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IN MEDIO STAT VIRTUS: DOES A MIXED ECONOMY INCREASE WELFARE?

by

Alessandro FEDELE

Free University of Bozen/Bolzano, Italy

and

Sara DEPEDRI*

University of Trento, Italy

ABSTRACT: *Over the past few decades, social enterprises have grown remarkably. This paper investigates how social enterprises affect access to social services (e.g., education and health-care) and utilitarian welfare. To this end, two economic systems are compared: a market economy system, where all firms are profit maximizers, and a mixed economy system, where both for-profit businesses and social enterprises are present. Findings show that individuals are more likely to have access to social services within mixed economy. Moreover, conditions are derived under which utilitarian welfare is larger within mixed economy. Public policies in support of social enterprises (e.g., subsidies) are shown to result in the following trade-off: access to social services is further enhanced but utilitarian welfare is more likely to be lower than that within market economy.*

Keywords: market economy, mixed economy, access to social services, utilitarian welfare, public policies
JEL classification: L33, L38, L13, P51

Introduction

In the aftermath of the economic crisis, Stiglitz (2009) remarked that productive organizations such as cooperative and socially oriented enterprises may play a key role in

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restoring people's confidence. Indeed, these productive organizations 'are less inclined to exploit those with whom they interact: their workers, their customers, and their suppliers' (p. 357). Accordingly, Stiglitz argued that an economy is more likely to be successful if it is able to 'find a balance between markets, government, and other institutions, including not-for-profits and cooperatives' (p. 348) and, as it can be inferred from his reasoning, that cooperative and socially oriented enterprises may help increase both the wellbeing of individuals and economic efficiency. Put differently, the welfare of citizens and producers may be positively affected by the presence of different firm types in the same sector of production.

The Stiglitz's argument draws upon a recent literature on the evolution of socially responsible productive organizations. Three strands of literature are worth mentioning. First, the literature on mixed oligopoly mainly focuses on competition between state-owned welfare-maximizing public firms and profit-maximizing private firms: see De Fraja and Del Bono (1990) for a survey. More recently, studies on Corporate Social Responsibility (CSR) have become mainstream. CSR is a form of corporate self-regulation, according to which firms commit to a behavior that takes into account not only the shareholder interests (profit), but also the utility of agents dealing with the firm (stakeholders), such as employees, business partners, consumers and the environment (e.g., Kitzmüller and Shimshack 2012). Finally, the literature on nonprofit entities. These organizations have been initially classified as 'third sector' organizations, as opposed to governmental enterprises and private for-profit businesses. Nonprofit organizations exhibit several peculiar traits: they invest potential surpluses in social activities (Evers 1995), involve citizens in the co-production of services (Pestoff et al. 2012), develop reciprocity principles in opposition to pure market principles and to the redistributive role of governmental institutions (Defourny and Pestoff 2008), are commercial organizations with social purposes (Vaccaro 2012). In addition, nonprofit firms straddle the border between the public and private, as well as between the for-profit and the nonprofit sectors (Anheier and Isar 2011). Other contributions aim to explain the co-existence of different firm types in the same market. For instance, Marwell and McInerney (2005) study the dynamic relationships that arise in a market where when for-profit, nonprofit, and government providers coexist. Te'eni and Young (2003) focus on the resilience of nonprofit firms due to their relative advantages in the network economy.

To the best of our knowledge, few economics papers have relied on formal theoretical analysis to investigate how the co-existence of diverse firm types in the same sector affects the economic efficiency (e.g., Fulton and Giannakas 2001, Kopel and Marini 2014, Kopel et al. 2014). The current work relies on a horizontal differentiation model à la Hotelling to add the analysis of how such co-existence impacts on access to social services. To this aim, two different economic systems are compared. (i) An economy where all firms are profit maximizers. This system is referred to as a market economy. (ii) An economy where both for-profit businesses and socially oriented enterprises are present. This system is defined as a *mixed economy*. Throughout this paper, we refer to socially oriented organizations as social enterprises. According to the literature (e.g., Borzaga and Defourny 2001) and recent instructions of the European Commission, as reported in the Social Europe Guide (European Commission 2013a, b), social enterprises are defined as hybrid organizations that balance their social mission with their entrepreneurial activity. In addition, our study aims to contribute to the analysis of public policies supporting the presence of social enterprises.

The remainder of the paper is organized as follows. In Section 1, we describe how the meaning of 'mixed economy' and the role of social enterprises have evolved over time; this will help contextualize the analysis. In Section 2 , we describe the setup, based on a Hotelling environment that captures horizontal product differentiation. In line with the literature, social enterprises' objective function is assumed to take into account both profits and stakeholders' benefit. In the current framework, users of social services are the only stakeholders, hence social enterprises are assumed to care about user welfare (e.g., Brekke et al. 2012). In Section 3, we study the equilibrium properties of the market economy and mixed economy. The two economies are compared in Section 4 to identify the conditions under which the presence of social enterprises in the production of social services enhances both the access of individuals to social service and utilitarian welfare. Social enterprises are required to be financially self-sustainable in that they are subject to a break-even constraint; public policies aimed at directly supporting social enterprises are disregarded. This part of the analysis could, therefore, provide normative insights into the access to the service and the efficiency guaranteed by a mixed economy in countries where social enterprises are less likely to be directly supported by governments. Sections 5 and 6 provide two extensions of the model. First, we introduce individuals who are influenced by ideological concerns when choosing which organization, either the for-profit or social enterprise, resort to. Second, we explicitly consider policies supporting the presence of social enterprises through, for example, subsidies. Section 7 concludes with policy recommendations. Computations and proofs of our results are in the online Appendix.

1 Mixed economy and role of social enterprises

The term mixed economy can be used to define the presence of different economic actors (e.g., private and public firms), that produce a good or service. This definition has evolved over time, following the evolution of welfare systems and the role of a welfare state.[1]

Focusing on social services sectors, we can remark that in most European economies, social services were supplied directly by public bodies until the 1970s, while private for-profit businesses supplied integrative services through accreditation systems. The role of nonprofit organizations in the direct production of social services was somewhat marginal; nonprofit organizations were confined to perform an advocacy function and supply social services only to the poorest people. In this context, the term mixed economy was referred to as a mix of for-profit businesses and public bodies in the provision of social services (e.g., Kazepov 2009).

