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2009

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MPRA Paper No. 15041, posted 06 May 2009 00:30 UTC

SELF-INTEREST, INCENTIVES AND THE DECISION-MAKING

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ABSTRACT

Paper analyzes the impact of incentives and disincentives on the decision-making of individuals. Their role in the decision-making processes is huge, as they affect the cost-benefit analysis of investment projects of scarce resources. They both are subject of huge negative effects. A hidden trap of providing incentives is represented by costs any such activity involves, with coercive subsidies having socialized costs for the benefits of individuals. This makes them very dangerous and controversial.

Keywords: Evolutionary games, incentives and disincentives, investment decisions, Roy model.
JEL: C73, D85, G11, D61, O31.

1 Introduction

Austrian economist and philosopher, Ludwig von Mises (1949), defined an action as a purposeful behavior, or “a will put into operation and transformed into an agency, aiming at ends and goals, the ego’s meaningful response to stimuli and to the conditions of its environment, and a person’s conscious adjustment to the state of the universe that determines his life.” People act according to their rational self-interest. In order to survive, everything in nature acts according to its self-interest (Rand 1967); a lion has to hunt or to starve, a deer has to run from the hunter or be eaten, amoeba takes chemicals from other amoebas would like to have, etc. People do not use only their instinct for living as animals do, but have developed social interaction by which they gather information they need, capacity to think and the ability to reason.

When deciding which action to pursue, individuals compare their private gains and costs from pursuing one activity, while also weighing according to what is desirable, what is feasible, and what is their best response as regards the dilemma. “It is not from the benevolence of the butcher, the brewer, or the baker, that we expect our dinner, but from their regard to their own self-interest,” as Adam Smith wrote in *The Wealth of Nature*. People go to work to earn money they need for the living by which they satisfy their objectives. On the other side, a capitalist hires workers because he needs them to satisfy his objectives to become rich. It is a spontaneously well-regulated principle of the matching the two rational self-interests, managed by invisible hands of the two.

In such spontaneously regulated system, incentives and disincentives represent an essence of people's decision-making. Incentives and disincentives alter the feasibility constraint in the above tradeoff and step into the principle of spontaneous order of self-interests. Incentives could be defined as any action, tangible or intangible, that provides motive for a particular course of action, and disincentive as any such action that lessens the motive for a particular course of action. Incentives have positive motivational influence on the people, while disincentives a negative one. As such, incentives induce reallocation of activities towards those that are subject of an incentive and away from those that are not, or are subject of a disincentive (see Holmstrom and Milgrom 1991, and Baker 1992).

A lot of research has been done on the role of incentives in firms (Jensen and Murphy 1990, Prendergast 1999). The answer how incentives and disincentives induce moral hazard and affect the decision-making of the people is not universal as people differ in their preferences, knowledge, attitudes, and other individual-specific characteristics. An important characteristic of them both is that they might arise from individuals, or from the outside. Secondly, incentives and disincentives might be market-based or coercive. Examples of coercive incentives and disincentives that do not arise upon the voluntarily relationship of individuals are provisions made by politicians. Such coercive disincentives are most commonly done through taxes and other provisions that harm personal and economic freedoms of individuals, while subsidies represent a common way of providing incentives to individuals.

The role of government expenditures on decision-making of people has been investigated by Brock and Turnovsky (1981). Devereux and Griffith (1998) show that corporate taxes affect the decision-making of multinational firms where to invest, and Judd (1985, 1999), Jones et al. (1993), King and Rebelo (1990) and others proved the negative impact of taxes on the production process.

In the paper, I do not argue about the appropriate or even optimal course of action of individuals, neither what it should be, because both are far beyond the possible. Namely, the behavior of heterogeneous individuals in pursuing their self-interest cannot have an optimal upside-down solution (see Hayek 1945). Instead, the analysis is focused on the effects incentives and disincentives might induce on a decision-making in an environment of interacting individuals. The rest of the paper is organized as follows. Section 2 provides the game of disincentives through taxes, and Section 3 provides a game of incentives when subsidizing the production of corn. All games are iterated forward. Section 4 gives some concluding remarks.

