu_i \in [0, 1]$ are shareholders, with $\lambda = \frac{1}{\mu_i \alpha}$, and a fraction $1 - \mu_i$ are non-owners, for whom $\lambda = 0$. The lower $\mu_i$ the more concentrated is the ownership structure in country $i$. The higher $\mu_i$ the more egalitarian is the ownership structure.

4 Results

We first determine the equilibrium under autarky and under openness. Then we give the results of the votes in both countries.

Under autarky, we determine for each citizen $(\alpha, \theta)$, the work and consumption decisions by comparing their indirect utilities. There are four types of citizens under autarky depending on whether they consume or not one unit of the differentiated good and whether they work or not. Due to the linearity of the utility function, the working decision depends only on $\alpha$ and the consumption decision depends only on $\theta$. We then determine the demand in the good market and the supply in the labor market. The wage is determined endogenously by balancing supply and demand in the labor market and by using the assumption that one unit of output requires one unit of labor. Finally, we find the price and quality that maximize the firm’s profit. Proposition 1 provides the equilibrium outcome under autarky.

**Proposition 1** (Autarky Equilibrium). Under autarky, in each country $i$ ($i = 1, 2$), firm $i$ produces quality $q_i^* = \bar{q}$ and sells it at price $p_i^* = \frac{\bar{q} \theta(\theta + 2 \alpha)}{2(\theta + \alpha)}$. Workers receive a wage $w_i^* = \frac{\bar{q} \theta}{2(\theta + \alpha)}$ and the profit of firm $i$ is given by $\pi_i^* = \frac{\bar{q} \theta \alpha}{4(\theta + \alpha)}$.

We now determine the equilibrium under openness assuming without loss of generality that $q_2 \geq q_1$. When finding the consumption and work decisions of the citizens by comparing their indirect utilities, nine types of citizens appear depending on their choice in terms of work and consumption. Like under autarky, because of the linearity of the utility function, the work decision depends only on $\alpha$ and the consumption decision depends only on $\theta$. We then determine the demand in the good market and the supply in the labor market. The wage is determined endogenously by balancing supply and demand in the labor market and by using the assumption that one unit of output requires one unit of labor. Finally, we solve the two-step game by backward induction. Proposition 2 provides the equilibrium outcome under openness.

**Proposition 2** (Openness Equilibrium). Under openness, at equilibrium qualities, prices, wages and profits are given by:

$q_1^* = \frac{4}{7} \bar{q}$, $q_2^* = \bar{q}$, $p_1^* = \frac{\bar{q} \theta(\theta + 8 \alpha)}{14(\theta + \alpha)}$, $p_2^* = \frac{\bar{q} \theta(\theta + 4 \alpha)}{4(\theta + \alpha)}$, $w_1^* = \frac{\bar{q} \theta}{2(\theta + \alpha)}$, $w_2^* = \frac{\bar{q} \theta \alpha}{4(\theta + \alpha)}$, and $\pi_1^* = \frac{\bar{q} \theta}{24(\theta + \alpha)}$, $\pi_2^* = \frac{\bar{q} \theta \alpha}{24(\theta + \alpha)}$. 


We notice that under openness prices are lower than under autarky, wages are as least as high as under autarky. The profit of the high quality firm is higher under openness. The profit of the low quality firm is higher under autarky. We now move to the results of the votes.

**Proposition 3** (Votes’ results). In Country 2, for any \( \mu_2 \in [0, 1] \), citizens vote in majority for openness.

In Country 1, the results of the votes are as follows:

- if \( \mu_1 < \frac{1}{2} \) (majority of non-shareholders), citizens in Country 1 vote in majority for openness.
- if \( \mu_1 > \frac{1}{2} \) (majority of shareholders), the result of the votes of citizens in Country 1 is given in Figure 1 in the space \( (\mu_1, \delta = \frac{\theta}{\alpha}) \).

Openness prevails whenever the votes of the citizens in country 1 are in majority for openness.

From the equilibrium outcome under autarky and openness. As workers and/or consumers, citizens will always favor openness. As shareholders, they will favor openness if they own the high quality firm and autarky if they own the low quality firm. In country 2, the majority vote is always for openness as the work, consumption and ownership effects all favor openness. Openness prevails when citizens in country 1 vote in majority for this option. More precisely, non-shareholders in country 1 vote for openness. Shareholders in country 1 have to compare the positive work/consumption effect to the negative ownership effect. Figure 1 is obtained by comparing the indirect utilities of each shareholder \((\alpha, \theta)\) in country 1 under autarky and openness, then counting the number of shareholders in country 1 who prefer autarky and comparing it to \( \frac{1}{2} \delta \alpha \) which corresponds to half the citizens in country 1.

![Figure 1 – Openness Zones in the \((\mu_1, \delta = \frac{\theta}{\alpha})\)-space.](image-url)
5 References


Falvey, R., Kierzkowski H. (1987), Product Quality, Intra-Industry Trade and (Im)perfect Competition, in: Kierzkowski (ed.).