In the 1980s, due to the crisis of welfare state, a growing demand for social services related to new social needs (e.g., drug addiction and alcoholism), and the increasing participation of women in the labor market, the number of nonprofit organizations rose and their productive role became more relevant. These productive nonprofits were institutionalized through the introduction of new organizational forms. Solidarity co-ops in Québec, sociétés coopératives d'intérêt collectif in France, social cooperatives in

1 Some contributions use the alternative term mixed-form markets (e.g., Marwell and McInerney 2005).

Italy, and, more generally and recently, social enterprises. Furthermore, the increasing relevance of social enterprises induced many governments to consider them as an active part of social policies and to establish new forms of public-private relationship, where private nonprofit organizations directly supply social services (e.g., Ostrander 1989).

The new century has witnessed a further evolution in welfare systems. An increasing presence of social enterprises and potential competition between social enterprises and for-profit businesses have been observed in social services sectors (e.g., Ben-Ner 2002). Accordingly, the term mixed economy is now often used to define situations in which services are provided by different productive entities, including not-for-profits (e.g., Beckford 1991). Following this evolution of welfare systems and mixed economies, a new stream of theoretical economics literature on mixed oligopolies has flourished. Initially, the benchmark was the analysis of competition between state-owned welfare-maximizing public firms and profit-maximizing private firms (De Fraja and Delbono 1990). Subsequently, the focus has shifted to efficiency generated by cooperative firms (e.g., Fulton and Giannakas 2001, Delbono and Reggiani 2013, Marini et al. 2015). Our work is focused on social enterprises and contributes to this literature.

From an empirical point of view, several cross-country studies have investigated the growth of social enterprises. A seminal contribution is the Johns Hopkins Comparative Nonprofit Sector Project, conducted in 22 countries (European countries, Australia, Japan, the United States, and some Latin American countries) in the 1990s. As reported in this study, the expenditure of the nonprofit economic sector was about $1.1 trillion, equivalent to 4.6% of the total GDP of the sample countries (Salamon and Anheier 1997). Further studies at the country level (e.g., CIRIEC 2007) find that about 130,000 nonprofit enterprises are active in France with more than 1.4 million employees; about 37,000 units in Portugal with 160,000 employees; 127,000 enterprises in Spain with 380,000 employees; 31,400 organizations in Sweden with 95,000 employees; about 13,000 organizations in Denmark with 121,000 people; 506,000 units in Germany, with more than 1.4 million employees. According to Salamon (2006, p. 402), 'nonprofits account for 40 percent of all hospital patient days in Germany, 55 percent of all residents in residential care facilities in French, three-fourths of all students in higher education in Japan, and much of the social service provision in Italy'. Today, many nonprofit enterprises are commercial institutions that sell their products and services in the marketplace. According to Kerlin (2006), the commercial revenues of nonprofit enterprises in the United States increased on average by 219% from 1982 to 2002; similarly, commercial revenues accounted for 57.6% of nonprofit firms' total revenues in 2002 compared with the 48.1% in 1982.

2 Setup

We introduce a hypothetical economy made up of two industrial sectors. In Sector A, a good is produced by for-profit firms. For example, consider a car industry where producers are typically for-profit. Sector B supplies instead a social service (e.g., education and health-care). Each Sector $j = A, B$ is characterized by a Hotelling-type segment of length 1 where two firms, indexed by i, j with $i = 0, 1$, are located at the extremes, firm $0, j$ is at $x = 0$ and firm $1, j$ at $x = 1$ (Figure 1). Potential buyers of mass one are

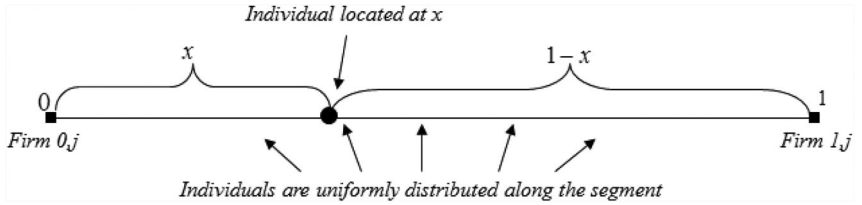

Figure 1 – The Hotelling-type linear segment describing sector $j = A, B$.

uniformly distributed along the segment. In each sector, each individual demands at most one unit of the commodity, the good in Sector A or the social service in Sector B.

Individuals derive utility s_j from one unit of the commodity produced in Sector $j = A, B$. We refer to the difference between utility and total purchase costs as surplus of an individual. More precisely, the surplus of an individual located at point $x \in [0, 1]$ is equal to

$$\begin{array}{lll} s_j - p_{0,j} - tx & \text{when buying the commodity from firm } 0, j, & (a) \\ s_j - p_{1,j} - t(1-x) & \text{when buying the commodity from firm } 1, j, & (b) \\ 0 & \text{when not buying a commodity,} & (c) \end{array} \qquad (1)$$

where $p_{0,j}$ ($p_{1,j}$) is per unit of commodity price charged by firm 0 (1) in Sector $j = A, B$. Expressions tx and $t(1-x)$ denote a further cost borne by the individual located at x when buying from firm $0, j$ and $1, j$, respectively. The Hotelling framework fits our analysis because of its 'flexibility'. Indeed, the segment where firms compete by producing horizontally differentiated commodities can be interpreted in several different ways.

Following the traditional interpretation, the segment can be thought of as a physical space: individuals bear transportation costs when moving along the segment to make their purchases. Location x of an individual denotes her/his geographical distance from the two firms. In Figure 1, for instance, x and $1-x$ are the distances travelled by the individual located at x when going to firm $0, j$ and $1, j$, respectively. In addition, parameter $t > 0$ denotes the per unit of distance cost of transportation. Overall, tx and $t(1-x)$ are the transportation cost borne by the individual located at x when buying from firm $0, j$ and $1, j$, respectively. In Sector B, where social services are traded, tx and $t(1-x)$ represents, for example, the cost of transporting children to school and day nursery or the elderly to hospitals.