2 Income taxes and the choice of the residency

The power to tax is the most familiar manifestation of the coercion of governments against individuals, and one of the most familiar manifestations of providing disincentives to people,

forcing them to find alternative solutions. Roy's model deals with such questions which kinds of persons find it more worthwhile to migrate (Roy 1951; Heckman and Honore 1990; Borjas 1999). The model was developed to explain occupational choice when individuals differ in their endowments of occupational-specific skills, but the intuition is easily transferable to explain the selection of residency when individuals face different tax rates, which affect their wealth. Taxation as such has two kinds of intertwined drawbacks, one affecting the other. One is moral within the principles of individual and economic freedom, and the other is within the context of efficient allocation of scarce resources. Since skilled and productive individuals represent a major determinant of long-run growth (Lucas 1988, Romer 1990), such migration of high-skilled individuals is detrimental for the economy for the country of emigration.

We make a simple taxation game. Consider a group of $n = 1.000$ individuals. Part of them, denoted P , are high productive individuals and the rest, $L = (1 - P)$ less productive. We have two neighboring countries, A and B in a Tiebout environment of open border world with free movements of capital and the people between them. Individuals are connected in the social network (Watts and Strogatz 1998). Assume that individuals are endowed with H units of human capital, which is subject to taxation, where T represent a tax-rate. Taxes lessen the value of human capital of an individual to $H_N = (1 - T) \cdot H$. It is assumed that individuals are concerned only in the value of the after-tax human capital. The level of productivity of individuals is exogenous in the model and constant. This means that less productive individuals cannot improve their productivity and high productive individuals cannot lose it. They can adapt to the changing taxation in one country by changing the residency. We assume that changing a residency is not subject to any additional costs and that individuals in other country get suitable employment as was in the country he left. We also assume that tax policies are the only ways by which countries can enter into the process of individuals' decision-making.

Assume that country A is a flat-tax rate jurisdiction of $T_F = 25$ percent, while country B has two tax rates. T_p is levied on high-productive individuals and T_L is levied on low-productive individuals. We assume that $T_L = 20$ percent throughout the game, while $T_p = 25$ percent in the beginning is the same as in country A . In simulations, we analyze how increased tax levels on productive individuals in a country B subordinated to the changing levels of human capital of high productive individuals change the decision-making of individuals. This is done by a step of $\tau = 5$ percent (denoted *tau* in Figures 1) where $T_p = T_p + \tau$ on the sample space $25.0 \leq T_p \leq 75.0$ percent. The games begin with a random distribution of individuals of both productivities in both countries, thus $P = L = 0.5$.

In the beginning, values of human capital of both groups of individuals are the same, $H_p = H_L = 10$ units. To analyze how high-productive individuals react to the changing level

of their human capital subordinated to the height of the tax rate, we use a step of $p = 1.0$ units on the value of their human capital on the sample space $10.0 \leq H_p \leq 20.0$ with $H_p = H_p + p$. The value of human capital of low productive individuals is the same throughout the games and equals $H_L = 10$ units. Individuals accumulate the value of their after-tax human capital in time, $W_{t+1} = W_t + (\bullet)$ where W_{t+1} and W_t represent the value of the accumulated human capital of individuals in time intervals $t + 1$ and t , while (\bullet) represents the value of after-tax human capital that an individual receives through one of the following decisions. We assume that $W_0 = 0$.

	<i>P</i>	<i>L</i>
<i>A</i>	$(1 - T_F) \cdot H_P$	$(1 - T_F) \cdot H_L$
<i>B</i>	$(1 - T_P) \cdot H_P$	$(1 - T_L) \cdot H_L$