An alternative and fairly innovative interpretation is compatible with the flexible Hotelling framework and proposed in Section 5. Individuals are assumed to have heterogeneous tastes in firm types (i.e., for-profit versus social enterprise). In this case, individuals bear ideological costs for not purchasing from the preferred type of firm when 'travelling' along the ideological space. This interpretation is rather natural when different types of firms, not only for-profits, coexist and when a social service is traded in the market. Indeed, the users' choice of social services providers is based on the perception of risk, confidence, and trust, in which case the location x can describe the proximity in

terms of identity and organizational fit, as described by the psychology and behavioral economics literature (e.g., Van Dyne and Pierce 2004).[2]

We define two additional aspects, which are key to our analysis: firms' profits and surplus of all individuals. Firm i, j, is assumed to incur constant per unit of commodity production cost $c_j \geq 0$. Accordingly, its profit function is

$$\Pi_{i,j} = \left(p_{i,j} - c_j\right) D_{i,j}, \tag{2}$$

where $D_{i,j}$ denotes the share of individuals who decide to buy from firm i, j, i.e., the demand for the commodity supplied by firm i, j. Surplus of firm i, j's customers is given by

$$CS_{i,j} = D_{i,j}\left(s - p_{i,j} - \frac{t}{2}D_{i,j}\right): \tag{3}$$

see online Appendix A.1 for computations. Surplus of individuals who do not buy is obviously zero:

$$CS_{H,j} = 0. \tag{4}$$

Expression (3) is (negatively) affected by the unit transportation cost t, which plays a crucial role in our framework. To illustrate this role, we denote with $x_{I,j}$ the location of an individual who obtains the same surplus when purchasing the commodity from firm $0, j$ or firm $1, j$. This location is obtained after solving equality $(1 - a) = (1 - b)$ by x:

$$x_{I,j} = \frac{1}{2} + \frac{p_{1,j} - p_{0,j}}{2t}. \tag{5}$$

We then plug $x_{I,j}$ into either $(1 - a)$ or $(1 - b)$ to get the surplus of the indifferent individual, denoted by $\sigma_{I,j}$. In symbols,

$$\sigma_{I,j} = s_j - \frac{t}{2} - \frac{p_{1,j} + p_{0,j}}{2}. \tag{6}$$

Not surprisingly, $\sigma_{I,j}$ decreases when the unit transportation cost t increases.

In Figure 2, we provide a graphical representation of individuals' surplus as a function of their location x, i.e., we depict $(1 - a)$ and $(1 - b)$. Intuitively, both expressions are decreasing in the distance travelled by the individuals, x when buying from firm

2 A similar interpretation of the Hotelling segment is proposed by, e.g., Becchetti et al. (2014), who assume that different individuals' locations in the segment implies differences in the psychological perceptions of the ethical value of a good. Yet in their framework, all individuals incur disutility only when going from a more ethical to a less ethical point in the segment, thus weakly preferring more ethical goods, even if to a different extent; in other words, psychological costs are asymmetric. These costs are instead symmetric in our pure horizontal differentiation model, with the effect that more 'ethical' organizations, such as social enterprises, are not necessarily preferred by all individuals. The advantage of our approach is to capture heterogeneity of ideologies across individuals. Such heterogeneity is confirmed by different waves of the World Value Survey, according to which more than 40% of sample respondents are either indifferent or even incur disutility when buying a product above their ethical standards.

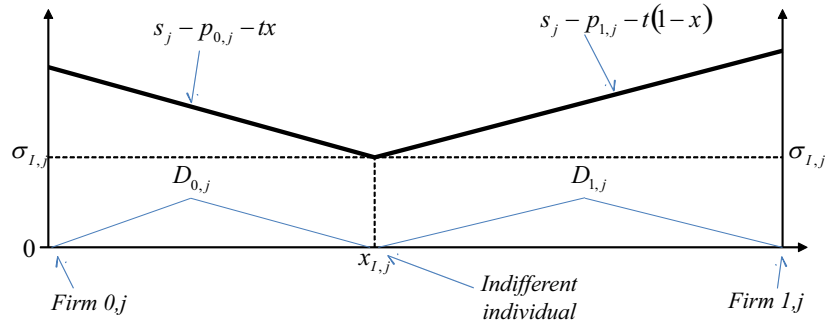

Figure 2 – Full coverage in sector $j = A, B$.

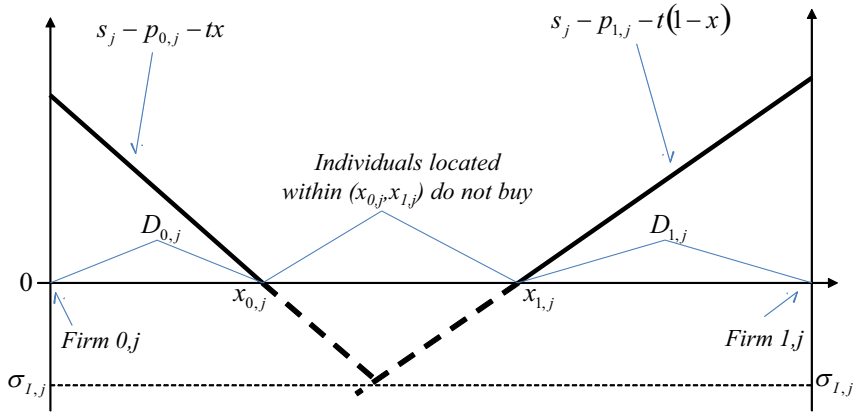

Figure 3 – Partial coverage in sector $j = A, B$.

$0, j$ and $(1 - x)$ when buying from firm $1, j$. We also depict the surplus of the indifferent individual, $\sigma_{I,j}$, by assuming it is positive. In this case, the indifferent individual is willing to buy either from firm $0, j$ or firm $1, j$. As a result, all individuals located to the left of $x_{I,j}$ buy from firm $0, j$, while those located to the right of $x_{I,j}$ buy from firm $1, j$. The demand shares of the two firms are $D_{0,j} = x_{I,j} - 0$ and $D_{1,j} = 1 - x_{I,j}$. Sector $j = A, B$ is said to be fully covered because all individuals buy. Note that this is likely to occur when the unit transportation cost t is low, i.e., when the two downward-sloping bold lines are relatively flat.