FIGURE 1a: Productive individuals in country A

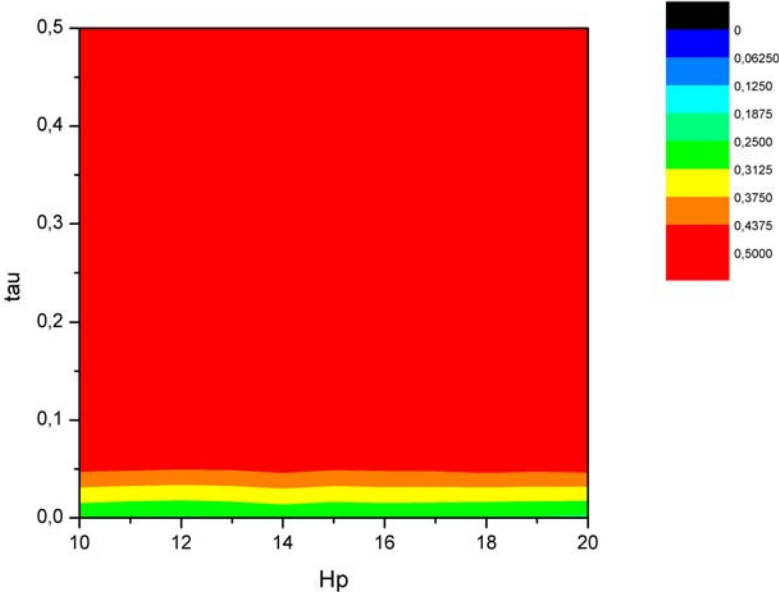


FIGURE 1b: Productive individuals in country *B*

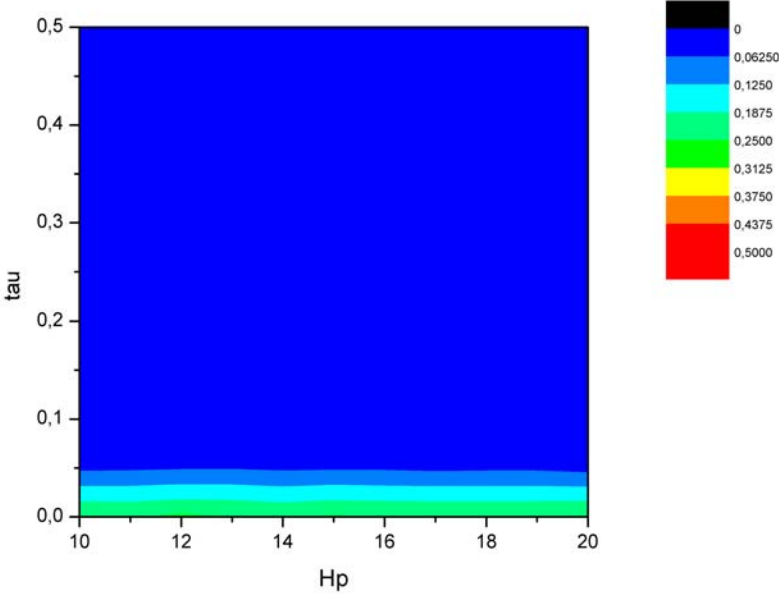


FIGURE 1c: Non-productive individuals in country *A*

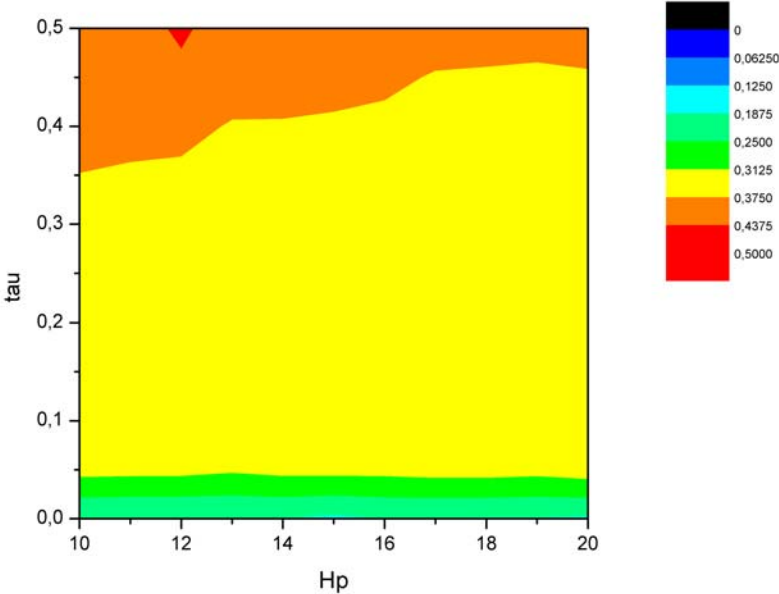
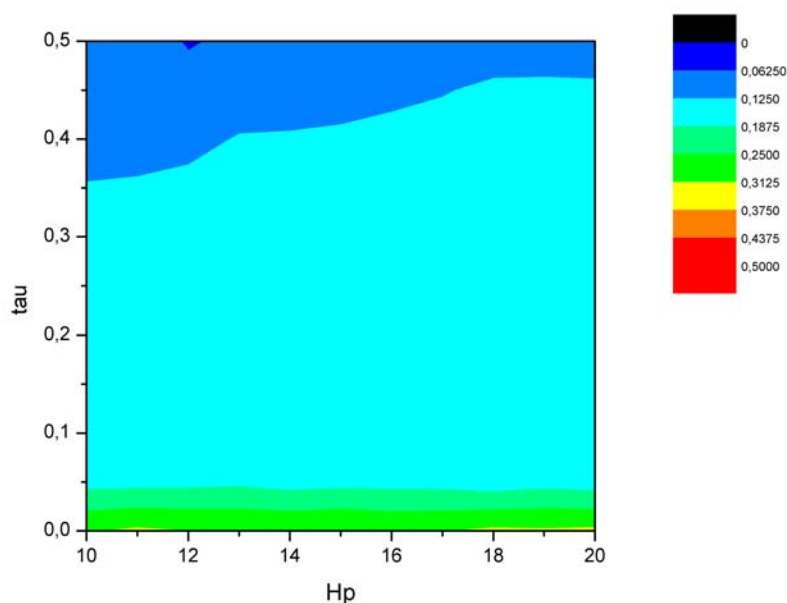


FIGURE 1d: Non-productive individuals in country *B*



Simulations of the tax-rate games demonstrate that high productive individuals from a high tax-rate country *B* settle in a low-tax rate country *A* (Figure 1a) as the level of taxation in country *B* is raising. Figures 1c and 1d reveal that under the modeled circumstances the outflow of productive individuals attracts also low-productive individuals to move to country *A*, despite they are levied at a slightly higher tax-rate of 5 percentage points. Thus, disincentives through taxes on high-productive individuals produce huge allocation effects as assumed by the Roy's model.

3 Subsidies in the decision-making: corn or soybean?

We now turn to provisions that are considered as incentives to individuals and first give a short note on investments.

Every investment is the act of incurring immediate or delayed costs in the expectation of a reward in the future. To consider investments as options means that individuals not only consider outcomes of an investment but also prospects of modifying investments in the future with the arrival of new information (Dixit and Pindyck 1994). Irreversibility, the ability to delay an investment and the option to invest are some common characteristics of investments, for which they are as options to individuals. As long as it is expected that one investment alternative outperforms another, it is expected that individuals grasp it.

In such market-based mechanism, subsidizing alternative investments presents a good enough incentive for individuals to switch from their current and more efficient activities to the subsidized and less efficient one. Granting subsidies to individuals has at least following huge negative consequences. Subsidies follow a *no-free-lunch* principle, meaning that a subsidy cannot be smaller than taxes are. Because a subsidy represents a costless-money for the recipient, granting them stimulates rent-seeking making such activities superior to production activities (Tullock 1967, Becker 1983, Murphy et al. 1993). Administrative expenditures that come up with subsidizing and misspending induce that the amount of subsidies is always much smaller than the amount of collected taxes. Important questions when granting subsidies are at least the following: which sectors or individuals will be subject to a subsidy and who will choose them; what will be the period of subsidizing the activities or individuals; and what are the foundations to grant subsidies to individuals for inefficient use of resources if such activities are not market prospective. As subsidies are an act of incentives for individuals, they have huge allocation effects of scarce resources, moving them from efficient into an inefficient use. However, because individuals pursue the most efficient use of their resources when valuing investment opportunities, they require the subsidy of at least the height of the loss if resources are not employed in their most efficient use. The danger of subsidizing activities might also lead to overinvestment or overspending in a subsidized activity, having a whole set of additional negative effects, i.e. bubble in a secondary-mortgage market due to the CRA.

We make a simple simulation test to analyze the role of subsidies in the decision-making of individuals when they decide which crop to produce: soybean or subsidized corn. Consider again a group of $n = 1.000$ individuals-farmers connected in a social network. Farmers decide whether to use the soil for a production of corn or soybean, or share the soil with the $0 \leq Cp \leq 1$ part for production of a soybean and $(1 - Cp)$ part for a production of corn. By sharing the soil on two parts, farmers make a portfolio from the two. We assume that there are no additional costs when farmers move from one activity to the other. Each alternative is subject to costs and income. The income from the production of soybean is denoted I and costs in the production of soybean C , while income in production of corn is denoted Io and costs Co . A subsidy to the production of corn is denoted S . Farmers accumulate their income in time, $W_{t+1} = W_t + (\bullet)$ where W_{t+1} and W_t represent wealth of individuals in time intervals $t + 1$ and t , while (\bullet) represents an income that an individual receives through one of the following decisions. We assume that $W_0 = 0$. A one-time matrix of payoffs is represented as follows.