In Figure 3, instead, the surplus of the indifferent individual, $\sigma_{I,j}$, is assumed to be negative, in which case the individual located at $x_{I,j}$ does not buy. As a result, the demand shares of firms $0, j$ and $1, j$ become $D_{0,j} = x_{0,j}$ and $D_{1,j} = 1 - x_{1,j}$, with $x_{0,j} < x_{I,j} < x_{1,j}$. Sector $j = A, B$ is said to be partially covered because individuals located in $(x_{0,j}, x_{1,j})$ do not buy. This is likely to occur when the unit transportation cost t is high, i.e., when the two downward-sloping bold lines are relatively steep.

The analysis proceeds by comparing two different economies.

(i) An economy where each firm $i = 0, 1$ in each Sector $j = A, B$ is for-profit. By definition, a for-profit firm i, j aims at maximizing its own profit $\Pi_{i,j}$.

(ii) An economy where both firms are profit maximizers in Industry A, while Sector B is made up of the following mixed duopoly: firm $0, B$ maximizes the surplus of its customers, $CS_{0,B}$, and it is referred to as a social enterprise, whereas firm $1, B$ is a standard profit maximizer, which targets its own profit $\Pi_{1,B}$.

We introduce the following:

Definition 1. *An economy where all firms are profit maximizers is defined as a market economy. An economy where both firms are profit maximizers in Sector A and Sector B has a social enterprise is defined as a mixed economy.*

In Sector B of the mixed economy, the unit production costs incurred by the two types of firms are identical and equal to c_B. In other words, the social enterprise and for-profit firm are supposed to have access to the same production technology.

The timing of events in our framework is as follows.

- At $t = 0$, in each Sector $j = A, B$ of each economy, either market or mixed, firms $0, j$ and $1, j$ simultaneously choose prices $p_{0,j}$ and $p_{1,j}$ to maximize their objective functions.
- At $t = 1$, profits accrue to the firms.

We make the following reasonable hypothesis: price competition occurs only between firms belonging to the same industrial Sector, either A or B, and not between firms across sectors. This is due to the different nature of, and thus the different demand for, the commodities supplied in the two industries. One good is typically supplied by for-profit companies, for example, cars. The other is a social service, which is offered by both for-profit and nonprofit entities. Finally, we let the unit consumption utility s_j be higher than the unit production cost c_j in both industries. This is a necessary condition for trade between individuals and firms to occur.

The analysis proceeds as follows. In the next Section we study the (Nash) equilibrium of the price competition game taking place at $t = 0$. We consider separately the market economy and mixed economy. In Section 4, we move to a welfare analysis.

3 Equilibrium analysis

3.1 Market economy

We compute the equilibrium of the market economy and, then, study how the equilibrium is affected by different values of the unit transportation cost t. All firms set prices $p_{i,j}$ to maximize profit $\Pi_{i,j}$, subject to the following constraint: all their customers must get a non-negative surplus, otherwise they would not buy.

The equilibrium prices in the market economy are computed in online Appendix A.2, where we show that in each Sector $j = A, B$, the two firms set the same price, denoted by p_j^*. This is because the two firms are symmetric, i.e., they maximize the same profit function $\Pi_{i,j}$. In line with the intuition provided by Figure 2, we also prove that the full coverage of Sector $j = A, B$ occurs only when the unit transportation cost t

is relatively low (for the sake of precision, not larger than $s_j - c_j$). For higher values of t, instead, those individuals living close to $x = \frac{1}{2}$ prefer not to buy: partial coverage occurs, as depicted in Figure 3. These results come as no surprise. A higher t makes it more difficult to serve all the individuals since, ceteris paribus, their surplus is negatively affected, as testified by expressions $(1 - a)$ and $(1 - b)$.

3.2 Mixed economy

We turn our focus on the mixed economy. According to Definition 1, Sector A is still made up of two for-profit firms, $0, A$ and $1, A$, whose symmetric equilibrium price, p_A^*, has been computed in online Appendix A.2.

By contrast, in Sector B, firm $0, B$ is a customer surplus maximizer rather than profit maximizer. Accordingly, it aims at maximizing the surplus of its customers, $CS_{0,B}$, subject to the following constraint: its profits must be non-negative, $\Pi_{0,B} \geq 0$. This break-even constraint ensures the financial self-sustainability of the social enterprise. In Section 6, we introduce an alternative and probably more realistic form of mixed economy, where the social enterprise in Sector B is allowed to set the price below its production cost. The consequent loss is recovered by a transfer from the firms operating in Sector A.[3] This explains the role of Sector A in our framework.

Since the surplus of customers is negatively affected by price, at equilibrium, the social enterprise sets the price $p_{0,B}^{**}$ as low as possible, i.e., equal to the production cost c_B, with the effect that its equilibrium profit is zero, $\Pi_{0,B}^{**} = 0$. The price $p_{1,B}^{**}$ set by the for-profit firm $1, B$ is instead higher than c_B: for computations, see online Appendix A.3, where we show that the full coverage of Sector B, depicted in Figure 2, occurs only when transportation cost t is not larger than $\frac{3(s_B - c_B)}{2}$.

To conclude this Section, we remark that an interesting aspect concerning coverage of Sector B arises when comparing the two different economies. The parametric interval where full coverage occurs is larger under mixed economy, $t \leq \frac{3(s_B - c_B)}{2}$, rather than $t \leq s_B - c_B$. In other words, the social service market is more likely to be fully covered under mixed economy. This is because the sum of equilibrium prices in the social Sector B is lower if the economy is mixed, $p_{0,B}^{**} + p_{1,B}^{**} < p_{0,B}^{*} + p_{1,B}^{*} = 2p_B^*$ (see online Appendix A.4), which eases the purchase also for individuals who live far away. By setting its price as low as possible, the social enterprise forces the for-profit rival to reduce its own price in the mixed economy: a side-effect of the presence of a social enterprise is to make competition tougher.[4]

We sum up these findings in the following Proposition (see online Appendix A.5 for a formal proof):

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3 This assumption aims to capture two important aspects. First, social enterprises, unlike for-profit firms, are often tax-exempt; this asymmetric tax treatment can be thought of as a cross-subsidization by for-profit firms. Second, donative behavior of big for-profit companies is widely observed in developed countries and strongly promoted, e.g., by the Social Business Initiative (European Commission 2011).

4 It is well known that the prices are strategic complements in Hotelling-like models. If firm $0, B$ reduces its price, firm $1, B$ does the same to maximize profits.

Proposition 1. *(i) When $t \leq s_B - c_B$, all individuals have access to the social service under both types of economy. (ii) When $t \in (s_B - c_B, \frac{3(s_B - c_B)}{2}]$, all individuals have access to the social service only if the economy is mixed. (iii) When $t > \frac{3(s_B - c_B)}{2}$, there is no full coverage but more individuals have access to the social service under mixed economy.*

4 Welfare analysis

This Section compares two levels of welfare: (i) the welfare under market economy, where competition occurs between for-profit firms; (ii) the welfare under mixed economy, where firm 0 in Sector B is customer surplus maximizer. We adopt a utilitarian approach by defining welfare as the sum of firms' profits and surplus of all individuals in the two sectors.

Let us first consider the market economy. Since both firms within each sector set the same price p_j^*, at equilibrium, they end with the same profit, which we denote by Π_j^*. Similarly, customers of each firm obtain the same total surplus within each sector, i.e., $CS_{0,j}^* = CS_{1,j}^* = CS_j^*$. See online Appendix A.2 for the mathematical values of Π_j^* and CS_j^* . Summing up, the equilibrium utilitarian welfare is given by $2\Pi_A^* + 2\Pi_B^* + 2CS_A^* + 2CS_B^* + CS_{H,j}$, where we recall that $CS_{H,j} = 0$ denotes the surplus of individuals who do not buy.

Let us turn our attention to the mixed economy, where the equilibrium in Sector A is as that in the market economy. Each firm makes profit Π_A^* and the surplus of all customers of each firm is CS_A^*. Things are different in Sector B, where a social enterprise is active. Recall that the social enterprise makes zero profit, $\Pi_{0,B}^{**} = 0$. We denote with $\Pi_{1,B}^{**}$ the profit made by firm 1, B . Similarly, the surplus of all customers of firm 0, B and 1, B are indicated with $CS_{0,B}^{**}$ and $CS_{1,B}^{**}$. The equilibrium utilitarian welfare in the mixed economy can, thus, be written as $2\Pi_A^* + \Pi_{0,B}^{**} + \Pi_{1,B}^{**} + 2CS_A^* + CS_{0,B}^{**} + CS_{1,B}^{**} + CS_{H,j}$.

To proceed with our welfare analysis, we compare the welfare values arising in the two scenarios, market and mixed, by computing their difference:

$$\left(2\Pi_B^* + 2CS_B^*\right) - \left(\Pi_{0,B}^{**} + \Pi_{1,B}^{**} + CS_{0,B}^{**} + CS_{1,B}^{**}\right). \tag{7}$$

The surplus of individuals who do not buy, $CS_{H,j}$, is zero; hence, it does not appear in (7). Similarly, (7) does not depend on the equilibrium values in Sector A, $2\Pi_A^*$ and $2CS_A^*$. These values are indeed equal across both economies, market and mixed. As a consequence, we can disregard Sector A and focus our attention on what happens in Sector B. The role played by Sector A is twofold. On the one hand, the presence of Sector A gives a more complete picture of the real-world economy, where different types of goods and services are supplied; on the other hand, Sector A produces profits that are partially transferred to the social enterprise. This second aspect will be analyzed in Section 6, where we allow the social enterprise to sell below cost.

In Figure 4a, we depict the two terms of difference (7) as a function of unit transportation cost t. Welfare in Sector B of the market economy, $2\Pi_B^* + 2CS_B^*$, is represented by the dashed line, while welfare in Sector B of the mixed economy, $\Pi_{0,B}^{**} + \Pi_{1,B}^{**} + CS_{0,B}^{**} + CS_{1,B}^{**}$, is denoted by the solid line.

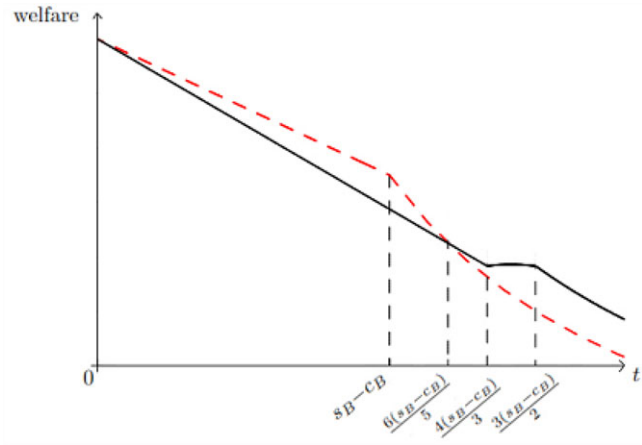

Figure 4a – Welfare in the market economy versus welfare in the mixed economy.

As is apparent from Figure 4a, welfare is larger in the market economy only when unit transportation cost t is relatively low. More precisely, in online Appendix A.6, we prove the following:

Proposition 2. *(i) When* $t \leq \frac{6(s_B-c_B)}{5}$ *welfare is larger under market economy. (ii) When* $t > \frac{6(s_B-c_B)}{5}$ *welfare is larger under mixed economy.*

First note that both lines in Figure 4a are negatively affected by t. As transportation cost t increases welfare decreases.[5] We discuss the results of Proposition 2 by considering the relevant intervals of t separately.