	<i>Farmer</i>
<i>Soybean</i>	$I - C$
<i>Portfolio</i>	$(I - C) \cdot Cp + (1 - Cp) \cdot (Io - Co + S)$
<i>Corn</i>	$Io - Co + S$

When choosing which alternative to take, farmers consider the profit from the investment. Data for the two crops are taken from the USDA database and refer to the year 2007 for the United States. In 2007, the value added for corn, denoted I_o , was on average 467.61 USD per acre at the total production costs per acre, denoted Co , 443.97 USD. On the other side, production of soybean reached a value added per acre, denoted I , of 357.99 USD, at the average costs per acre, denoted C , 301.21 USD. Despite both alternatives were profitable in 2007, it is straightforward that production of soybean was a better alternative for farmers, exceeding the return of corn for 33.14 USD per acre, ceteris paribus. Because corn is a worse decision for farmers, subsidizing it is an incentive for them to start producing it. As production of corn is less efficient than the production of soybean, a subsidy brings about huge allocation effects of the use of the soil, moving it into from efficient use into less efficient use.

FIGURE 2a: Farmers' decision-making under subsidizing corn – soybean

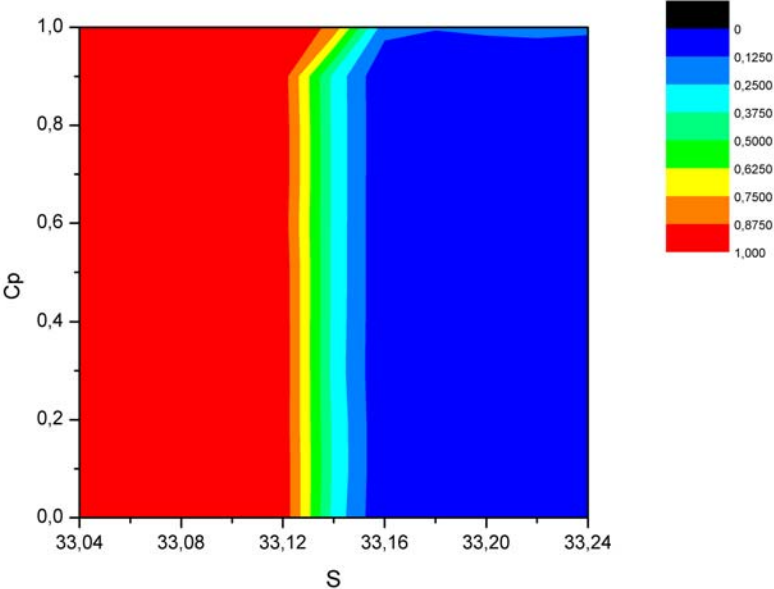


FIGURE 2b: Farmers' decision-making under subsidizing corn – portfolio

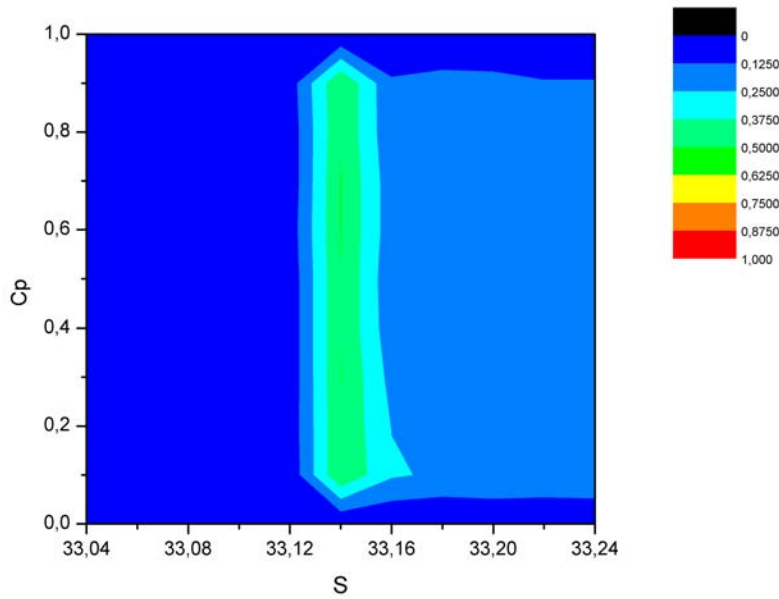
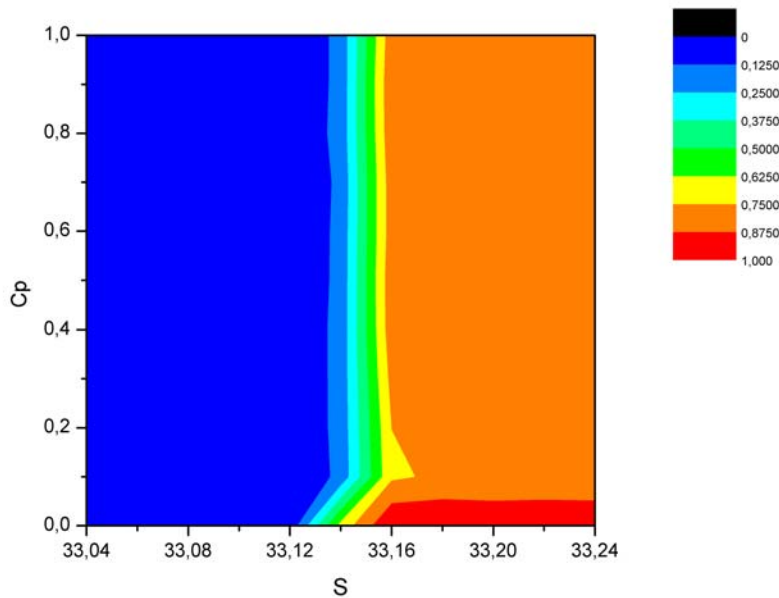


FIGURE 2c: Farmers' decision-making under subsidizing corn – corn



Figures 2 reveal that subsidies affect the value of investments and thus have a significant impact on the decision which investment to pursue. There is no gain from the subsidy as long as its amount does not come close to the difference in the efficiency of the two uses of resources, a subsidized use and the market-based use of the soil. Around the value of bifurcation, farmers far more often opt for a portfolio of the two uses of the soil. Some of the

farmers still opt for a portfolio although the subsidy makes the corn production more profitable decision than production of a soybean, while there is no pure soybean production anymore, despite it is market-based most efficient.