When $t \leq s_B - c_B$, there is full coverage of Sector B under both types of economy according to Proposition 1. Equilibrium prices increase when moving from a mixed to a market system. This has a positive effect on firms' profits and a negative effect on individuals' surplus in Sector B because the sum of equilibrium prices in Sector B is larger under market economy. In symbols, $2\Pi_B^* > \Pi_{0,B}^{**} + \Pi_{1,B}^{**}$ and $2CS_B^* < CS_{0,B}^{**} + CS_{1,B}^{**}$. This trade-off is standard when prices increase. More interestingly, the profit gain turns out to be larger than surplus loss (in absolute value). In symbols, $2\Pi_B^* - (\Pi_{0,B}^{**} + \Pi_{1,B}^{**}) > (CS_{0,B}^{**} + CS_{1,B}^{**}) - 2CS_B^*$. As a result, the welfare is greater under market economy. This is because customers incur lower total transportation costs: see online Appendix A.6 for a formal proof. Indeed, such costs are minimized when the indifferent individual is located in the middle of the segment, such that firm $0, B$ $(1, B)$ serves the left (right) half of the market. This is what occurs in the market economy, where firms set the same equilibrium price in Sector B, p_B^*. Plugging $p_{0,B}^* = p_{1,B}^* = p_B^*$ into the location of the indifferent individual (5) with $j = B$ yields $x_{I,B} = \frac{1}{2}$. By contrast, the social enterprise $0, B$ sets a lower price than the rival in Sector B of the mixed economy, $p_{0,B}^{**} < p_{1,B}^{**}$.

5 The only exception is given by the solid line in interval $\frac{4(s_B-c_B)}{3} \leq t \leq \frac{3(s_B-c_B)}{2}$, which exhibits an inverted-U relationship with t. The intuition for this technical result is given in online Appendix A.6.

Plugging $p^{**}_{0,B} < p^{**}_{1,B}$ into (5) with $j = B$ yields $x_{I,B} > \frac{1}{2}$. As a result, the indifferent individual lies closer to firm 1, B and total transportation costs become larger.

When $s_B - c_B < t < \frac{4(s_B - c_B)}{3}$, the full coverage of Sector B occurs only in the mixed system according to Proposition 1. Figure 4a shows the downward-sloping dashed line is steeper than the downward-sloping solid line, meaning that the negative effect of t on the welfare of the market economy is larger than that on the welfare of the mixed economy. This is due to the reduction in demand in the market economy. Welfare becomes greater under mixed economy at $t = \frac{6(s_B - c_B)}{5}$. This result is confirmed in interval $\frac{4(s_B - c_B)}{3} \leq t \leq \frac{3(s_B - c_B)}{2}$, where again the full coverage of Sector B occurs only in the mixed system.

Finally, when $t > \frac{3(s_B - c_B)}{2}$ there is partial coverage under both systems, but demand is greater in the mixed economy according to Proposition 1. As a consequence, welfare is enhanced under mixed economy.

Summing up, the full coverage of the social service market is more likely to occur in the mixed economy because the equilibrium prices are lower. Yet, when t is relatively low, full coverage occurs under market economy as well. In this case, welfare is enhanced when all firms are profit maximizers because individuals bear lower total transportation costs. As t increases, instead, welfare becomes larger in the mixed economy because a greater fraction of individuals have access to the social service.

5 Extension I: t as an ideological cost

In line with the original Hotelling framework, the segment denotes a physical space and parameter t denotes a transportation cost in the above analysis. In this Section, we check the robustness of our findings by proposing an alternative interpretation.

We assume that Sector A, where only for-profit companies operate, is still represented by a physical space. Instead, we disregard transportation costs in the social service Sector B and suppose that the unit segment represents a space of firm types. More precisely, a hypothetical firm located at point $x \in [0, 1]$ is assumed to maximize the following objective function: a convex combination of its profits and surplus of its customers, where x is the weight attached to profits and $1 - x$ is attached to customers' surplus. Accordingly, a social enterprise attaching maximum weight to customers' surplus is located at the extreme left of the unit segment, $x = 0$. By contrast, a for-profit firm lies on the extreme right, $x = 1$, because it puts weight 1 on its profits.

Similarly, the location of individuals along the segment denotes their ideological position towards firm types. The ideal type for an individual located in $x \in [0, 1]$ consists in a firm attaching weight x to its profits and weight $1 - x$ to the surplus of its customers. Thus, this individual incurs the ideological cost tx when buying from a social enterprise located at 0 and $t(1 - x)$ when buying from a for-profit firm located at 1, where t denotes the per unit of distance cost to fill the ideological distance between an individual's ideal type of firm and the actual type she/he buys from. This is an example of single-peaked preferences in the spirit of the median voter framework. One might think of an individual who takes into account both the social responsibility of companies and commercial and business aspects. If the individual gives higher importance to the former (latter), her/his ideological location is closer to the social enterprise (for-profit firm).

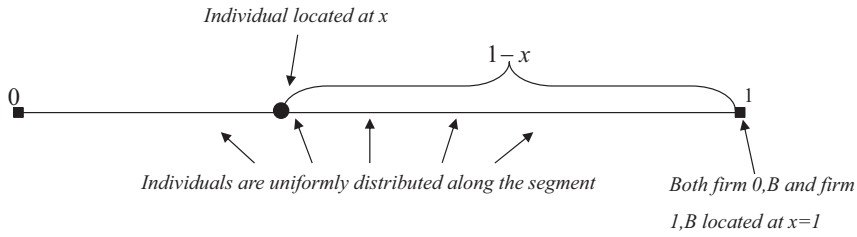

Figure 4b – The Hotelling-type ideolgical segment describing Sector B of the market economy.

This alternative interpretation of our framework does not affect the strategic interaction in Sector B of the mixed economy. Indeed, the two rivals are still located at the extremes of the segment, the social enterprise $0, B$ at $x = 0$ and the for-profit firm $1, B$ at $x = 1$. Accordingly, the mixed economy equilibrium is as that described in Section 3.

By contrast, the strategic interaction in Sector B of the market economy is dramatically affected because the two rivals are profit maximizers and, therefore, both located at $x = 1$, rather than lying at the extremes of the segment. One can easily check that, given the same extreme-right location of the two firms, their services are not horizontally differentiated. Indeed, an individual located at any point $x \in [0, 1]$ incurs the same ideological cost $t(1 - x)$ when buying from either firms (see Figure 4b is for an illustration). Accordingly, firms' strategic interaction boils down to Bertrand competition, where both firms set the equilibrium price equal to the unit production cost. In symbols, $p_B^I = c_B$, where superscript I stands for ideological.

Interestingly, in online Appendix A.7 we prove what follows. First, the full coverage of Sector B within market economy occurs only if $t \leq s_B - c_B$, as in Proposition 1. Second, when $t > s_B - c_B$, the share of individuals who have access to the social service does not change in comparison with the result for the standard Hotelling framework. These two findings may appear surprising since individuals pay a lower price for the social service, $p_B^I < p_B^*$. Yet, they also incur larger ideological costs when they decide to buy because all firms are located at the extreme right of the segment. These two opposite effects compensate each other. Finally, equilibrium welfare in Sector B of the market economy, which we denote with $2\Pi_B^I + 2CS_B^I$, is equal to $2\Pi_B^* + 2CS_B^*$, i.e., its value is not affected by the interpretation of parameter t as an ideological cost. The intuition is as follows. The two for-profit firms charge a lower equilibrium price than that set in the standard Hotelling framework, $p_B^I = c_B < p_B^*$. This affects negatively their profits, $2\Pi_B^I < 2\Pi_B^*$, and positively the surplus of their customers, $2CS_B^I > 2CS_B^*$. [6] These two opposite effects compensate each other.

6 For the sake of precision, there are two effects on individuals' surplus. On the one hand, it is increased by the reduction in prices. On the other hand, it is reduced by the larger ideological costs borne by individuals. Indeed, all individuals located in $x \in [0, \frac{1}{2})$ have to 'travel ideologically'more than half of the segment when they decide to buy. The positive effect of lower prices is shown to prevail over the negative one of higher ideological costs, with the effect that individuals' surplus increases in comparison with that in the market economy, where t denotes transportation costs.

Bearing in mind that the mixed economy equilibrium is as that described in Section 3, we can write the following

Proposition 3. *When parameter t denotes an ideological rather than a transportation cost, the results of Propositions 1 and 2 stand.*

The above Proposition proves that our findings are robust to the alternative specification of parameter t as an ideological cost.

6 Extension II: Mixed economy with transfers

In this Section, we enrich our analysis by considering an alternative and probably more realistic form of mixed economy, where the social enterprise in Sector B is allowed to set the price below its production cost. Accordingly, we modify the timing of events introduced in Section 2 by assuming that at $t = 1$, the social enterprise receives a lump-sum transfer k on top of the profits realized. Thus, we refer to this system as a *mixed economy with transfers*. As mentioned, the amount k is taken from profits of firms operating in Sector A and can be thought of as a non-distortionary lump-sum tax paid by the for-profits to subsidize the social enterprise.[7]

First, note that the strategic behavior of the two for-profit firms in Sector A is not affected since the transfer k is lump-sum. Equilibrium profits of each firm in Sector A are, thus, denoted by Π_A^* minus the transfer to the social enterprise. Similarly, the equilibrium surplus of customers of each firm is still equal to CS_A^*. By contrast, in Sector B, the social enterprise 0, B solves a new problem. It still aims at maximizing the surplus of its customers, $CS_{0,B}$, but subject to a different constraint. Given that firm 0, B is now allowed to set the price below cost, the break-even constraint $\Pi_{0,B} \geq 0$ is substituted with a price non-negativity constraint, $p_{0,B} \geq 0$. The equilibrium in Sector B is computed and described in online Appendix A.8.

Following the analysis in Section 3, we are interested in comparing the coverage of Sector B of the mixed economy with transfers vis-a-vis the coverage of Sector B of the market economy.

Proposition 4. *(i) When $t \leq s_B - c_B$, all individuals have access to the social service under both types of economy, market and mixed with transfers. (ii) When $t \in (s_B - c_B, \frac{3s_B - c_B}{2}]$, all individuals have access to the social service only under mixed economy with transfers. (iii) When $t > \frac{3s_B - c_B}{2}$, there is no full coverage but more individuals have access to the social service under mixed economy with transfers.*

The intuition for this result is as follows. The social enterprise sets its price equal to zero, i.e., the price non-negativity constraint is binding at equilibrium, $p_{0,B} = 0$. Doing so, it forces the for-profit rival to reduce its own price. In other words, a side-effect of allowing for transfers to the social enterprise is to make price competition even tougher.

7 Including rival firm 1, B's profits as a source of transfers to the nonprofit firm would complicate the computations without adding any additional insight.

As a result, the social service market is more likely to be fully covered under mixed economy with transfers (further details in online Appendix A.9).

We proceed by providing a welfare analysis, as in Section 4. To this aim, we compute the welfare arising in the mixed economy with transfers. The overall profits made by the firms are denoted with $(2\Pi_A^* - k) + (\Pi_{0,B}^\circ + k) + \Pi_{1,B}^\circ$. Recall that the amount k denotes the lump-sum transfer from for-profit firms i, A to the social enterprise $1, B$. Instead, the surplus of all individuals is denoted with $2CS_A^* + CS_{0,B}^\circ + CS_{1,B}^\circ + CS_{H,j}$. See online Appendix A.8 for the mathematical values of $\Pi_{0,B}^\circ$, $\Pi_{1,B}^\circ$, $CS_{0,B}^\circ$, and $CS_{1,B}^\circ$. Instead, recall that $CS_{H,j} = 0$ denotes the surplus of individuals who do not buy. Summing up, the equilibrium welfare in the mixed economy with transfers is given by $2\Pi_A^* + \Pi_{0,B}^\circ + \Pi_{1,B}^\circ + 2CS_A^* + CS_{0,B}^\circ + CS_{1,B}^\circ$.

With the aim of making a welfare comparison, we write the difference in welfare between a market economy and mixed economy with transfers,

$$\left(2\Pi_B^* + 2CS_B^*\right) - \left(\Pi_{0,B}^\circ + \Pi_{1,B}^\circ + CS_{0,B}^\circ + CS_{1,B}^\circ\right), \tag{8}$$

and, to simplify the reading of our results, we introduce the following notation:

$$t^\circ = \begin{cases} \dfrac{4s_B - c_B}{3} & \text{if} \quad c_B \in \left[0, \dfrac{3\sqrt{2}-1}{17} s_B\right], \\ \dfrac{4s_B - 2c_B - \sqrt{2s_B^2 - 4s_B c_B - 2c_B^2}}{2} & \text{if} \quad c_B \in \left(\dfrac{3\sqrt{2}-1}{17} s_B, \dfrac{s_B}{3}\right). \end{cases} \tag{9}$$

In online Appendix A.10, we prove the following

Proposition 5. *(i) When $c_B \leq \frac{s_B}{3}$, welfare is larger (lower) under market economy if and only if $t \leq (>) t^\circ$. (ii) When $\frac{s_B}{3} \leq c_B \leq s_B$, welfare is larger under market economy for any t.*

We depict t° in plane (c_B, t) with $c_B \in [0, s_B)$ to illustrate the results of Proposition 5: see Figure 5.