This depicts the negative effects of such subsidies that the efficient market decisions are succumbed to the inefficient political decisions. Because of overproduction of subsidized activities that is likely to happen, this might pushing down the prices of subsidized activities thus making the subsidized investment even more inefficient. There are two another negative features when subsidizing an inefficient activity. As a recipient of a subsidy does not know whether he will get a subsidy in the future, he could lose the ability to adapt to the efficient use of scarce resources once a subsidy is gone. Subsidizing an activity is a subject of additional costs of switching from the subsidized to the most efficient use of resources once subsidies are over and formerly subsidized activity still inefficient.

4 Concluding remarks

Paper deals with the decision-making of individuals under incentives and disincentives. Simulations demonstrate that under Tiebout environment changing the residency is their response to increasing taxation. An implication of such response is the so-called brain-drain effect with its very negative effect to the efficiency and the prospects of such heavy-taxed economy. However, under the modeled circumstances, such emigration of most productive individuals also attracts less productive individuals to imitate them leading to exodus from heavy-taxed country on productive individuals.

An example of subsidies demonstrated that they are a powerful incentive for recipients with a huge reallocation effect. Such coercive incentives are not costless, and must be of the size of inefficiency of the alternative use of resources. As a result, resources are used in an inefficient way, and they are paid for this difference.

Subsidies are subject to one another negative characteristic that is due the irreversibility of investment decisions. Once individuals opt for a subsidized and less-efficient activity, they face additional costs to switch to the most efficient activity once a subsidy is over and the formerly subsidized alternative still inefficient. Both, incentives and disincentives, might affect to the state of inaction, when individuals wait to see the development of the circumstances that are likely to affect the decision-making.

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