As in Proposition 2, the market economy enhances welfare for relatively low values of t (i.e., in the south portion of plane (c_B, t)), in which case all individuals have access to the social service under both types of economy. Again, this result emerges because total transportation costs are minimized under market economy: see online Appendix A.10 for a formal proof.

Differently from Proposition 2, for relatively large values of t, the mixed economy with transfers enhances welfare only if the unit production cost c_B is low relative to s_B (i.e., in the shaded area of Figure 5). In other words, when transfers are allowed, the area in which the mixed economy enhances the welfare reduces from $t > \frac{6(s_B - c_B)}{5}$ and $c_B < s_B$ to $t > t^\circ$ and $c_B \leq \frac{s_B}{3}$, with $t^\circ > \frac{6(s_B - c_B)}{5}$ (further details in online Appendix A.10).

Overall, an interesting trade-off arises when the social enterprise in Sector B is allowed to sell below cost. On the one hand, the coverage of the social service market is further enhanced. This happens because the social enterprise sets an even lower price than in the mixed economy without transfers. On the other hand, the parametric area,

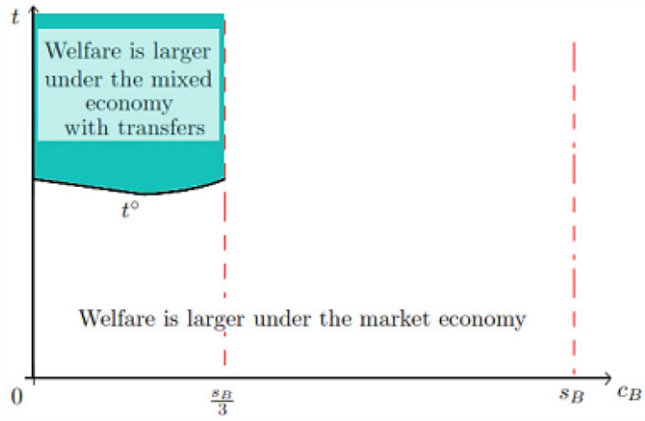

Figure 5 – Market economy versus mixed economy with transfers in terms of welfare.

where welfare is lower under market economy, shrinks. This is because the before-transfer losses incurred by the social enterprise negatively affects welfare.

7 Policy implications and conclusion

In this paper, we investigated the impact of social enterprises on the individuals' access to social services and the level of utilitarian welfare. Our analysis provides a rationale for the co-existence of different types of firms in the same market and has potentially relevant policy implications, which we detail in the following paragraphs.

In the basic setup of Sections 2, 3, and 4 , the presence of a social enterprise has been shown to impact positively on the economy as individuals are more likely to have access to the social service (Proposition 1) and the utilitarian welfare is larger when individuals face relatively high transportation costs (Proposition 2). Our results show that the presence of social enterprises is not only effective, because of the enhanced access to the social service, but also efficient. As a social policy implication, governments should take steps to introduce laws that encourage the entry of social enterprises in social services sectors where individuals and families bear large transportation costs. Similarly, the outsourcing of social services from public bodies to private social enterprises – a common feature of many European countries – should be further encouraged.

However, when transportation costs are less relevant, mixed economies are less efficient. In this case, support to social enterprises can be justified if the goal is to enable more people to access the social service, i.e., enhance the redistributive effect of social enterprises.

It is well known that ideological and intrinsic motivations play an important role when 'ethical' goods produced by socially responsible firms are available to consumers. The first extension of the framework dealt with this aspect. Interestingly, the impact of social enterprises turned out to be beneficial also when ideology drives individuals' choice between the different types of firms supplying the social service. Proposition 3 confirms

that mixed economies are both more effective and efficient than market economies when the ideological costs are relatively high, i.e., when individuals' preferences for different types of firms are particularly heterogeneous. This finding suggests that policies in support of social enterprises would help clients satisfy their ideological preferences; in particular, monitoring of social aim and ethical traits of social enterprises and accreditation of social enterprises with the aim of enhancing information to clients.

Often, governments play an active role by guaranteeing tax exemption, subsidies and public transfers to social enterprises. These measures have a redistributive effects. A possible shortcoming is that subsidies distort the market and decrease the efficiency of the economic system. The second extension of the model investigated this situation and showed the existence of a trade-off. On the one hand, the presence of subsidized social enterprises in the marketplace is even more effective and their redistributive impact is magnified (Proposition 4). On the other hand, the possible negative impact of mixed economies on efficiency is exacerbated (Proposition 5).

In the light of these predictions, when public funding shrinks due, e.g., to crises, efficiency becomes of central importance for governments and economies. Public transfers from for-profit firms to social enterprises are not desirable since they harm efficiency. Governments must find alternative solutions that encourage voluntary transfers to social enterprises rather than imposing (coercive) taxation on for-profit firms. Indeed, it has been argued that an individual's overall utility is not negatively affected in case she/he decides to donate (e.g., Rose-Ackerman 1996). In other words, the amount of a donation positively enters into the utilitarian welfare function. This means that relying on voluntary contributions to social enterprises rather than, for example, taxation on for-profit firms may increase the mixed economy effectiveness without compromising efficiency.

In conclusion, we remark that the issue of encouraging donations and citizens' involvement is extremely up-to-date: see, for example, some of the contents of the Social Business Initiative (European Commission 2011). This issue is one of the main pillars of a 'Big Society', where people participate in the creation and management of social enterprises and where an increasing 'organizational biodiversity' in the marketplace might positively affect economic efficiency.

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